



Do Government Social Assistance Programs Protect the Health of Society's Most Income-Insecure?

An Examination of Ontario and Comparable Jurisdictions in Canada, the United States, and the United Kingdom

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About this Report

Converge3 commissioned Dr. Arjumand Siddiqi and team to conduct a review of the impact of government social assistance programs on health. To inform policy in Ontario, their work examines and compares Ontario to other jurisdiction in Canada, the United States and the United Kingdom. Converge3 receives funding from the Province of Ontario. The views expressed in this report are those of the authors and do not necessarily reflect those of Converge3 or the Province of Ontario.

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About Converge3

Converge3 is a policy research centre based in the Institute of Health Policy, Management and Evaluation at the University of Toronto, that focuses on integrating health, economic and equity evidence to inform policy. The Centre is funded by the Province of Ontario and includes multiple partner organizations, including Li Ka Shing Knowledge Institute at St. Michael's Hospital, McMaster University, Ottawa Hospital Research Institute, ICES, Health Quality Ontario, Public Health Ontario, and the Ministry of Health and Long-Term Care.

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LIST OF ACRONYMS

AFDC	Aid to Families with Dependent Children
ATT	Average Treatment Effect on the Treated
BC	British Columbia
BHPS	British Household Panel Survey
BMI	Body Mass Index
CCHS	Canadian Community and Health Survey
CJFP	Connecticut Jobs First Program
COPD	Chronic Obstructive Pulmonary Disease
EI	Employment Insurance
EITC	Earned Income Tax Credit
FFTP	Florida Family Transition Program
FTC	Family Tax Credit
HSE	Health Survey for England
IS	Income Support
IWTC	In-Work Tax Credit
JSA	Jobseeker's Allowance
LFS	Labour Force Survey
NHIS	National Health Interview Survey
ON	Ontario
OR	Odds Ratio
OW	Ontario Works
QC	Quebec
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PRWORA	Personal Responsibility Work Opportunity and Reconciliation Act
PSM	Propensity Score Matching
PSRH	Poor Self-Rated Health
PSU	Primary Sampling Unit
RDC	Statistics Canada Toronto Research Data Centre
SA	Social Assistance
SE	Standard Error
SIPP	Survey of Income and Program Participation
SLID	Survey of Labour and Income Dynamics
SSI	Supplemental Security Income
TANF	Temporary Assistance for Needy Families
The Commission	World Health Organization Commission on Social Determinants of Health
US	United States
USSR	Union of Soviet Socialist Republics

EXECUTIVE SUMMARY

Health inequalities are widening in Canada and in comparable nations. The consequences of health inequalities are diverse and serious. In addition to being unfair, health inequalities increase health care costs, compromise worker productivity, and damage the social fabric of our society. Since income and other socioeconomic resources — in absolute terms and relative to others — are the fundamental causes of poor health, public health theory suggests that the observed widening of income and other socioeconomic inequalities in these societies is the primary reason for widening health inequalities. Social policies to reduce socioeconomic inequalities are thus thought to be the most promising intervention strategies for resolving health inequalities. But the extant empirical evidence on the effects of social policies on health is scant.

At this juncture, policymakers are faced with a critical question that has yet to be answered: what is the extent to which the current social policy landscape is contributing to (or detracting from) observed health inequalities. In particular, there is growing interest in the role of social assistance programs, which supplement the incomes of the most socioeconomically vulnerable members of society during hard times. In this context, our study sought to assess the impact of current social assistance policies on the health of the socioeconomically vulnerable in Ontario, Canada-wide, and in comparable societies, exemplified by the United States and the United Kingdom. We did so through: review of the existing literature, and two sets of analyses of the most comprehensive, nationally representative survey data available in these societies: one that assessed the health of social assistance recipients to comparable non-recipients, and one that examined how health changes as individuals move in and out of social assistance reciprocity.

Our results suggest social assistance programs are not increasing the health of social assistance recipients. There are several possibilities for our findings. They may reflect the inadequacy of benefits, the strictness of eligibility criteria, or the damaging potential of benefit conditionalities. They may be indicative of stigmatization associated with the receipt of means-tested benefits. They may also reflect the fact that some benefits (*e.g.* prescription drug coverage, dental care) are not available to the poor without social assistance, and thus sicker people are selecting into social assistance. Though we carefully controlled for many of the most notable alternative explanations, other unaccounted ‘confounding’ or ‘selection effects’ may also contribute to explaining our results.

The results of our study, in the context of the broader literature, suggest a need for further research on alternative models of social assistance that: (a) increase the generosity and population coverage of benefits, (b) provide universal ancillary benefits and, (c) occur in a context of reduced broader socioeconomic inequality in society. While researchers cannot usually influence the implementation of programs with these characteristics, there are two feasible next-steps that will make significant contributions to the evidence base. The first is an effort to link, and make readily accessible, the administrative data on social assistance recipients and, importantly, also on non-recipients, in order to more fully account for variables that cannot be fully accounted for with currently available survey data. The second is to use the implementation of new programs, or reforms to programs, as an opportunity to conduct an experiment, or quasi-experiment. As such, the Ontario Basic Income Pilot Project thus provides a unique window of opportunity to test an alternative model of social assistance in the context of an experimental study design.

1. INTRODUCTION

1.1 A Public Health Crisis

A recent study conducted by Toronto Public Health indicates that, despite ten years of efforts to reduce ‘health inequalities’ – avoidable and unjust differences in health status across socioeconomic groups - poorer Torontonians are even sicker than richer Torontonians than they were a decade before [1,2]. Toronto is not alone in this regard. The widening of health inequalities appears to be a Canada-wide phenomenon, and has also been detected in comparable countries such as the United States [3–6]. The consequences of health inequalities are diverse and serious [7–9]. Higher health care costs are induced by sicker people requiring greater health services utilization [10]. Human capital formation and worker productivity can be compromised when sicker people are unable to meet their full potential [11]. Notions of citizenship and social cohesion, crucial to the functioning of democratic societies, can be eroded by the injustice of one’s health and wellness being so tightly tethered to one’s socioeconomic position [12].

Attention in public health to health inequalities goes back quite far. In the mid 2000s, the World Health Organization Commission on Social Determinants of Health (The Commission) shed public light on what for a long time had been a settled scientific finding: our health is fundamentally a product of our income, along with other aspects of socioeconomic position. This is because socioeconomic position shapes and constrains nearly all opportunities for health, through its influence on stress, health-related behaviours, access to services, and other aspects of everyday living conditions. The Commission suggested that, to reduce health inequalities, social policies that support the income and other socioeconomic resources of the most disadvantaged, both in absolute terms and relative to the most advantaged members of society, are the most promising of intervention strategies.

However, beyond these generalities, little is known about the specific policies that are most likely to yield positive health outcomes and reduce health inequalities. As a starting point, very little is known about the extent to which contemporary social assistance policies are succeeding in these goals. Moreover, the findings of widening health inequalities raise serious doubts that current social assistance policies are adequately addressing the health of the most income insecure. These findings are making imperative the need to assess the current policy landscape and its health effects. The purpose of this study is to respond to this imperative.

1.2 Theoretical Foundations Informing the Study

Decades of epidemiological research have demonstrated that income, employment status, race/ethnicity, and other aspects of socioeconomic position (often referred to as ‘social determinants of health’) are the ‘fundamental causes’ of virtually every health outcome [7,13]. This is because the social determinants of health predict the everyday living conditions – experiences of stress, diet, physical activity, exposure to environmental toxins – which are the mechanisms that make us sick or keep us healthy [14]. Across the income spectrum, being poorer leads to worse living conditions, and consequently to worse health. These findings are so consistent and powerful that they have now been codified as a theoretical basis for understanding the causes of health, which has been adopted by the World Health Organization [15].

One of the most remarkable aspects of this theory – itself based on decades of findings - is that it predicts the public health interventions which are routinely implemented to promote health equity - like education programs that aim to produce changes in individuals’ dietary practices – will be insufficient for reducing health inequalities. This is because: (a) the social determinants of health affect many different mechanisms, such that, even when we address one of the mechanisms, health inequalities will nevertheless reassert themselves through the others (for example, even if diet is addressed, stress differentials between income groups may still lead to differences in hypertension), and (b) without addressing socioeconomic position, future individuals in the same socioeconomic position will experience the same outcomes, thus the tide is never stemmed when we focus only on the mechanisms, rather than on the fundamental causes [13].

Therefore, public health theory would predict that the efforts of public health agencies, which mainly focus on intervening mechanisms, in the absence of addressing factors such as income and employment conditions, are insufficient for reducing health inequalities [16]. How, in retrospect, would public health theory explain that health inequalities not only didn’t improve, but worsened over time? The theory would suggest widening health inequalities are likely the consequence of widening socioeconomic inequalities. In what follows, we present evidence that has examined the state of socioeconomic inequalities.

1.3 Empirical Insights Informing the Study

Over the last several decades, we have seen fast-paced growth in many aspects of socioeconomic inequality. Take the case of income, among the most critical of socioeconomic resources. While incomes at the top end of the distribution have been rising, at the bottom-end, incomes have been stagnating, and have even declined in real terms [17,18]. This is thought to be the consequence of many factors, including increases in the prevalence of precarious forms of employment that offer little security and few benefits, and reforms to social assistance programs that have created more stringent eligibility criteria and reduced the level of benefits available for recipients. In broad terms, these trends have been attributed to a shifts towards ‘neoliberalism,’ which is defined as an ideology, economic philosophy, and policy orientation that is centered around individuals and families being responsible for their own welfare, and thus privileges conditions that move away from entitlement to economic security and decent living by virtue of residency, or even citizenship [19]. The result is that those with resources have access to opportunities for well-being, while those that don’t are left in very undesirable situations.

Under this broad umbrella of societal conditions that worsen the circumstances of the most disadvantaged members of society, several discrete strands of research provide an empirical link between neoliberal phenomena and health outcomes [20,21]. A large body of research on precarious employment among the countries of the Organization for Economic Co-operation and Development, to which Canada belongs, demonstrates that such jobs can be even more damaging for health status than unemployment [22–24]. Data uniquely available in the United States to measure change over time suggests that the health of low-income mothers, whom in the United States are the most likely to be social-assistance recipients, declined over the period during which ‘welfare reforms’ were introduced to reduce eligibility and payments [25,26]. In Europe, a

growing body of research is demonstrating that austerity measures introduced by governments in response to economic recessions, are leading to declines in health status [27].

Such findings suggest that low-income members of society are caught in a contemporary poverty trap between a perilous labor market and a disappearing social safety net. Historical examples corroborate the notion that expanding government support buffers the impact of socioeconomic disadvantage. During the fall of communism in the former USSR, Finland, one of its largest trading partners, also experienced economic turmoil. However, instead of turning austere, it began a campaign of investing heavily in providing economic security to its citizens, in the hopes that it would reap the population health and human capital rewards, which it did [28]. During the early 1980s, despite lower levels of economic growth and higher levels of unemployment, Canada began to establish a population health advantage over the United States, which has been attributed to lower levels of income inequality and higher levels of social spending in Canada [21].

1.4 Contributions of the Study

Given the clear implications for social assistance policies in supporting the health of the poor, and the pressing need now, more than ever, to understand why the health of the poor is lagging further and further behind that of the rich, this study investigates the extent to which current social assistance policies have been successful at improving the health of the most income-insecure in Ontario, Canada-wide, and in two comparable societies (the United States and the United Kingdom).

We begin with a systematic review of the literature. In order to provide a broad perspective on the role of income support policies, our literature review encompasses a range of policies that supplement incomes during times of income or employment challenges. We then conduct the most comprehensive and rigorous known evaluation of the impact of social assistance policies on the health of low-income individuals within these jurisdictions. Our evaluation study focuses on policies that are specifically intended to supplement incomes of the most income-insecure members of society.

In Ontario, we focus on Ontario Works (OW), a means-tested social assistance program that provides income and employment assistance to individuals whose households lack sufficient financial resources to meet a basic standard of living, as defined by the Ontario government. Those in receipt of OW are also eligible for some additional health and social services, including prescription drug coverage and basic dental care. Most recipients are expected to demonstrate reasonable effort at seeking and accepting employment or they risk losing their benefits. Some groups, such as lone parents with children not yet of school age, are exempt from this rule. Elsewhere in Canada, we focus on equivalent provincial social assistance programs whose key structures and provisions are nearly identical to OW. Examples include Alberta Works (Alberta) and Income Assistance (British Columbia).

In the United States, we focus on the Temporary Assistance for Needy Families (TANF) program. Like provincial social assistance programs in Canada, TANF is a means-tested social assistance benefit available to individuals who demonstrate financial need and a willingness to

work. Unlike its Canadian counterparts, TANF is only available to low-income households with children below the age of 18 (or 19 if they are a full-time student). TANF was implemented through the 1996 Personal Responsibility Work Opportunity and Reconciliation Act (PRWORA), which significantly altered American social welfare policy. Most notably, PRWORA tightened eligibility criteria for receiving social assistance, decreased the level of assistance provided, and attached work conditionalities to the receipt of assistance. More concretely, these reforms ended federal guaranteed income support to poor families with children.

In the United Kingdom, we focus on two separate benefit programs: Income Support (IS) and Jobseeker's Allowance (JSA). IS is a means-tested social assistance benefit available to low-income individuals who work fewer than 16 hours a week and are either lone parents with a child below the age of 5 or caring after someone who is ill or disabled. Most IS recipients are employed and experiencing in-work poverty. By contrast, JSA is an unemployment benefit program available only to those who are jobless and actively seeking work. There are two types of JSA. Contributions-based JSA is an unemployment insurance program available to those who have made sufficient tax contributions to the National Insurance system. Unlike Canadian social assistance programs, contributions-based JSA is not means-tested and does not require proof of financial need and a willingness to work. Income-based JSA is a means-tested unemployment assistance benefit available to those who do not have sufficient contributions and thus do not qualify for contributions-based JSA. Whereas IS serves as the functional equivalent of Canada's provincial social assistance programs among low-income individuals who are employed, income-based JSA serves as the functional equivalent among low-income individuals who are unemployed.

Based on the findings of our systematic review and primary study, we conclude with a discussion and a set of policy recommendations.

2. SYSTEMATIC REVIEW

2.1 Introduction

The field of public health has arrived at a broad consensus: social policies that shape the extent to which socioeconomic advantage and disadvantage occur in society offer the most effective, if politically contentious, strategy for reducing health inequalities [14,15,29,30]. Although rhetorical support for the role of social policies is pervasive, empirical evidence on their health impact is still quite limited [31,32]. In fact, within the now extensive literature on the social and economic determinants of health, relatively few studies have examined whether, and to what extent, social policy arrangements are successful at protecting the health of socioeconomically disadvantaged populations. Rigorous evidence has been particularly scant, with most studies in the field relying on a highly descriptive set of methods. Given the widespread theoretical concern for the role of social policies as determinants of health inequalities, the aim of this chapter is to conduct a systematic review of peer-reviewed studies that have empirically examined the health impact of social policies that aim to address socioeconomic disadvantage, to ascertain their findings and to comment on the empirical rigor of the extant literature. We focus on income support programs, which provide direct financial assistance, rather than programs that provide in-kind forms of resources (*e.g.* housing assistance and food stamps). Income typifies the characteristics that make socioeconomic resources so valuable and it is fundamental for purchasing other resources, such as housing. It is flexible, and can be used to purchase a variety of goods and services as needed. It has been shown to be associated with virtually every health outcome in every society in which the relationship has been measured [33].

2.2 Methods

Population of Interest

Our population of interest consisted of working-age adults 18-65 years of age. We restricted our search to advanced capitalist countries that have an established welfare infrastructure (*e.g.* Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States). In other words, we restricted to nations whose economic and political conditions clearly provide the independence and capacity to distribute and redistribute socioeconomic resources, such as income.

Exposure of Interest

The exposure of interest was participation in an income support program. For the purpose of our review, we defined income support programs as government interventions that are designed to provide direct financial assistance to individuals and families with the aim of offsetting the consequences of adverse socioeconomic experiences such as poverty and unemployment. The following programs met our definition: (i) social assistance; (ii) unemployment benefits; (iii) tax credits; and (iv) guaranteed annual income. We excluded studies that examined the impact of in-kind benefits (*e.g.* housing assistance and food stamps).

Outcome of Interest

We reviewed quantitative studies that examined the impact of income support programs on at least one health outcome, major risk factor for disease (*e.g.* hypertension and obesity), or health-related behaviour (*e.g.* smoking, drinking, and nutritional habits). We excluded studies that examined health care outcomes (*e.g.* health insurance coverage, hospital separations, and physician visits), which require a separate theoretical orientation and methodological approaches.

Search Strategy

We conducted a systematic search of the literature in accordance with the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). The search protocol was registered with PROSPERO (CRD42016048078). We consulted a librarian trained in systematic reviews for the social and health sciences to develop relevant search terms. The list of search terms is listed in Table 2.1. We searched the following electronic databases from inception until December 31, 2016: Embase, MEDLINE, PROQUEST, Scopus, and Web of Science. We supplemented the electronic search by handsearching the reference lists of all included literature and related review articles. We restricted our search to English-language publications in peer-reviewed journals. Grey literature, working papers, and peer-reviewed commentaries lacking empirical tests were excluded. Two authors conducted separate searches. Disagreements were resolved as a team through discussion and consensus.

The initial search yielded 2058 unique abstracts. Abstracts were screened using Covidence, an online systematic review platform. Eligibility for full-text review was determined on the basis of four inclusion criteria: (i) reference to an income support program; (ii) reference to a health outcome, major risk factor for disease, or health-related behaviour; (iii) reference to an appropriate study population; and (iv) reference to an empirical method of testing the impact of program participation. Abstracts were marked as “Yes” if they satisfied all four inclusion criteria; “Maybe” if they satisfied two or three of the criteria; and “No” if they satisfied fewer than two of the criteria. Abstracts marked as “Yes” or “Maybe” were subject to full-text review.

Data Extraction, Analytic Strategy, and Quality Assessment

A standardized form was used to extract relevant data from each study. We extracted the following information: title, authors, year of publication, country, data source, sample size, study population, main research question, study design, analytic technique, policy exposure, health outcome, and main findings. Two authors extracted the data independently. The results of the data extraction were shared and discussed with the entire research team. Disagreements were resolved as a team through discussion and consensus. Two authors used the extracted data to summarize the key features of the selected literature and synthesize the available evidence across studies. Previous research suggests that different income support programs vary in their redistributive effects [34]. Accordingly, the synthesis of evidence was stratified according to the relevant policy exposure. The research team attempted to identify and describe empirical patterns (or lack thereof) based on the summary of the literature and synthesis of the evidence.

In addition, the studies were subject to quality assessment using questions drawn from a modified version of the Newcastle-Ottawa Scale for appraising the quality of observational studies [35]. The following criteria were used to assess the methodological quality of individual studies:

- Does the study draw on a representative and randomized sample of observations?
- Does the study use a direct measure of policy exposure?
- Does the study describe the characteristics of both the exposed and unexposed groups?
- Does the study control for observed confounders?
- Does the study attempt to control for unobserved confounders?
- Does the study test the robustness of reported statistical estimates?

Studies received one point for each item in the scale. Scores of 1-2 were defined as low quality. Scores of 3-4 were defined as medium quality. Scores of 5-6 were defined as high quality.

2.3 Results

Literature Search

Figure 2.1 summarizes the results of the search strategy, including the number of studies initially identified, the process through which studies were excluded, and the final number of studies included in the review. Of the 2058 unique abstracts initially identified, eighty studies were selected for full-text review. Upon further examination, twenty-four of these studies were found to meet our inclusion criteria. An additional three studies were identified through supplementary handsearching. Only a single study examining the impact of guaranteed minimum income met our inclusion criteria [36]. The decision was therefore made to drop this policy exposure from the review. In total, twenty-six studies were included in our study. Tables 2.2 through 2.4 provide an overview of these studies, stratified by policy exposure. Table 2.5 lists their primary characteristics, which we describe in further detail below.

Data Sources and Sample Characteristics

A large majority of the studies involved secondary analyses of nationally-representative survey data [25,26,37–57]. Among the minority that were not, two relied on population-based administrative data and one drew from a smaller community cohort study [58–60]. Twelve of the studies included the general working-age population in their main analyses [37,40–48,58,59]. Four studies restricted their analyses to working-age parents, all of them investigating the impact of tax credits in New Zealand [53–56]. Ten studies restricted their analyses to socioeconomically disadvantaged women within the working-age population [25,26,38,39,49–52,57,60]. With the exception of two cross-national comparative case studies [45,47], all of the studies examined the impact of program participation within a single country. Taken as a whole, the studies showed high levels of geographic concentration, with a majority of them being based in the United States (N=14). Eight of the remaining studies were based in other Anglo-Saxon countries which, like the United States, are characterized by weakly redistributive social policies: Australia (N=2), Canada (N=1), New Zealand (N=4), and the United Kingdom (N=1). Two other single-country studies examined data from Norway and Sweden, respectively. Of the two cross-national studies,

one compared data from Germany, the United Kingdom, and the United States and the second compared data from Ireland, Sweden, and the United Kingdom.

Policy Exposures

Ten studies investigated the impact of social assistance. Six of them aimed to compare the health of social assistance recipients to that of the general population in Canada, Norway, Sweden, and the United States [37–41,60]. The other four looked at the effects of changes to social assistance programs in the United States [25,26,58,59]. The changes included the 1996 Personal Responsibility Work Opportunity and Reconciliation Act (PRWORA), the 1994 Florida Family Transition Program (FFTP), and the 1996 Connecticut Jobs First Program (CJFP). All three reforms ended federal guaranteed income support to poor families with children. In addition, they imposed a lifetime limit on the receipt of public assistance and introduced new work-related eligibility requirements. The PRWORA also made assistance conditional on specific maternal behaviors, including reproductive and marital decisions, and added more stringent eligibility criteria for immigrants.

Seven studies examined the impact of unemployment benefits. Five of them assessed whether the unemployment benefits can mitigate the adverse consequences of unemployment on health [42,45–48]. These five studies also investigated whether social assistance is as effective as unemployment benefits in mitigating those adverse consequences. They therefore compared the relative strength of social assistance and unemployment benefits as protective buffers against the experience of unemployment. The last two studies examining the impact of unemployment benefits compared the health of unemployment assistance recipients to that of the general population in Australia [43,44].

Nine studies investigated the impact of tax credits. Five of them aimed to estimate the effect of the Earned Income Tax Credit (EITC) in the United States and the In-Work Tax Credit (IWTC) and Family Tax Credit (FTC) in New Zealand [53–57]. The other four focused on EITC expansions during the 1990s, which resulted in substantial increases in the maximum credits available to households with two or more children [49–52].

Outcomes

Most studies provided evidence on more than one relevant outcome. Half of the studies examined the impact of program participation on one or more dimensions of psychological health, including depression, psychological distress, and common mental disorders [37–46,48,50,60]. Eight studies focused on self-rated general health [25,41,47,52–55,60]. Seven studies explored health-related behaviours, such as smoking, drinking, and nutritional habits [26,37,38,49,51,56,57]. Two studies focused on mortality rates [58,59]. Another two looked at health-related biomarkers as risk factors for disease [52,57]. These included blood pressure, cholesterol levels, and several measures of infection and immunity. One study examined health-related quality of life using a 12-item short form questionnaire about various aspects of the individual's physical and mental health status [40]. Finally, one study assessed the impact of program participation on the probability of reporting a chronic health condition [41].

Methods

Seven studies drew on descriptive cross-sectional research designs [37,39–43,46]. Another ten studies drew on descriptive longitudinal research designs [38,44,45,47,48,53–56,60]. All of the cross-sectional and longitudinal papers relied on linear or logistic regression techniques. Two of the longitudinal studies also used marginal structural modeling, a relatively recent class of statistical techniques that aim to address problems of causal inference arising from time-varying confounders such as prior exposure to the program of interest [55,56].

Seven studies exploited natural policy experiments (often called quasi-experimental designs) by using difference-in-differences estimation to assess changes in health status before and after policy implementation in a policy-exposed group compared to a policy-unexposed (control) group [25,26,49–52,57]. Notably, these quasi-experimental studies were all based in the United States. Two of the papers examined the impact of welfare reform (*i.e.* PRWORA) while the remaining five examined the impact of EITC disbursement and expansions. In all seven of these studies, the objective was to examine how the given policy exposure influenced the health of those most likely to receive benefits. Notably, none of these studies directly assessed who had specifically accessed these programs, but rather assumed that the affected (‘treated’) group consisted of those whose socioeconomic status would make them eligible for the program. This was either because the data did not permit them to do so or because the effects of policy changes were hypothesized to extend to the group most vulnerable to these reforms, even if they did not specifically experience them. In these studies, then, the treatment group consisted of socioeconomically disadvantaged single mothers. Specifically, five of the studies used low levels of education as a metric of eligibility, subsetting their analyses to either those with less than a college degree or those with a high school diploma or less. Another study subsetting its analyses to women who fell below the income eligibility cut-off for receiving benefits. The control groups of these studies somewhat varied, though all consisted of women in the same socioeconomic strata as the treatment groups. One study additionally conducted synthetic control analyses, in which they used a weighted combination of three control groups to compare against their treatment group (married mothers, single non-mothers, and married non-mothers) [26]. The last paper to use a quasi-experimental research design used difference-in-differences estimation to examine the effects of regularly scheduled EITC disbursements on monthly fluctuations in the health of EITC-eligible women [57]. As in the other quasi-experimental studies, eligibility was estimated using individuals’ socioeconomic and demographic characteristics.

Finally, two papers used a natural-experiment design to examine the impact of state-level welfare reform in Florida and Connecticut, respectively [58,59]. In both cases, the authors compared mortality rates between those who participated in reformed welfare programs and those in receipt of traditional welfare benefits.

Findings

All six descriptive studies comparing the health of social assistance recipients to that of the general population found that social assistance recipients reported worse health outcomes than their non-recipient counterparts, even after adjusting for known confounders such as gender, marital status, and education [37–41,60]. In Canada, Sweden, Norway, and the United States,

social assistance recipients reported higher levels of psychological distress in addition to other adverse mental health outcomes. The studies from Canada and the United States also observed an association between social assistance receipt and higher rates of poor self-rated health. The Swedish study and one American study found worse health-related behaviours among social assistance recipients, including higher rates of smoking, binge drinking, and poor nutritional habits.

Three of the four quasi-experimental studies examining the impact of welfare reform in the United States found that such reforms were associated with worse health outcomes among social assistance recipients. In the two studies on the effects of PRWORA, welfare reform was associated with a 7% (95% CI 1%-12%) increase in the prevalence of poor self-rated health, an 8.8% (95% CI 6.8%-10.8%) increase in the prevalence of smoking, and an 8.3% (95% CI 4.7%-12%) increase in the prevalence of binge drinking among socioeconomically disadvantaged mothers [25,26]. Another study found a 16% (95% CI 14%-19%) higher mortality rate among social assistance recipients who participated in the FFTP welfare reform experiment [58]. By contrast, significant mortality effects were not observed in another study by the same authors evaluating the CJFP welfare reform experiment [59].

All five studies evaluating the protective influence of unemployment benefits found that they were associated with a significant reduction in the adverse health consequences of unemployment [42,45–48]. Three found that unemployed individuals in receipt of unemployment benefits were no more likely than their employed counterparts to report poor self-rated general health or adverse mental health outcomes. By contrast, the same five studies found that the receipt of means-tested social assistance did not confer a protective effect on the health of unemployed individuals, who generally reported similar levels of health to unemployed individuals in receipt of no benefits. This pattern of results spanned several countries, including Germany, Sweden, the United Kingdom, and the United States. A comparative study found that the health advantage associated with the receipt of unemployment benefits was more pronounced in Sweden than in Ireland and the United States [45].

Two Australian studies investigating the health of unemployment assistance recipients found that they reported worse mental health outcomes than the general population [43,44]. Notably, the reference group these studies included both employed and unemployed non-recipients. As a result, neither of them permitted a more direct comparison between unemployed recipients and unemployed non-recipients. Moreover, the previously mentioned studies examined the impact of contribution-based unemployment insurance, the last two studies focused on Australia's Newstart Allowance, a means-tested unemployment assistance program.

Literature on the impact of tax credits presented a more mixed set of findings. With respect to short-term impacts, two studies looking at the IWTC and FTC in New Zealand failed to find significant associations between eligibility for tax credits and self-rated health [53,54]. One study from the United States found that EITC eligibility was associated with a number of beneficial short-term outcomes during credit disbursement months, including decreased rates of smoking and increased levels of food security [57]. Another two studies from New Zealand examined long-term impacts and found that cumulative years of FTC receipt was associated with a very marginal decrease in self-rated health and no discernible effects on smoking habits [55,56]. On

the other hand, studies focused on the expansion of EITC benefits found that increases in the maximum credits available to households were consistently associated with positive health outcomes among affected mothers, including decreased rates of smoking, lower depression symptomology, increased self-rated health, and fewer risky biomarker counts [49–52].

Quality Assessment

The results of the methodological quality assessment are presented in Table 2.6. Four studies were deemed to be low quality, sixteen studies were medium quality, and six studies were high quality. The most common methodological issue was the absence of an experimental or quasi-experimental study design that was capable of controlling, at least to some extent, for unmeasured sources of confounding. As a result, the majority of studies were not methodologically equipped to distinguish observed differences between exposed and unexposed groups from potential sources of selection bias. In addition, nearly half of the studies used an indirect measure of exposure. More specifically, they used individuals' demographic and socioeconomic characteristics as a proxy for exposure to a policy treatment (*e.g.* welfare reform). In these studies, not all of the members included in the exposed group were in fact subjects of the given policy treatment. Finally, less than half of the studies conducted some manner of supplementary analysis to assess the robustness of reported estimates. The minority that did, used either multiple analytic techniques or conducted several subgroup analyses to test the sensitivity of their results.

2.4 Discussion of Findings

A number of empirical patterns can be discerned from the evidence reviewed in this study. First, studies comparing the health of income support recipients to that of the general population consistently found that those who are in receipt of means-tested forms of assistance (*i.e.* social assistance or unemployment assistance) are doing considerably worse than their non-recipient counterparts, even after controlling for demographic and socioeconomic differences between the two populations. By contrast, the results of the review suggest that universal social policies may stand a better chance of promoting health equity among socioeconomically vulnerable populations. Indeed, a subset of studies investigating the impact of income support among the unemployed found that individuals receiving unemployment insurance reported similar levels of health to those in full-time employment. Thus, unlike their means-tested counterparts, universal unemployment insurance policies appear to confer a significant health advantage upon individuals [32]. Finally, the literature we have reviewed does not point to a decisive set of conclusions concerning the health impact of tax credits. This reflects the finding of a previously published review assessing the effects of tax credits on population health outcomes [61]. Given that interest in evaluating these policies is relatively new — the earliest of these studies included in our review was published in 2013 — we should expect further evidence to accumulate in the coming years.

In spite of the empirical patterns that we have been able to discern, the overall results of the systematic review also suggest that evidence on the health impacts of social policies remains patchy. Rigorous evaluations of policy effects are particularly lacking. We believe there are three principal reasons for the lack of available evidence on the question examined in this review,

though analysis of these factors is beyond the scope of this study: the limitations of existing data sources, insufficient familiarity with appropriate statistical techniques among public health researchers, and institutional barriers stemming from attempts to fund and publish politically sensitive research.

2.5 Limitations

We restricted our search to peer-reviewed journal articles. Although this meant that books, reports, and working papers were excluded from the review, such a restriction was necessary to ensure a common benchmark for the quality of studies included in the review. We also restricted our search to the impact of social policy interventions on adult health outcomes. There is, however, a need to consider their impact on child health outcomes as well. In addition, due to differences across studies both in policy exposures and health outcomes, we were not able to conduct a meta-analysis of their results. As this body of work grows, opportunities for meta-analytic research will arise.

3. DATA ANALYSES

3.1. Introduction

Our systematic review produced two findings that prompted the need for further research. First, it appears that there is a significant dearth of studies examining the Canadian context. Second, the existing research largely does not draw on the strongest available methods, given the available data. Against this backdrop, we conducted a study of the impact of social assistance programs – in Ontario, Canada-wide, and in two comparable countries (the United States and the United Kingdom) – on health outcomes. This study was designed to use the best available data in these three societies, and the best-known methods for evaluating policy impacts, given the available data, in order to provide the most comprehensive and rigorous analysis on this topic to date. Because our main objective was to investigate how programs designed to provide benefits to the most income-insecure influence health, we restricted our analysis to social assistance programs in these three countries (as opposed to, for example, employment/unemployment insurance programs, which have a much broader mandate).

3.2. Methods

3.2.1. Cross-Sectional Analysis

Data Source

In each country, we used the largest available nationally representative cross-sectional annual household health surveys that have extensive information on health status, health risk factors, and considerable information on social assistance and related variables. To ensure a representative national sample, while curbing the administrative costs associated with data collection, surveys from all three countries use a similar multistage, stratified sampling design, common for national surveys. Generally speaking, in the first stage, smaller geographic areas called primary sampling units (PSU) are randomly selected from within each stratum of larger geographic areas (e.g. regions, provinces, counties). The strata are created to make sure that regional and demographic characteristics of the population are adequately represented, and not inadvertently left out of the sample. Then, households are randomly selected from within each sample PSUs.

For Canadian analysis, ten available cycles¹ of the Canadian Community and Health Survey (CCHS) covering 2003, 2005, and 2007-2014 were used. The CCHS collects information on a nationally representative sample of Canadians above age 12, excluding individuals living on Indian Reserves and on Crown Lands, institutional residents, full-time members of the Canadian Forces, and residents of certain remote regions. For details on the methodological overview of the CCHS including its sampling strategy, see Beland (2002) [62]. The CCHS was conducted in every two years until the redesign in 2007, and annually thereafter. Approximately 130,000 individuals were interviewed for each cycle before 2007, and 65,000 once the data collection became annual.

¹ The CCHS was accessed through the Statistics Canada Toronto Research Data Centre (RDC) and Cycle 1 (2000/2001) is excluded because the mental health proxy variable was not asked.

For the American analysis, we used the National Health Interview Survey (NHIS), also covering 2003-2014, and conducted annually. The NHIS is representative of all non-institutionalized civilian United States residents. See Parsons (2014) [63] for details on the survey methodology. In the NHIS, the core questionnaires are asked from all individuals in the household, but main health-related questions of interest are asked from only one randomly selected adult per household. This sub-sample is called the Sample Adult Core in the survey and was used in our analysis. Approximately 30,000 adults were interviewed each year.

Due to unavailability of an equivalent health survey covering the whole United Kingdom, our cross-sectional analysis looks at only England. For this analysis, we used the Health Survey for England (HSE), covering the years 1998-2014 to ensure adequate sample sizes. The HSE is an annual survey that provides nationally representative information about the health and wellbeing of adults aged 16 and over living in England. Each cycle of the survey includes a core set of questions and laboratory measurements repeated annually, in addition to specific modules on topics that vary from year to year. Further details on the survey methodology and sampling frame can be found at the National Statistics report [64]. Approximately 8,000 adults were interviewed each year.

For each country, we pooled survey cycles after verifying the feasibility of combining cycles by comparing the question wording, universe, and response categories of all variables of interest. The combined samples are not representative of the population in a particular year but rather they represent the combined population of each country over the duration of the annual samples.

In order to avoid problems in interpretation of findings, we attempted to limit sources of confounding/selection bias that may be introduced by comparing people with widely varying basic characteristics. We did so by limiting the analytic sample to individuals whose socioeconomic circumstances make them vulnerable to income insecurity, and whose other characteristics make them more probable recipients of social assistance: those in the lowest income decile group who are labour-force active and between the ages of 18-64 during the reference year.² To reduce the contaminating effects of receiving benefits other than social assistance, we excluded observations in Canada and the United States if someone in the family received Employment Insurance. We skipped this step for England because employed and unemployed individuals are eligible for different and mutually exclusive means-tested social assistance benefits. These are Income Support and Jobseekers' Allowance, respectively.

Surveys often contain missing information for some questions. There are many accepted ways to manage missing information. When the sample size is large enough for adequate power and sample remains representative of the target population without the missing respondents, the general recommendation is to delete the respondents with missing information from the dataset (often referred to as 'listwise deletion') [65]. We used this method based on the combination of sample size and proportion of missing data in our study. The missing rate for any variable used was less than 5% and the final analytic sample sizes were adequately large with 3,969

² Continuous income data is not available in the NHIS public data file. Hence, the lowest income decile group is identified from the poverty ratio variable. Poverty ratio of below 1 comprises 10.33% of the weighted distribution. For HSE, due to limited sample sizes, we were only able to restrict our analytic sample to the lowest quintile instead of decile.

observations for Ontario, 12,602 observations for Canada, 19,821 observations for the United States, and 5,587 observations for England. Further details on how we reached the final sample sizes are provided in Table 3.6.

Outcome Variables

We examined a range of health metrics that measure the major sources of morbidity and mortality, which were measured consistently across survey waves, and are relatively comparable across datasets. All metrics were dichotomized (with 1 indicating the presence of the given negative health outcome, and 0 indicating the absence of the given negative health outcome). More refined categories could not be used due to sample-size limitations.

Poor self-rated health status: Both CCHS and NHIS ask a general health status question with an equivalent Likert scale (excellent, very good, good, fair, poor). Those who reported fair or poor health were coded as having ‘Poor self-rated health’ (1), and were compared against those who had excellent, very good, or good self-rated health (0). The Likert scale used in the HSE is somewhat different, though similar to other European surveys (very good, good, fair, bad, very bad). Those who reported fair, bad, or very bad health were coded as having ‘Poor self-rated health’ (1), and were compared to those who had very good or good self-rated health (0).

Hypertension: Hypertension is asked similarly in CCHS and NHIS, and those who said they had ever been diagnosed with high blood pressure (1) were compared to those who reported never having been diagnosed (0). Due to a large proportion of missing values in the HSE for questions concerning the diagnosis of hypertension (*e.g.* in some cycles, the questions are only posed to older adults aged 65 and above), we did not include this outcome in our English analysis.

Chronic Condition: Chronic condition was assigned a value of (1) if the respondent reported having any of these conditions: Asthma, Emphysema, Chronic Bronchitis, Chronic Obstructive Pulmonary Disease (COPD), Cancer, Diabetes, Heart disease, Stroke³. Conditions were not analyzed separately due to sample-size constraints.

Current Smoking: Smoking (1) was defined by reporting smoking every day or some days, compared to former or non-smokers (0). The variable is identical in all three datasets.

Binge alcohol consumption: Our study focused on binge drinking, a common form of problem drinking. The National Institute of Alcohol Abuse and Alcoholism (2004) defines binge drinking as having 5 or more drinks in a single occasion at least once a month. The CCHS has a variable consistent with this definition. For the NHIS, this variable is derived from the question, "In the past year, on how many days did you have 5 or more drinks of any alcoholic beverage?" Respondents who reported more than 12 days were assigned a value of (1), and compared against those who reported no drinking or drinking less than this amount (0). For the HSE, data concerning the monthly or annual drinking habits of adult respondents was not available across most cycles. Instead, this variable was constructed using questions concerning individuals’ drinking habits over the past seven days. Those who reported having 5 or more drinks on one

³ On top of small sample size, there was inconsistent collapsing of these conditions in the survey questionnaire across cycles in the CCHS, making it impossible to analyze some of these conditions separately.

occasion were assigned a value of (1), and compared against those who reported no drinking or drinking less than this amount on any single occasion.

Physical Inactivity: In the CCHS, physical inactivity can be identified from a variable that categorizes respondents as being "active", "moderately active", or "inactive" in their leisure time based on total daily Energy Expenditure values (kcal/kg/day). For the NHIS, physical inactivity can be derived from the number of minutes of moderate and vigorous activities from various activity participation questions. Those who indicated that they remotely or never engaged in physical activities were classified as inactive (1), compared to those who were at least moderately active (0). Due to significant differences in the physical activity module across cycles of the HSE, it was not possible to operationalize a common physical inactivity variable. For this reason, this outcome is not included in our English analysis.

Obesity: In all three datasets, respondents with Body Mass Index (BMI) 30 or above calculated from their self-reported height and weight measures were coded as Obese (1), and were compared to those with a body mass lower than 30 (0).

Independent Variables

Receipt of Social Assistance Benefits: The main ‘exposure’ variable of interest in our study was the receipt of social assistance benefits. We measured this exposure by whether at least one family member had received social assistance during the year in which the respondent was surveyed. We believe household receipt, rather than solely individual receipt, is more suitable for capturing the effects of social assistance on health since social assistance benefits may have considerable spillover effects within the household, due to effects on available financial resources, stress, and the like [66–69]. The CCHS asks respondents their source of household income over the past year, for which out of a lengthy response set, ‘social assistance’ is one response category. The NHIS has a variable that indicates if, at any time during the last calendar year, the person received any government assistance payments because of low income excluding food stamps, supplemental security income (SSI), energy assistance, or medical assistance payments. The HSE asks respondents to indicate, from a list, the sources of income they receive at the time of the interview. Those responding affirmatively to receiving social assistance in the CCHS or the HSE, or to receiving government assistance because of low-income in the NHIS were coded as (1) and compared to those who did not report receiving any such benefits (0). In the HSE, we further distinguished between those who were eligible to receive means-tested Income Support (*i.e.* employed individuals) and those who received Jobseekers’ Allowance (*i.e.* unemployed individuals). Due to survey limitations, we were not able to further distinguish, among the unemployed, those receiving means-tested Jobseekers’ Allowance and those receiving contributions-based Jobseekers’ Allowance.

Labour force status. In all three surveys, labour force status was defined as the respondent’s report of their working status during the previous week. Those who reported that they didn’t have job in the last week and looked for work were categorized as unemployed, and were compared against those who reported being employed during the previous week. We further categorized employed group into full-time and part-time workers, using standard definitions of

full-time work (30 hours/week in Canada, and 35 hours/week in the United States and the United Kingdom).

Covariates

Models accounted for variables related both to health and to receipt of social assistance and employment status. At the individual level, we included metrics of age (years), sex/gender (male vs. female), family type (single, couple, single with children, couple with children), race/ethnicity⁴ (white, black, aboriginal, Asian, other), educational attainment (postsecondary, some postsecondary, secondary, less than secondary), immigrant status (foreign vs. native born, and length of residence (15+ years, 5-15 years, less than 5 years))⁵, home ownership, urban living⁶, number of children, and having health insurance coverage⁷. We further accounted for mental health status, which appears to be an additional factor that determines use of social assistance programs [70–72]. In Canada, respondents were coded as having poor mental health if they reported having an anxiety disorder (e.g. a phobia, obsessive compulsive disorder or a panic disorder), and/or a mood disorder (e.g. depression, bipolar disorder, mania or dysthymia). In the United States and England, direct diagnostic information was not available; therefore, respondents were coded as having poor mental health if they reported functional limitations from depression, anxiety, or an emotional problem. We also accounted for geographical/geopolitical region as Atlantic, Prairies, Quebec, Ontario, British Columbia for Canada, and Northeast, North Central/Midwest, South, West for the United States. Government Office Regions were used for England.

Statistical Analyses

We began by describing the demographic, socioeconomic, and health-related characteristics of the full and analytic samples. The full samples consisted of working age adults in the labour force who were not in receipt of Employment Insurance. By contrast, our analytic samples included only the subset of these observations that fell within the lowest income decile. Using descriptive statistics, we tested both samples for the presence of any underlying differences between social assistance recipients and non-recipients. Table 3.1a-Table3.1d show the demographic and socioeconomic characteristics, and Table 3.2a-Table 3.2d show health-related characteristics.

For our main analysis, we used propensity score matching (PSM) method to measure the effect of social assistance on several health outcomes. PSM estimates the effects of a treatment - the receipt of social assistance in our study - in observational studies, where the exposure to the treatment is not randomly assigned. Simply, it creates an artificial control group that provides credible estimate of the counterfactual outcomes of the treated group (*i.e.* the health outcome of the social assistance recipients had they not received the assistance). As shown in Table 3.1a-Table3.1d, there are considerable baseline differences between those receiving social assistance and those who do not (untreated group) in characteristics that are also likely to be related to

⁴ An additional category as Hispanic origin was included for the U.S. data

⁵ No variable was available to define “immigrant status” in the English data.

⁶ No variable was available to define “urban living” in the U.S. data

⁷ Due to the universal health plan, this variable was not used in the Canadian and English data

health status. PSM is a robust way to correct for this potential ‘selection bias’ by accounting for observable systematic differences between the treated and untreated groups. The identification of the treatment effect assumes that (1) the potential health outcomes are independent of treatment status after controlling for a particular set of observable characteristics, (2) for any given set of characteristics, every individual has a nonzero probability of receiving the treatment.

PSM proceeds in two steps. First, a propensity score is established through regression modeling, which estimates the probability that an individual will experience the treatment, given their observable characteristics [73]. Then, individuals are matched based on their propensity scores using selected matching algorithms. This establishes two groups that are comparable in all observable characteristics except for their exposure to treatment. The comparison of average health outcomes of these two groups after is the average treatment effect on the treated (ATT) [74].

The propensity score model used to establish probability of receiving social assistance was generated using theoretical considerations and the extant literature in terms of choosing the covariates that can affect the health outcomes and receipt of social assistance. The predicted probability of participation for each observation in the treated and untreated groups is obtained from these estimated coefficients. As it is not clearly established in the literature how to accommodate survey weights in the context of matching, we accounted for the survey design by using a logit model for the regression, and the computed log odds-ratio for the matching procedure [75]. The Stata package `psmatch2` offers set of commands to perform full propensity score matching analysis. The `pscore` command that estimates the propensity score performs a balancing test to ensure that the balancing condition of covariates (that was driven by theoretical considerations) is, in fact, met. The test arbitrarily stratifies the sample of treated and untreated observations in number of equal strata based on their propensity score. It tests if the average propensity score between the treated and untreated group is significantly different from each other. If it is, it splits the strata further and repeats the testing until the estimated propensity scores for the two groups in each stratum are close. Once the strata are balanced, an individual t-test is performed to test for the equality of the mean of each covariate within each stratum. If the t-test suggests systematic differences of characteristics, `pscore` reports imbalance and we return to the variable selection stage and include different interaction terms, and repeat the procedure until we get an acceptable balance [76]. We accepted the propensity score model if at most one variable in one stratum failed the t-test and this variable was not considered to be of primary theoretical importance⁸. To ensure that there was always an overlap between the treated and the control groups, we imposed the common support region based on the propensity score. Common support is defined as the maximum of the minimums, and the minimum of the maximums. This means for any extremely high or low propensity score in one group, there will be a close match in the other group.

We performed separate analysis in the employed and unemployed sub-populations. We ran an extensive set of matching algorithms such as simple nearest neighbor matching both with and without replacement, caliper matching with different distance values both with and without replacement, kernel weight matching with different bandwidth values, and caliper radius matching with different radius values, from which we chose the algorithms that produced the

⁸ PPT slide from Helene Starks, Melissa M.Garrido (2014)

best matches. An extensive set of tables and figures were produced to review these algorithms, but these are not included in the report due to Statistics Canada RDC regulations. Caliper matching and kernel weight matching provided the best matches and were chosen for the analysis. Caliper matching matches each treated observation i with its nearest neighbor j from the untreated group if their distance in propensity score is smaller than the imposed tolerance level (distance=0.015⁹). It ensures high quality matching (decreases bias) by avoiding bad matches at a cost of dropping some observations (increases variance). Caliper matching with distance is estimated with replacement: each treatment observation can be matched to the nearest comparison unit, even if a comparison observation is matched more than once. Matching with replacement increases the number of matched pairs and reduces bias especially when there are few comparison observations similar to the treated observations, but at the expense of increased variance [78]. Moreover, there is no potential sensitivity to the order in which the treatment observations are matched when matching is performed with replacement [73,79]. Kernel matching uses weighted average of all observations in the untreated group to construct the counterfactual outcome based on kernel density. The farther the untreated observation is from the treated observation the lower the weight. A bandwidth of 0.06 is imposed. By using all information this method reduces variance, but prone to bad matches. Hence, the imposition of common support is important for this method.

To account for the fact that the balancing score is estimated, we used the bootstrap method to estimate standard errors for both matching estimators with 100 replications [78,80]. Since the validity of the PSM relies on the assumption that the distribution of observed baseline covariates is independent of treatment status, we checked the matching quality (post matching balance) using a two-sample t-test. After matching there should be no systematic difference between the treated group and the control group that we created from the untreated sample. The matching qualities are reported in Table 3.5a-Table3.5d.

3.2.2. Longitudinal Analysis

Data sources

Longitudinal surveys are designed to follow survey subjects over a period of time and gather information on significant life events at multiple points in time. Since the same individuals are re-interviewed in successive waves (e.g. years, months), it allows researchers to observe changes in characteristics over time at an individual level, rather than having to compare individuals, and therefore avoids differences between individuals that can introduce confounding. We used the largest available national longitudinal household labor surveys that provide detailed information about collection of social assistance, employment status, income, and also have measure of health status.

For the Canadian analysis, we combined panel 4 (2002-2007) and panel 5 (2005-2010) of Survey of Labour and Income Dynamics (SLID)¹⁰. We chose these particular panels for reasons that any prior panel might conflate exposure to social assistance policy with exposure to *change* in social

⁹ This tolerance level is smaller (stricter) than the 0.2 of the standard deviation of the logit of propensity score suggested by Austin (2011b) [77]

¹⁰ The SLID was accessed through the Statistics Canada Toronto Research Data Centre.

assistance policy that occurred during the mid-1990s, and because the survey was discontinued in 2011, meaning the most recent data available from the SLID is for 2010. The SLID is an annual survey sampled to represent all individuals in Canada, excluding residents of the Yukon, the Northwest Territories and Nunavut, residents of institutions and persons living on First Nations reserves. The SLID samples are selected from the monthly Labour Force Survey (LFS). For a methodological overview of LFS, see “Methodology of the Canadian Labour Force Survey (71-526-X)” available at <<http://www.statcan.gc.ca>>. In the SLID, each panel samples about 30,000 adults, and follows them for a period of six consecutive years. As a new panel is introduced every three years, two panels always overlap.

For the American analysis, we combined the 2001, 2004 and 2008 panels of the Survey of Income and Program Participation (SIPP), which cover the years 2001-2003, 2004-2005, and 2009-2011, because this most closely approximates the years covered by SLID. SIPP collects detailed information about employment and program participation from a sample of over 100,000 individuals representing the civilian, noninstitutionalized population of the United States for each panel. Sample individuals are interviewed every 4 months for core questionnaires about their activities in the previous four months, and the panel length varies from 24-48 months in total. For more information on the survey methodology, please visit the SIPP website at <www.census.gov/sipp>. We created annual records from the 4-month period waves because the health status question is asked approximately once a year as part of a topical module and for consistency with the annual nature of the SLID.

For the United Kingdom analysis, we studied the British Household Panel Survey (BHPS) covering 2001-2008¹¹, also the years that best approximate the years of the SLID that we investigated. The BHPS is representative of all adult (16+) members of private households residing in the United Kingdom, made up of England, Scotland, Wales and Northern Ireland. Those in permanent or long-stay institutions where the respondent was too elderly or too unwell to be approached, and those in prison are excluded. For further details on the methodological overview, see Taylor *et al* (2010) [81]. Information is collected annually on a sample of more than 5,000 households, with a total of approximately 10,000 individual interviews.

For all three datasets, we limited the sample to those who, during the reference year, were: of working age (18-64 years old) and labour-force active. We further eliminated individual observations if they had received Employment Insurance during the reference year.¹² Moreover, we restricted the sample to those who were present in the first year of their respective panel periods, that is new entrants in subsequent years are excluded. This allows us to follow a representative population of the beginning year. Since we did not require a balanced panel where each person is observed every year, the number of individuals varied from year to year. The advantage of the unbalanced panel analysis is the opportunity to exploit all information but the disadvantage is that the sample is skewed with more observations in the earlier years.

For missing information for some questions by the respondent, we used listwise deletion

¹¹ The boost sample representative of Northern Ireland was included in the survey only in 2001 and the survey is no longer running since 2008

¹² No variable is available to separate two different groups (Employment Insurance and Social Assistance equivalent) receiving Jobseeker’s Allowance in the UK data.

consistent with the cross-sectional analysis. The proportion of missing was less than 5% for any variable used and sample size remained adequately large. The final sample sizes for Ontario, Canada, the United States and the United Kingdom were 5,367, 18,184, 98,556 and 7,793 individuals (20,071, 69,058, 203,723, and 42,050 person-year observations) respectively. Table 3.11 offers details on how the final sample sizes were obtained.

Outcome Variables

Health Outcomes. The health status measure we examined was self-rated health. In the SLID, it was derived from the question “Compared to other people [your] age, how would you describe [your] state of health?” with responses: excellent, very good, good, fair, poor. Those who reported fair or poor health were coded as having ‘Poor self-rated health’ (1), and compared against those who had excellent, very good, or good self-rated health (0). The same coding was applied to the SIPP data since the response categories are equivalent and the question “Would you say your health in general is []?” is comparable to the SLID. The BHPS differs in two ways. First, it asks health over last 12 months instead of current/general health status. Second, the responses are categorized slightly differently. The question is worded as follows: “Please think back over the last 12 months about how your health has been. Compared to people of your own age, would you say that your health has on the whole been excellent, good, fair, poor, or very poor?”. Following previous research using a dichotomized self-rated health from the BHPS data [82–85], we coded fair, poor or very poor health responses as having ‘Poor self-rated health’ (1), and compared against excellent or good self-rated health responses (0).

Independent Variables

Receipt of Social Assistance Benefits. The main exposure variable was the receipt of social assistance benefits by at least one family member during the reference year. For Canada, it was derived from the question “Did [you] receive any income from social assistance or welfare in [reference year]?”. Those responding affirmatively were coded as exposed (1) and compared to those who did not report receiving any income from social assistance (0). For the United States, the variable was coded exposed (1) if positive amount is reported anytime in the past 12 months for the variable asking “Total family public assistance payments such as AFDC or TANF for this month”, and compared to those who did not report any positive amount for any given month in the reference year. For the United Kingdom, the BHPS asks “Have you yourself or jointly with others since [year] received Income Support?” and “Have you yourself or jointly with others since [year] received Jobseeker's Allowance?”. ‘Yes’ response to at least one of the questions was coded as exposed (1), and compared to those who received neither IS nor JSA.

Covariates

For the longitudinal analysis, we wanted to ‘exploit’ the availability of data on changes over time and hence we were particularly interested in time varying covariates such as labour force status, family type and income. To be consistent with the outcome variable, we used current/interview-month labour force status categorized as employed and unemployed. Income is annual disposable total household income, equalised using the square root equivalence scale¹³ and

¹³ The square root equivalence scale divides household income by the square root of the household size.

adjusted for inflation using the Consumer Price Index of each country in 2015 respective prices.

Statistical Analyses

We began by describing the demographic, socioeconomic, and health-related characteristics of the full sample consisting of working age adults in the labour force who are not in receipt of Employment Insurance based on the first-year information of the respondents to see the characteristics of the population we followed over time. We then described these baseline characteristics for only those individuals who had reported variation in the health outcome over the study period and were therefore included in our analytic models (see below for a description of fixed-effects modeling). Table 3.7 reports these baseline characteristics.

We explored the association between social assistance receipt and individual health status by exploiting the panel nature of our data. This allowed us to limit the problem of omitted variable bias, since it controls for the potential confounding effects of time invariant unobserved individual heterogeneity. The latter includes common socio-economic status variables such as sex, race, and birth cohort, as well as more difficult to measure variables such as anchoring of the response, intrinsic differences in health and genetic makeup. The anchoring of the response is an important issue to consider when dealing with a subjective measure like self-reported health. Indeed, subjective health status may suffer from a reporting bias reflecting individual differences in norms and health expectations leading them to interpret the response scales differently [86].

Our model specification is given by

$$y_{it} = \beta x_{it} + \gamma z_{it} + v_t + \alpha_i + \epsilon_{it}, \quad i = 1, 2, \dots, m \quad t = 1, 2, \dots, T \quad (1)$$

where i indexes individual respondents and t indexes time periods. y_{it} is a dichotomous indicator of poor health = 1 if an individual reported poor self-rated health and zero otherwise; x_{it} is a dummy variable =1 if an individual's family received social assistance; z_{it} is a vector of time-varying control variables including labor force status, family composition and household income and v_t captures time specific macro shock common to all respondents using a set of calendar year dummies for the SLID and the BHPS samples, and survey-year dummies for the SIPP sample due to its independent short panels which do not overlap. Finally, α_i is an individual specific error component capturing time invariant unobserved personal characteristics affecting individual health, which could also be correlated with social assistance receipt; ϵ_{it} are identically and independently logistic distributed individual specific error terms. Consistent estimates of the coefficients are obtained by conditional maximum likelihood method [87,88]. Stata's xtlogit, fe command is utilized for this estimation.

We first estimated a simple logistic regression on the pooled years of the samples as Model 1 controlling for all constant and time-varying individual characteristics including sex, visible minority status, education attainment, immigrant status, birth cohort, home ownership, geographical area, marital/partnership status, household income and number of children. Model 2 fitted a crude fixed effects logistic model associating individual health outcome with an indicator variable for receipt of social assistance and unemployment status. We extended this baseline specification by adding controls for whether an individual lives in a couple-headed household and whether the individual has children in Model 3. We added a control for adjusted household

income in Model 4.

The fixed effects logit estimator identifies the health effect by exploiting within-individual variations in receiving the treatment (social assistance) and health status over time. In fact, the coefficients are estimated on the sample of individuals who experienced change in health status at least once during the panel period. Individuals with unchanged outcome drop out of the conditional maximum likelihood function. Hence the reported analytic sample sizes of the fixed effects logit models are substantially smaller than the full sample. There is therefore a trade-off between less bias of fixed effects logit specification and the resulting loss in efficiency.

We considered labour market status-specific differences in the effect of social assistance on poor self-rated health status. However, computing the marginal effects of the interaction term in the fixed effect logit model is impossible without making a further assumption that all the fixed effects are zero and the alternative, odds ratio interpretation, is discouraged due to its complications [89]. Moreover, in the case of short panels, there are also potential bias and inconsistency issues associated with non-linear fixed effects models (such as logit fixed effects), due to the incidental parameter problem. The former assumption is counterintuitive given our model of unobserved individual heterogeneity. Hence, we estimated linear probability models with interaction terms controlling for individual fixed effects. As a robustness check, we estimated our Model 4 with a linear probability model as well.

To account for the sampling design of the surveys, we used survey weighting in all models. All individuals were weighted by their first-year time-constant weights. This cross-sectional weighting produced estimates from the sample that are representative of their respective population in the first year of each panel. However, this method cannot account for potential panel attrition bias.¹⁴

Fixed effects models are not considered sufficient to establish ‘causal’ relationships as the modeling does not involve a strong control group. The results can thus be biased if there are time-varying variables that correlate with the explanatory variables, and for which we did not control. For example, individual’s anchoring of their health status may change from year to year. However, the estimates from longitudinal data provide stronger evidence towards ‘causality’ than simple cross-sectional analysis [91].

3.3. Results

3.3.1. Ontario

Cross-Sectional Analysis: Descriptive Characteristics

Table 3.1a presents a description of the demographic and socioeconomic characteristics of the full and analytic samples. Relative to non-recipients, social assistance recipients in Ontario were more likely to be single or lone parents (69.7% vs. 23.2% among the unemployed; 46.8% vs. 22.2% among the employed), more likely to be Aboriginal (8.8% vs. 2.5% among the unemployed; 6.3% vs. 1.8% among the employed) or Black (11.3% vs. 3.9% among the

¹⁴ See sections 21.8.5 and 23.5.2 of Cameron and Trivedi (2005) [90] for further discussion.

unemployed; 6.5% vs. 3.3% among the employed), more likely to attain less than a secondary level of education (22.1% vs. 10.0% among the unemployed; 17.8% vs. 7.6% among the employed), less likely to own their dwelling (14.9% vs. 68.7% among the unemployed; 40.9% vs. 78.9% among the employed), and more likely to report a mental health problem (28.3% vs. 13.2% among the unemployed; 18.8% vs. 8.0% among the employed). Social assistance recipients also had a greater number of children between the ages of 0 and 11 (0.55 vs. 0.39 among the unemployed; 0.53 vs. 0.47 among the employed). As expected, social assistance recipients reported significantly lower average household income compared to their non-recipient counterparts. Among the employed, social assistance recipients were more than twice as likely as non-recipients to be in part-time employment (27.5% vs. 10.3%).

Within our analytic sample of low-income Ontarians, social assistance recipients were more likely to be single or lone parents (83.1% vs. 58.9% among the unemployed; 77.2% vs. 48.6% among the employed), less likely to be an immigrant (20% vs. 36.6% among the unemployed; 18.2% vs. 32.0% among the employed), more likely to attain less than a secondary level of education (29.7% vs. 17.5% among the unemployed; 25.0% vs. 18.1% among the employed), less likely to own their dwelling (7.7% vs. 44.1% among the unemployed; 9.4% vs. 52.4% among the employed), and more likely to report a mental health problem (30.0% vs. 21.5% among the unemployed; 29.7% vs. 13.4% among the employed). Among the unemployed, social assistance recipients tended to be younger (36.5 years vs. 39.5 years), have a greater number of children between the ages of 0 and 11 (0.65 vs. 0.40), and report lower average household income compared to their non-recipient counterparts. Among the employed, social assistance recipients were more than twice as likely as non-recipients to be in part-time employment (58.1% vs. 30.1%). While unemployed recipients were more likely than non-recipients to be White (70.9% vs. 61.6%) and less likely to be women (55.0% vs. 59.1%), employed recipients were less likely than non-recipients to be White (25.0% vs. 30.4%) and more likely to be women (63.0% vs. 57.1%).

Table 3.2a presents a description of the health-related characteristics of the full and analytic samples. Social assistance recipients in Ontario reported worse health outcomes and worse behavioural risk profiles relative to non-recipients. For example, within the low-income analytic sample, social assistance recipients reported higher rates of poor self-rated health (25.2% vs. 18.0% among the unemployed; 22.2% vs. 12.6% among the employed) and smoking (57.2% vs. 32.85 among the unemployed; 53.8% vs. 32.8% among the employed). Employed social assistance recipients also reported higher rates of chronic conditions (29.5% vs. 20.1%), hypertension (16.0% vs. 11.6%), and obesity (25.9% vs. 18.0%). Unemployed recipients reported higher levels of binge drinking (23.4% vs. 12.9%). Within the full population of Ontarians, unemployed recipients also reported higher rates of chronic conditions (23.4% vs. 14.1%).

Cross-Sectional Analysis: Findings

Prior to matching individuals on the propensity score, we observed significant differences in the demographic and socioeconomic characteristics of social assistance recipients in Ontario and their non-recipient counterparts. These differences were no longer significant after matching, indicating that we succeeded at reducing bias and achieving a satisfactory covariate balance. The

results suggest that, even after achieving this balance, social assistance recipients in Ontario are doing considerably worse than the comparison group, particularly in the employed subsample. As shown in Table 3.3, among the unemployed, social assistance recipients exhibited higher rates of poor self-rated health (5.2%-9.6%), chronic conditions (5.3%-8.6%), and smoking (8.8%-12.3%). These treatment effects were only statistically significant when using caliper matching. Differences in the prevalence of chronic conditions, hypertension, binge drinking, and physical inactivity were not statistically significant among the unemployed after matching. Similar overall patterns were observed among the employed presented in Table 3.4, who exhibited higher rates of poor self-rated health (5.0%-5.8%), obesity (7.3%-8.5%), and smoking (8.8%-11.0%). These were statistically significant across both matching specifications. Differences in the prevalence of chronic conditions, hypertension, binge drinking, and physical inactivity were not statistically significant among the employed after matching.

Longitudinal Analysis: Descriptive Characteristics

Table 3.7 presents a description of the baseline characteristics of the full and analytic samples. Relative to the full sample, those in our analytic sample from Ontario were more likely to be a non-white (25.3% vs. 21.7%), more likely to be an immigrant (33.3% vs. 28.2%), and more likely to have completed less than a secondary level of education (16.1% vs. 10.7%). Relative to the full sample, they exhibited higher rates of poor self-rated health (27.5% vs. 5.5%), social assistance recipiency (8.5% vs. 5.2%), and unemployment (6.2% vs. 4.0%). Those in the analytic sample also reported lower average household income compared to those in the full sample. Table 3.8 presents trends in the labour market status, social assistance coverage, and self-rated health of the full and analytic samples over the period of study. Within the analytic sample, there was a somewhat secular trend towards increasing rates of poor self-rated health, from 26.2% in 2002 to 40.8% in 2010. Rates of social assistance recipiency differed from year to year, ranging from 7.2% to 11.0%.

Longitudinal Analysis: Findings

Table 3.9a presents the results of our pooled logit and fixed effects models for Ontario. In the pooled logit model (Model 1), after controlling for a range of demographic and socioeconomic variables, factors associated with poor self-rated health included being unemployed (OR 2.32, SE 0.48) and receiving social assistance (OR 2.38, SE 0.34), while being married or cohabitating, having children, and having a higher annual household income were all associated with better self-rated health. In the crude fixed effects model (Model 2), moving into unemployment was associated with poor self-rated health (OR 2.24, SE 0.59). By contrast, the association between social assistance receipt and self-rated health was no longer significant. These results remained stable after controlling for time-varying characteristics (*i.e.* household structure and income) (Model 3-4). As shown in Table 3.10a, our supplemental analyses using linear probability modeling suggested no significant interaction between social assistance and employment status.

3.3.2. Canada

Cross-Sectional Analysis: Descriptive Characteristics

Table 3.1b presents a description of the demographic and socioeconomic characteristics of the full and analytic samples. Relative to non-recipients, social assistance recipients in Canada were more likely to be single or lone parents (68.9% vs. 29.8% among the unemployed; 50.8% vs. 25.0% among the employed), more likely to be non-white (36.6% vs. 31.4% among the unemployed; 25.8% vs. 19.0% among the employed), more likely to attain less than a secondary level of education (33.1% vs. 12.1% among the unemployed; 22.9% vs. 8.7% among the employed), less likely to own their dwelling (14.5% vs. 64.3% among the unemployed; 39.8% vs. 76.8% among the employed), and more likely to report a mental health problem (26.9% vs. 13.6% among the unemployed; 20.6% vs. 7.9% among the employed). Social assistance recipients also had a greater number of children between the ages of 0 and 11 (0.53 vs. 0.37 among the unemployed; 0.54 vs. 0.45 among the employed). As expected, social assistance recipients reported significantly lower average household income compared to their non-recipient counterparts. Among the employed, social assistance recipients were three times more likely than non-recipients to be in part-time employment (30.7% vs. 10.5%).

Within our analytic sample of low-income Canadians, social assistance recipients were more likely to be single or lone parents (80.8% vs. 61.4% among the unemployed; 80.2% vs. 53.6% among the employed), less likely to be non-white (25.9% vs. 31.9% among the unemployed; 21.2% vs. 25.8% among the employed), more likely to attain less than a secondary level of education (35.9% vs. 21.8% among the unemployed; 34.9% vs. 20.6% among the employed), less likely to own their dwelling (13.1% vs. 41.4% among the unemployed; 13.5% vs. 50.4% among the employed), and more likely to report a mental health problem (30.2% vs. 19.9% among the unemployed; 30.5% vs. 12.9% among the employed). Unemployed social assistance recipients in the analytic sample also reported lower average household income than their non-recipient counterparts and a greater number of children between the ages of 0 and 11 (0.57 vs. 0.43). Among the employed, social assistance recipients were more likely to be women (63.9% vs. 57.0%) and twice as likely as non-recipients to be in part-time employment (58.6% vs. 27.8%).

Table 3.2b presents a description of the health-related characteristics of the full and analytic samples. Social assistance recipients in Canada reported worse health outcomes and worse behavioural risk profiles relative to non-recipients. For example, within the low-income analytic sample, social assistance recipients reported higher rates of poor self-rated health (23.5% vs. 16.9% among the unemployed; 24.9% vs. 12.6% among the employed), chronic conditions (26.7% vs. 18.9% among the unemployed; 30.3% vs. 18.8% among the employed), obesity (23.1% vs. 16.0% among the unemployed; 26.0% vs. 17.8% among the employed), and smoking (59.4% vs. 38.3% among the unemployed; 54.0% vs. 34.0% among the employed). In addition, unemployed social assistance recipients reported higher rates of binge drinking (23.3% vs. 17.5%) and employed social assistance recipients reported higher rates of hypertension (15.2% vs. 11.1%).

Cross-Sectional Analysis: Findings

Prior to matching individuals on the propensity score, we observed significant differences in the demographic and socioeconomic characteristics of Canadian social assistance recipients and their

non-recipient counterparts. These differences were no longer significant after matching, indicating that we succeeded at reducing bias and achieving a satisfactory covariate balance. In general, the results of the propensity score matching suggest that the effect of social assistance on health is either statistically insignificant or negative. As shown in Table 3.3, among the unemployed, social assistance recipients displayed significantly higher levels of chronic conditions, with average treatment effects ranging from 5.4%-6.7% depending on the matching specification. Unemployed recipients also exhibited significantly higher rates of obesity (2.8%-4.8%) and smoking (5.3%-6.0%), though these were only significant when employing kernel matching. Differences in the prevalence of poor self-rated health, hypertension, binge drinking, and physical inactivity were not statistically significant among the unemployed after matching. As shown in Table 3.4, among the employed, social assistance recipients showed higher rates of poor self-rated health (6.8%-7.9%), chronic conditions (6.7%-5.1%), hypertension (1.9%-3.4%), obesity (6.3%-5.4%), smoking (7.8%-7.9%), and binge drinking (2.4%-2.5%). In most cases, these treatment effects were statistically significant across both matching specifications. Differences in the prevalence of physical inactivity were not observed in this group.

Longitudinal Analysis: Descriptive Characteristics

Table 3.7 presents a description of the baseline characteristics of the full and analytic samples. Relative to the full sample, those in our analytic sample from Canada were more likely to be a non-white (23.4% vs. 17.9%), more likely to be an immigrant (25.6% vs. 19.9%), and less likely to have completed a post-secondary degree (17.4% vs. 22.7%). Relative to the full sample, they exhibited higher rates of poor self-rated health (27.5% vs. 5.5%), social assistance reciprocity (8.5% vs. 5.2%), and unemployment (6.2% vs. 4.0%). Those in the analytic sample also reported lower average household income compared to those in the full sample. Table 3.8 presents trends in the labour market status, social assistance coverage, and self-rated health of the full and analytic samples over the period of study. Within the analytic sample, there was a somewhat secular trend towards increasing rates of poor self-rated health, from 27.2% in 2002 to 42.5% in 2010. Rates of social assistance reciprocity differed from year to year, ranging from 5.6% to 8.6%.

Longitudinal Analysis: Findings

Table 3.9b presents the results of our pooled logit and fixed effects models for Canada. In the pooled logit model (Model 1), after controlling for a range of demographic and socioeconomic variables, factors associated with poor self-rated health included being unemployed (OR 2.22, SE 0.27) and receiving social assistance (OR 2.02, SE 0.18), while being married or cohabitating, having children, and having a higher annual household income were all associated with better self-rated health. In the crude fixed effects model (Model 2), moving into unemployment (OR 1.61, SE 0.27) and social assistance reciprocity (OR 1.56, SE 0.25) were still associated with poor self-rated health. These results remained stable after controlling for time-varying characteristics (*i.e.* household structure and income) (Model 3-4). As shown in Table 3.10b, our supplemental analyses using linear probability modeling suggested no significant interaction between social assistance and employment status.

3.3.3. United States

Cross-Sectional Analysis: Descriptive Characteristics

Table 3.1c presents a description of the demographic and socioeconomic characteristics of the full and analytic samples. Relative to non-recipients, social assistance recipients in the United States were more likely to be women (57.6% vs. 45.6% among the unemployed; 56.3% vs. 45.7% among the employed); more likely to be parents (78.1% vs. 42.6% among the unemployed; 82.3% vs. 43.3% among the employed), less likely to be White (34.0% vs. 53.3% among the unemployed; 43.7% vs. 68.7% among the employed), more likely to attain less than a secondary level of education (37.7% vs. 20.2% among the unemployed; 27.7% vs. 10.1% among the employed), more likely to earn less than \$15,000 (USD) (57.6% vs. 24.0% among the unemployed; 29.8% vs. 6.1% among the employed), and less likely to own their dwelling (21.1% vs. 50.1% among the unemployed; 36.5% vs. 68.8% among the employed). On average, social assistance recipients also tended to be younger (30.81 years vs. 34.52 years among the unemployed; 34.89 years vs. 40.30 years among the employed). While unemployed recipients were more likely than non-recipients to have health insurance coverage (71.0% vs. 50.1%), employed recipients were less likely than non-recipients to have coverage (72.4% vs. 82.7%). Among the employed, social assistance recipients were more than twice as likely as non-recipients to be in part-time employment (38.4% vs. 19.9%).

Within our analytic sample of low-income Americans, social assistance recipients were more likely to be women (72.7% vs. 54.7% among the unemployed; 73.7% vs. 56.4% among the employed); more likely to be parents (82.6% vs. 47.4% among the unemployed; 88.4% vs. 52.1% among the employed), less likely to be White (21.2% vs. 34.3% among the unemployed; 27.0% vs. 38.4% among the employed), less likely to be an immigrant (19.0% vs. 25.6% among the unemployed; 27.9% vs. 34.2% among the employed), more likely to attain less than a secondary level of education (41.4% vs. 31.4% among the unemployed; 37.5% vs. 29.3% among the employed), less likely to own their dwelling (7.6% vs. 20.2% among the unemployed; 9.6% vs. 22.2% among the employed), and more likely to have health insurance coverage (78.0% vs. 45.3% among the unemployed; 68.3% vs. 52.0% among the employed). On average, social assistance recipients also tended to be younger than non-recipients (31.81 years vs. 34.77 years among the unemployed; 32.59 years vs. 34.25 years among the employed). Among the employed, social assistance recipients were more likely to be in part-time employment (54.9% vs. 45.2%).

Table 3.2c presents a description of the health-related characteristics of the full and analytic samples. Social assistance recipients in the United States generally reported worse health outcomes and worse behavioural risk profiles relative to non-recipients. For example, within the low-income analytic sample, social assistance recipients reported higher rates of obesity (36.9% vs. 29.6% among the unemployed; 35.2% vs. 27.2% among the employed) and smoking (44.2% vs. 37.0% among the unemployed; 35.3% vs. 26.3% among the employed). Employed social assistance recipients additionally reported higher rates of poor self-rated health (15.2% vs. 11.6%), chronic conditions (24.8% vs. 20.4%), and hypertension (18.0% vs. 15.6%). Within the full population, unemployed recipients also reported higher rates of poor self-rated health (15.6% vs. 11.0%), though a similar difference ceased to be statistically significant within the smaller, low-income analytic sample. In contrast to the other outcomes, social assistance recipients in the

low-income analytic sample tended to report lower levels of binge drinking than non-recipients (8.5% vs. 12.9% among the unemployed; 9.4% vs. 13.6% among the employed).

Cross-Sectional Analysis: Findings

Prior to matching individuals on the propensity score, we observed significant differences in the demographic and socioeconomic characteristics of social assistance recipients in the United States and their non-recipient counterparts. These differences were no longer significant after matching, indicating that we succeeded at reducing bias and achieving a satisfactory covariate balance. The results suggest that, even after achieving this balance, social assistance recipients in the United States are doing worse than the comparison group, particularly in the employed subsample. As shown in Table 3.3, among the unemployed, there was limited evidence that social assistance recipients show higher rates of poor self-rated health (3.9%-4.6%) and smoking (5.3%-6.3%). These treatment effects were only statistically significant when using kernel matching. Differences in the prevalence of chronic conditions, hypertension, obesity, binge drinking, and physical activity were not statistically significant. As shown in Table 3.4, among the employed, however, there was more evidence of worse health outcomes among social assistance recipients. Relative to the comparison group, employed recipients reported higher rates of poor self-rated health (2.2%-3.2%), chronic conditions (2.2%-3.1%), hypertension (2.7%-4.4%), smoking (6.9%-7.3%), and binge drinking (0.5%-2.8%). The effects on hypertension and smoking were statistically significant across both specifications, while the effects on poor self-rated health and chronic conditions were only statistically significant using kernel matching and the effects on binge drinking were only statistically significant when using caliper matching. Differences in the prevalence of obesity and physical activity were not statistically significant.

Longitudinal Analysis: Descriptive Characteristics

Table 3.7 presents a description of the baseline characteristics of the full and analytic samples. Relative to the full sample, those in our analytic sample from the United States were more likely to be a non-white (22.1% vs. 17.5%) less likely to have completed a post-secondary degree (18.5% vs. 29.7%), less likely to have health insurance coverage (71.9% vs. 80.2%), and less likely to own their dwelling (64.8% vs. 70.7%). Relative to the full sample, they exhibited higher rates of poor self-rated health (45.7% vs. 6.7%) and social assistance recipiency (3.1% vs. 1.5%), and similar levels of unemployment (5.1% vs. 4.8%). Those in the analytic sample also reported lower average household income compared to those in the full sample. Table 3.8 presents trends in the labour market status, social assistance coverage, and self-rated health of the full and analytic samples over the period of study. Within the analytic sample, there was a somewhat secular trend towards decreasing rates of social assistance recipiency, from 3.5% in 2002 to 1.5% in 2011. Rates of poor self-rated health and unemployment remained relatively stable during the study period.

Longitudinal Analysis: Findings

Table 3.9c presents the results of our pooled logit and fixed effects models for the United States. In the pooled logit model (Model 1), after controlling for a range of demographic and

socioeconomic variables, factors associated with poor self-rated health included being unemployed (OR 1.48, SE 0.06) and receiving social assistance (OR 1.49, SE 0.10), while being married or cohabitating, having children, having health insurance, and having a higher household income were all associated with better self-rated health. In the crude fixed effects model (Model 2), moving into unemployment was associated with poor self-rated health (OR 1.32, SE 0.12). By contrast, the association between social assistance receipt and self-rated health was no longer significant. These results remained stable after controlling for time-varying characteristics (*i.e.* household structure and income) (Models 3-4). As shown in Table 3.10c, our supplemental analyses using linear probability modeling suggested no significant interaction between social assistance and employment status.

3.3.4. United Kingdom

Cross-Sectional Analysis: Descriptive Characteristics

Table 3.1d presents a description of the demographic and socioeconomic characteristics of the full and analytic samples. Relative to non-recipients, social assistance recipients in the full English population were more likely to attain less than a secondary level of education (29.0% vs. 22.4% among the unemployed; 23.6% vs. 11.7% among the employed), less likely to own their dwelling (25.9% vs. 48.0% among the unemployed; 32.7% vs. 78.0% among the employed). Social assistance recipients also reported significantly lower average household income. While unemployed recipients were less likely than non-recipients to be women (25.3% vs. 34.0%) and tended to be older (39.2 years vs. 36.7 years), employed recipients were more likely to be women (54.0% vs. 46.2%) and tended to be younger (34.0 years vs. 40.4 years). Additionally, employed social recipients were more likely to be parents (46.9% vs. 35.2%), less likely to be white (85.7% vs. 92.1%), and more likely to be in part-time employment (47.3% vs. 22.0%).

Within our English analytic sample of low-income individuals, social assistance recipients were less likely to own their dwelling (19.8% vs. 31.0% among the unemployed; 27.1% vs. 53.2% among the employed). Social assistance recipients also reported lower average household income. While unemployed recipients were less likely than non-recipients to have children (26.9% vs. 37.9%) and less likely to be women (27.2% vs. 33.3%), employed recipients were more likely to have children (60.0% vs. 52.5%) and more likely to be women (63.6% vs. 56.0%). Employed recipients were also older (32.9 years vs. 39.8 years) and more likely to be in part-time employment (60.0% vs. 46.9%) than their non-recipient counterparts.

Table 3.2d presents a description of the health-related characteristics of the full and analytic samples. In contrast to the other jurisdictions, social assistance recipients in England were not consistently more likely to report worse health outcomes and worse behavioural risk profiles compared to non-recipients. In the full population, recipients were more likely to be smokers (75.7% vs. 65.9% among the unemployed; 60.5% vs. 52.9% among the employed). In addition, employed recipients were more likely to report poor self-rated health (26.2% vs. 13.5%). By contrast, in the restricted low-income analytic sample, unemployed recipients were less likely to report poor self-rated health (35.9% vs. 41.9%), whereas employed recipients remained at a greater risk of reporting poor self-rated health (26.1% vs. 21.0%). Low-income recipients also

reported higher rates of smoking (78.4% vs. 72.9% among the unemployed; 60.0% vs. 55.6% among the employed).

Cross-Sectional Analysis: Findings

Prior to matching individuals on the propensity score, we observed significant differences in the demographic and socioeconomic characteristics of social assistance recipients in England and their non-recipient counterparts. These differences were no longer significant after matching, indicating that we succeeded at reducing bias and achieving a satisfactory covariate balance. The results reported in Table 3.3 and Table 3.4 suggest that, after achieving this balance, social assistance recipients and non-recipients in England for the most part report similar health outcomes. One exception to this rule is self-rated health. In contrast to our findings in the other three jurisdictions, unemployed recipients in England reported significantly lower rates of poor self-rated health (-5.1% - -7.1%) relative to non-recipients. This treatment effect was only significant when using kernel matching. On the other hand, employed recipients reported significantly higher rates of poor self-rated health (5.8% - 13.4%). This effect was only significant when using caliper matching. Finally, unemployed recipients also exhibited higher rates of smoking (2.2% - 4.8%).

Longitudinal Analysis: Descriptive Characteristics

Table 3.7 presents a description of the baseline characteristics of the full and analytic samples. In contrast to the remaining jurisdictions, we did not observe significant differences in demographic and socioeconomic characteristics between those in the full sample and those in the analytic sample. They reported similar level of non-white status (3.51% and 3.94%), similar rates of post-secondary degree completion (19.5% vs. 17.9%), similar rates of home ownership (83.5% vs. 82.5%), and similar average household income. They also reported similar levels of social assistance recipiency (3.9% vs. 4.0%) and unemployment (3.7% vs. 3.6%). However, those in the analytic sample did report significantly greater levels of poor self-rated health (34.5% vs. 21.6%). Table 3.8 presents trends in the labour market status, social assistance coverage, and self-rated health of the full and analytic samples over the period of study. Within the analytic sample, rates of unemployment, social assistance recipiency, and poor self-rated health remained relatively stable over time.

Longitudinal Analysis: Findings

Table 3.9d presents the results of our pooled logit and fixed effects models for the United Kingdom. In the pooled logit model (Model 1), after controlling for a range of demographic and socioeconomic variables, unemployment was associated with poor self-rated health (OR 1.66, SE 0.16), though social assistance receipt was not. Factors associated with better self-rated health included having children and having a higher household income. In the crude fixed effects model (Model 2), movement into both unemployment (OR 1.35, SE 0.16) and social assistance receipt (OR 1.30, SE 0.16) were associated with poor self-rated health. These results remained stable after controlling for time-varying characteristics (*i.e.* household structure and income) (Models 3-4). As shown in Table 3.10d, our supplemental analyses using linear probability modeling suggested no significant interaction between social assistance and employment status.

3.4. Discussion of Findings

The results of our analyses suggest that, compared to non-recipients, social assistance recipients tend to be more income-insecure and are more likely to have other characteristics that are associated with socioeconomic disadvantage. They also have a worse health profile. Analytic models conducted to carefully control for differences in characteristics, and thus isolate the impact of social assistance, demonstrated that the health of social assistance recipients was, in most cases, worse than, and in some cases, no different than, the health of non-recipients. This finding held true when recipients were directly compared to closely matched non-recipients, and also when recipients were studied over time to determine the change in health associated with change in reciprocity status. In general, for cross-sectional analyses across all societies, there were fewer outcomes that demonstrated significant treatment effects in the unemployed sample compared to the employed sample, and the effect sizes were also considerably smaller for the employed sample. For the unemployed sample, Canada had the greatest number of outcomes with significant average treatment effects, while Ontario's average treatment effects were highest in magnitude. In longitudinal analyses, results from Canada and England suggested social assistance reciprocity was associated with poorer health, while for Ontario and the United States, changes in health status were not statistically significant.

Contrary to public health theory, which would predict that among the income-insecure, receipt of social assistance would be beneficial to health, and despite conducting among, if not the most rigorous possible analyses given available data, our results are consonant with the existing literature, which also suggest that current social assistance policies are not supporting the health of this group. On the surface, these results might suggest that providing benefits to the income insecure is inherently problematic for health. But, from a plethora of theoretical and empirical findings, such an explanation is without any merit. Rather, there are other far more plausible explanations, including the insufficiency of benefits (meaning the benefits are simply inadequate to overcome income insecurity), the stringency of eligibility criteria, and selection processes that lead sicker people to be more likely to become social assistance recipients.

3.5. Limitations

Though our study was conducted with the highest possible degree of rigor, given the available data, it does suffer from some limitations. Two limitations are related to the nature of the available data. First, health surveys from Canada do not extend back far enough to be able to assess change in health status associated with change in social assistance policies that occurred during the mid 1990s. Such data would permit a study design akin to a natural experiment, in which the implementation of a new policy is the 'treatment,' and the change in health status among the treated can be compared to the change in health status among a suitable control group. For example, former Ontario Premier Harris' "common sense revolution" of 1995 provided a unique natural experiment to identify cause and effect.

Another data limitation, also mentioned above, is the inability to account for a more extensive set of potential sources of confounding or selection bias. Finally, our study is limited by an inability to study the health effects of policies that improve benefits, rather than those that have reduced

them. This is because, in the era of neoliberalism, most societies have experienced across-the-board retrenchment. As societies, including Canada, begin to consider alternative programs that may improve benefits of the most income insecure (such as basic income arrangements), it will become important to also assess their health effects.

4. DISCUSSION

As the health of the rich continues to outpace the poor, considerable debate has emerged concerning possible causes of this phenomenon [92]. Grounded in public health theory and evidence, the most plausible candidate explanation can be articulated as follows. A general policy orientation among the advanced capitalist societies, known as neoliberalism, has created a widening of income and other socioeconomic inequalities, which is resulting in a commensurate widening of health inequalities [20,21]. In this context, our study sought to answer a specific research question: are policies that are intended to provide a safety net for society's most income-insecure succeeding in improving the health status of this group?

We answered this question through multiple means. First, we conducted a systematic review of the existing evidence from advanced capitalist countries with substantial welfare state structures, including Canada and comparable nations. Next, we examined how the health status of individuals who receive social assistance compares to the health status of their matched non-recipient counterparts in Ontario, Canada, and two comparable societies, the United States and the United Kingdom. Third, for each of these societies, we explored how the health of individuals changes over their life course as the move in and out of periods of collecting social assistance benefits. In this section of our study, we discuss our overall findings.

The results of all three components of our study were remarkably consistent: the receipt of social assistance and other similar means-tested benefits is associated with poorer health status or, at best, the absence of a clear health advantage, even when using many of the best available methods for controlling for alternative explanations, such as differences in the demographic and socioeconomic characteristics of recipients and non-recipients. The one exception to this finding was detected in our cross-sectional results from the United Kingdom, though this may be attributable to an inability to adequately differentiate between recipients of very different social assistance benefits — those intended for the poorest, and those that extend further into the socioeconomic spectrum. Moreover, evidence from the United States suggests that, over the mid 1990s, the period during which many societies underwent 'welfare reforms,' which created stricter eligibility criteria for reciprocity, rolled back the income and other benefits received by recipients, and attached conditionalities to receiving benefits, the health of social assistance recipients declined [25,26]. On the other hand, as indicated by the results of our systematic review, universal policies that provide income assistance (those such as employment/unemployment insurance, which are not means tested) appear to have been more likely to be successfully supporting the health of those experiencing socioeconomic disadvantage, including income insecurity [47].

Our study thus lends support to the leading explanation for widening socioeconomic inequalities in health. It suggests that one potential mechanism through which health inequalities are

entrenched and even widening is that means-tested social assistance programs have failed to counteract the impact on health status associated with economic insecurity.

There are several possible explanations for our findings. The amount of income currently provided by social assistance may be insufficient to buffer individuals and families in times of income scarcity and insecurity [19,26]. Work conditionalities attached to receipt of social assistance may be offsetting health benefits of social assistance, because recipients are being exposed to precarious labour market conditions [26,93,94]. The stigma associated with receiving means-tested benefits may also work to counteract potential health effects of social assistance [95,96]. In the context of ancillary benefits that are not universally available (e.g., Ontario Drug Benefit, Healthy Smiles Program), there is a ‘selection effect’ occurring, whereby people who are sicker, or for some other reason in more need of benefits, are more likely to be on social assistance [97]. Though we carefully controlled for many of the most notable ‘confounding’ explanations, other unaccounted for ‘confounding’ or ‘selection effects’ may differentiate social assistance recipients from the control/comparison groups we used (e.g., unemployment duration, unreported sources of income support), thus making for a problematic comparison. To the extent that these factors are also associated with health status, they could be biasing our findings. Unfortunately, we lack the data necessary to take account of these additional factors.

Our study also uncovered a major gap in the public health literature on health inequalities: a strong theoretical basis for privileging neoliberal policy directions (and other associated neoliberal phenomena) as primary explanations for growing health inequalities, and a dearth of strong empirical evidence to test this proposition [20]. We note some possibilities for this disjuncture. First, health surveys that are routinely conducted by governments tend to be limited in the data they offer to rigorously test questions on neoliberalism [98]. This is because the socioeconomic information they contain tends not to be sufficiently detailed, or because it tends not to be available over a sufficient time period (i.e., before and during neoliberalism) to analyze changes in health status associated with changes in policy. There have also been methodological limitations. While epidemiology is the main field of study pursuing the study of health inequalities, the conventional set of statistical methods used in epidemiology is more suited to understanding the impact on health of individual characteristics, rather than of policies [31]. In fact, in our systematic review of the literature, only about one-third of papers drew on the quasi-experimental methods that are considered to be the gold standard for assessing policy impacts. Finally, it is also possible that the lack of studies on this topic is intimately tied to political and institutional barriers that constrain this line of research, the most significant of which may be the lack of funding available for this research [99]. Funding limitations may stem from many factors, including: lack of dedicated, or ‘earmarked’ funding, an aversion of grant reviewers to favor politically sensitive research in general competitions, or a misalignment with the priorities of both health funders (who often don’t fund research on social policies) and social science funders (who often don’t fund research on health), resulting in this field of research ‘falling through the cracks’.

5. RECOMMENDATIONS

Our findings lend support to the notion that the most promising overarching policy direction for improving the health of the most economically insecure in society, and thus for reducing burdensome and unjust health inequalities, is to decrease economic insecurity itself. The results of our study, in the context of the broader literature, suggest a need for further research on alternative models of social assistance with the following attributes.

1. Social assistance programs that increase the generosity and population coverage of benefits. With significant evidence that social assistance programs have not kept up with the cost of living and do not cover many of the most economically insecure, our study suggests that, from a health perspective, policies may be warranted that reverse welfare reforms implemented over the past several decades. This includes expanding eligibility criteria, increasing the rates of income benefits provided, and untethering the receipt of benefits to work conditionalities.
2. Social assistance programs that provide universal ancillary benefits. While there are many rights-based arguments to support universal provision of benefits such as free prescription drugs and dental care, our study further suggests that doing so may prevent social assistance from representing a conduit to these benefits, rather than fulfilling its primary intent: as a means for providing a short-term economic safety net.
3. Social assistance programs that occur in a context of reduced broader socioeconomic inequality. In the context of the broader literature, there is likely to be a role for a broader set of policy solutions, beyond those pertaining directly to the reform of social assistance programs. Studies have documented that it is not only one's absolute income level, but their income relative to others in society that is predictive of health status [100]. The robustness of these findings suggests that the health of the most economically insecure will be improved if their economic circumstances are improved not only in absolute terms, but in significant ways in relation to the circumstances of broader society. Studies in the fields of economics demonstrate that reducing socioeconomic inequality will require bold, not incremental, policy shifts – both to expand the social safety net, and to reduce the precariousness of the labor market [101]. For example, in the United States, the intergenerational roots of economic inequalities are increasingly being exposed: a combination of historical social policies that selectively advantaged Whites, and the process of passing on accumulated wealth to children and grandchildren [102,103]. The solutions being discussed include 'baby bonds,' through which children would receive, at birth, bonds that would be distributed on a sliding scale, with the most disadvantaged children receiving the highest amounts. Other solutions to reduce socioeconomic inequality include expanded unionization and even a job guarantee [104]. A job guarantee program is one in which the government guarantees employment with good working conditions and benefits for those not employed by the private sector, a program that was considered in the past by several U.S. administrations, and is thought to hold the potential to increase economic indicators such as workforce productivity, and at the same time, incentivize the private sector to provide better job conditions in a manner similar to union coverage.

While researchers cannot usually influence the implementation of programs with these characteristics, there are two feasible next-steps that will make significant contributions to the evidence base. The first is an effort to link, and make readily accessible, the administrative data on social assistance recipients and, importantly, also on non-recipients, in order to more fully account for variables that cannot be fully accounted for with currently available survey data. Such an endeavor would lead to even more robust conclusions about the association between receipt of social assistance and health status.

The second is to use the implementation of new programs, or reforms to programs, as an opportunity to conduct an experiment, or quasi-experiment, which are considered to be the strongest research designs for establishing the impact of a policy or program on a range of outcomes, including health status. On the horizon in Ontario is the implementation of the Basic Income Pilot Project, which provides experimental conditions (there is a ‘treated’ group, whom will receive the new program, and a comparable ‘control’ group, whom will not, and there pre- and post-program outcomes can be compared to assess the impact of the program (which is equal to the difference in pre- and post- outcomes in the treated group minus the difference in the pre- and post-outcomes in the control group). The Basic Income Pilot Project thus provides a unique window of opportunity to test an alternative model of social assistance in the context of an experimental study design.

FIGURES AND TABLES

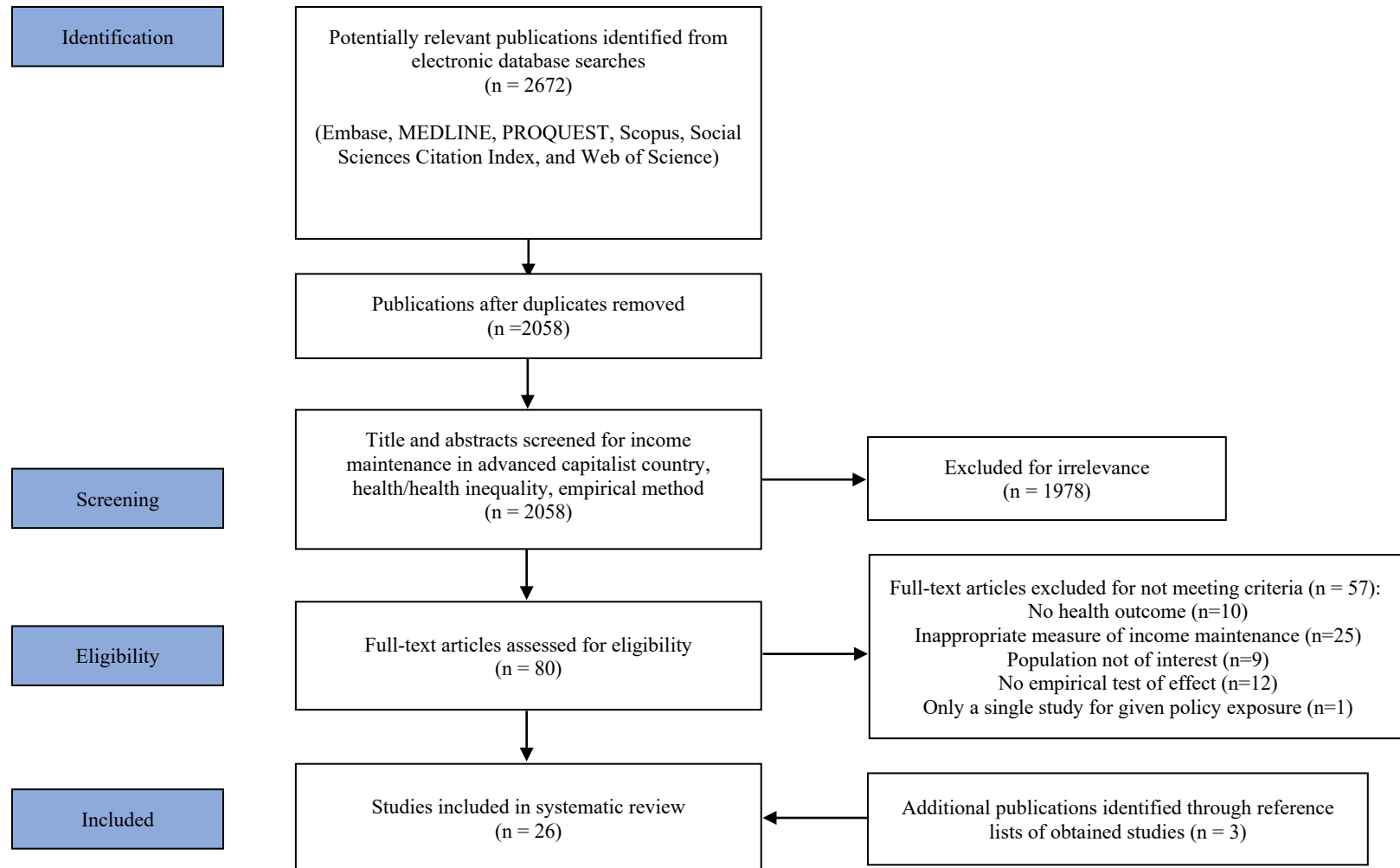


Figure 2.1: Summary of the search strategy

Table 2.1: List of search terms	
Component of the Review	Search Terms
Policy or Program	welfare state, welfare program, welfare reform, minimum income benefits, social assistance, public assistance, unemployment insurance, unemployment benefits, social protection, social policy, social policies, social welfare, social security, tax credit, economic policy, income supplement, income supplementation, tax benefits, unconditional cash transfer, conditional cash transfer, earned income tax credit, aid to families with dependent children, temporary assistance to needy families, Ontario works
Outcome	health status, health outcome, health equity, health disparities, health inequalities, self-rated health, mortality, public health
Methods	regression, multilevel, propensity score, regression discontinuity, instrumental variable, near-far matching, decomposition, difference-in-differences, synthetic control, cross-sectional, longitudinal

Table 2.2: Description of studies examining the health impact of social assistance (N=10)							
Authors	Country	Data Source and Observations	Relevant Research Question	Study Design	Methods	Health Outcome	Relevant Findings
Baigi et al (2008)	Sweden	Health on Equal Terms Survey (N=12166)	How does the health of social assistance recipients compare to the health of non-recipients in Sweden?	Cross-sectional	Logistic regression	Psychological symptoms Physiological symptoms Health-related behaviours	Relative to non-recipients, social assistance recipients reported more adverse psychological symptoms, more adverse physiological symptoms, and worse health behaviours. For example, they reported higher rates of anxiety (OR 2.73, 95% CI 2.11-3.53), smoking (OR 4.59, 95% CI 3.56-5.93), and poor nutritional habits (OR 2.56, 95% CI 1.98-3.31).
Basu et al (2016)	United States	Behavioural Risk Factor Surveillance System (N=2641734)	What was the impact of the 1996 Personal Responsibility Work Opportunity and Reconciliation Act (PRWORA) on the health of low-income single mothers in the United States?	Quasi-experimental	Difference-in-differences Synthetic control	Alcohol consumption Tobacco consumption	Among low-income single mothers, PRWORA was associated with an 8.8% (95% CI 6.8%-10.8%) increase in smoking and an 8.3% (95% CI 4.7%-12.0%) increase in binge drinking.
Dooley and Prause (2002)	United States	National Longitudinal Survey of Youth (N=3600)	What is the impact of a transition into social assistance on the health of women in the United States?	Longitudinal	Linear regression Logistic regression	Alcohol consumption Depressive symptoms	A transition into social assistance was associated with significant increases in depressive symptoms ($\beta=0.06$, $p<0.05$) and binge drinking (OR 2.06, $p<0.05$).
Ensminger and Juan (2001)	United States	Woodlawn Study (N=681)	What is the association between the receipt of social assistance during the child-rearing stage and the later health outcomes of low-income mothers in the United States?	Longitudinal	Linear regression Logistic regression	Self-rated health Chronic conditions Psychological distress	Relative to non-recipient mothers, mothers who received social assistance in both 1967 and 1975 reported higher rates of poor self-rated health, psychological distress, and chronic conditions.

Table 2.2 (cont'd): Description of studies examining the health impact of social assistance (N=10)

Authors	Country	Data Source and Observations	Relevant Research Question	Study Design	Methods	Health Outcome	Relevant Findings
Jayakody et al. (2000)	United States	National Household Survey of Drug Abuse (N=2728)	How does the health of social assistance recipients compare to the health of non-recipients among single mothers in the United States?	Cross-sectional	Logistic regression	Psychological disorder	Relative to non-recipients, social assistance recipients reported higher rates of psychological disorders (OR 1.35, p<0.05).
Løyland et al (2011)	Norway	Norwegian Survey of Living Conditions (N=4312)	How does the health of long-term social assistance recipients compare to that of the general population in Norway?	Cross-sectional	Linear regression	Psychological distress Health-related quality of life	Relative to non-recipients, long-term social assistance recipients reported higher levels of psychological distress and lower health-related quality of life.
Muennig et al (2013)	United States	Social Security Administration Death Master File (N=5094)	What was the impact of the 1994 Florida Family Transition Program welfare reform experiment on the mortality of social assistance recipients who participated in the program?	Experimental	Survival	Mortality	Relative to other social assistance recipients, participants in the Florida Family Transition Program experienced a 16 percent higher mortality rate than recipients of traditional social assistance benefits (HR 1.16, 95% CI 1.14-1.19).
Narain et al (2017)	United States	Survey of Income and Program Participation	What was the impact of the 1996 Personal Responsibility Work Opportunity and Reconciliation Act on the health of low-education single mothers in the United States?	Quasi-experimental	Difference-in-differences	Self-reported health	Among white low-educated single mothers, PRWORA was associated with a 7% increase in the prevalence of poor self-rated health (95% CI 0.01-0.12). Significant estimates were not found among other racial groups.

Table 2.2 (cont'd): Description of studies examining the health impact of social assistance (N=10)							
Authors	Country	Data Source and Observations	Relevant Research Question	Study Design	Methods	Health Outcome	Relevant Findings
Vozoris and Tarasuk (2004)	Canada	National Population Health Survey (N=51938)	How does the health of social assistance recipients compare to the health of non-recipients in Canada?	Cross-sectional	Logistic regression	Self-rated health Depression Distress Chronic conditions	Relative to non-recipients, social assistance recipients reported significantly higher odds of reporting poor self-rated health, depression, distress, and heart disease. Significant associations were not observed for obesity, diabetes, or hypertension.
Wilde et al (2014)	United States	Social Security Administration Death Master File (N=4612)	What was the impact of the 1996 Connecticut Jobs First welfare reform experiment on the mortality of social assistance recipients who participated in the program?	Experimental	Survival	Mortality	Relative to other social assistance recipients, participants in the Connecticut Jobs First program did not exhibit significant differences in mortality hazards. They did exhibit a slight, non-significant increase in mortality hazards.

Table 2.3: Description of studies either examining the health impact of unemployment benefits or comparing the health impacts of social assistance and unemployment benefits (N=7)

Authors	Country	Data Source and Observations	Relevant Research Question	Study Design	Methods	Health Outcome	Relevant Findings
Ford et al (2010)	United Kingdom	Adult Psychiatric Morbidity Survey (N=5090)	Does the receipt of unemployment benefits or social assistance mitigate the adverse health consequences of unemployment?	Cross-sectional	Logistic regression	Common mental disorders	Relative to employed individuals, the risk of common mental disorders was significantly greater in individuals receiving no benefits or social assistance. The risk of common mental disorders was not significantly greater in individuals receiving unemployment benefits.
Butterworth (2003)	Australia	National Survey of Mental Health and Wellbeing (N=10641)	How does the health of unemployment assistance recipients compare to the health of non-recipients in Australia?	Cross-sectional	Logistic regression	Psychological distress Mental disorders	Relative to non-recipients, unemployment assistance recipients reported greater levels of psychological distress (OR 2.77, 95% CI 2.38-3.24) and mental disorders (OR 1.92, 95% CI 1.64-2.26) than non-recipients.
Kiely and Butterworth (2013)	Australia	Household, Income and Labour Dynamics in Australia Survey (N=11031)	How does the health of unemployment assistance recipients compare to the health of non-recipients among working-age adults in Australia?	Longitudinal	Linear regression	Mental health	Relative to individuals not in receipt of any form of benefits, unemployed individuals receiving unemployment assistance reported worse mental health outcomes ($\beta=-2.45$, $p<0.001$).
Nordenmark et al (2006)	Ireland Sweden United Kingdom	Living in Ireland Panel Survey (N=923) Swedish Long-Term Unemployment Project (N=1394) British Household Panel Survey (N=1125)	Does the receipt of unemployment insurance or social assistance mitigate the adverse health consequences of unemployment?	Longitudinal	Linear regression	Psychological distress	In Sweden, unemployed individuals in receipt of unemployment insurance report significantly lower levels of psychological distress than unemployed individuals in receipt of social assistance or in receipt of no benefits at all. Similar results are found in Ireland and the United Kingdom, though these estimates do not remain significant after controlling for known confounders.

Table 2.3 (cont'd): Description of studies either examining the health impact of unemployment benefits or comparing the health impacts of social assistance and unemployment benefits (N=7)

Authors	Country	Data Source and Observations	Relevant Research Question	Study Design	Methods	Health Outcome	Relevant Findings
Rodriguez et al (1997)	United States	National Survey of Families and Households (N=7703)	Does the receipt of unemployment insurance or social assistance mitigate the adverse health consequences of unemployment?	Cross-sectional	Linear regression	Depressive symptoms	Inequalities in depressive symptoms were not observed between full-time workers and unemployed individuals receiving unemployment insurance benefits. By contrast, unemployed individuals receiving social assistance benefits or receiving no benefits at all reported higher levels of depressive symptoms relative to full-time workers.
Rodriguez (2001)	Germany United Kingdom United States	German Socio-Economic Panel (N=11086) British Household Panel Survey (N=8726) Panel Study on Income Dynamics (N=11668)	Does the receipt of unemployment insurance or social assistance mitigate the adverse health consequences of unemployment?	Longitudinal	Linear regression Logistic regression	Self-rated health	Inequalities in self-rated health were not observed between full-time workers and unemployed individuals receiving unemployment insurance benefits. By contrast, unemployed individuals receiving social assistance benefits or receiving no benefits at all reported poorer self-rated health relative to full-time workers.
Rodriguez et al (2001)	United States	National Survey of Families and Households (N=8029)	Does the receipt of unemployment insurance or social assistance mitigate the adverse mental health consequences of unemployment?	Longitudinal	Linear regression	Depressive symptoms	Among women, the receipt of unemployment insurance benefits was associated with a reduction in the adverse mental health consequences of unemployment. Unemployed men and women receiving social assistance were more likely than all other groups to report depressive symptoms in the short and long term.

Table 2.4: Description of studies examining the health impact of tax credits for low-income households (N=9)

Authors	Country	Data Source and Observations	Relevant Research Question	Study Design	Methods	Health Outcome	Relevant Findings
Averett and Wang (2013)	United States	National Longitudinal Survey of Youth (N=5830)	What was the impact of the 1993 expansion of the Earned Income Tax Credit (EITC) on the smoking behaviours of eligible women in the United States?	Quasi-experimental	Difference-in-differences	Smoking Status	White mothers eligible for expanded EITC benefits reported an 11% ($p<0.05$) decrease in the probability of smoking relative to white mothers who were not eligible for expanded EITC benefits. Significant associations were not found among black mothers.
Boyd-Swan et al (2015)	United States	National Survey of Families and Households (N=5557)	What was the impact of the 1990 expansion of the EITC on the mental health of eligible women in the United States?	Quasi-experimental	Difference-in-differences	Depressive symptoms	The expansion of EITC benefits was associated with a 15.7% ($p<0.05$) reduction in depression symptomatology among married mothers eligible for the expanded benefits. Robust associations were not found among unmarried mothers eligible for the expanded benefits.
Cowan and Tefft (2012)	United States	Behavioural Risk Factor Surveillance System (N=173811)	What was the impact of the 1993 expansion of the EITC on the smoking behaviours of eligible women in the United States?	Quasi-experimental	Difference-in-differences	Smoking status	The expansion of EITC benefits was associated with 2-4% ($p<0.05$) declines in the probability of smoking among married and unmarried mothers with some college education. Similar reductions were not found among mothers with a high school degree or less.
Evans and Garthwaite (2014)	United States	Behavioural Risk Factors Surveillance Survey (N=33673) National Health and Nutrition Examination Survey (N=3090)	What was the impact of the 1993 expansion of the EITC on the health of eligible women in the United States?	Quasi-experimental	Difference-in-differences analysis	Self-rated health Biomarkers	Women who were eligible for higher EITC benefits experienced a 1.35% ($p<0.05$) increase in the probability of reporting excellent or very good self-rated health and exhibited 23% ($p<0.05$) lower counts of risky biomarkers.

Table 2.4 (cont'd): Description of studies examining the health impact of tax credits for low-income households (N=9)

Authors	Country	Data Source and Observations	Relevant Research Question	Study Design	Methods	Health Outcome	Relevant Findings
Pega et al (2013)	New Zealand	Survey of Family, Income and Employment (N=6900)	What is the short-term impact of the In-Work Tax Credit (IWTC) on the self-rated health of working-age parents in New Zealand?	Longitudinal	Linear regression	Self-rated health	Becoming eligible for the IWTC and being eligible for \$1000 more in IWTC payments were not associated with any significant differences in self-rated health.
Pega et al (2014)	New Zealand	Survey of Family, Income and Employment (N=6900)	What is the short-term impact of the Family Tax Credit (FTC) on the self-rated health of working-age parents in New Zealand?	Longitudinal	Linear regression	Self-rated health	Becoming eligible for the FTC and being eligible for \$1000 more in FCT payments were not associated with any significant differences in self-rated health.
Pega et al (2016)	New Zealand	Survey of Family, Income and Employment (N=6900)	What is the cumulative impact of the FTC on the self-rated health of working-age parents in New Zealand?	Longitudinal	Linear regression Marginal structural modeling	Self-rated health	Each additional year of FTC receipt was associated with a reduction in self-rated health. In fully adjusted marginal structural models using stabilized weights, the average treatment effect associated with each additional year of FTC was a 0.031 unit decrease in self-rated health ($p < 0.05$).
Pega et al (2017)	New Zealand	Survey of Family, Income and Employment (N=4404)	What is the cumulative impact of the FTC on the smoking behaviours of working-age parents in New Zealand?	Longitudinal	Logistic Regression Marginal structural modeling	Smoking status Number of cigarettes	There was no association between the cumulative number of years of receiving the FTC and tobacco smoking or consumption among parents.
Rehkopf et al (2014)	United States	National Health and Nutrition Examination Survey (N=6925)	What is the short-term impact of the EITC on the health-related behaviours, risk factors, and biomarkers among eligible women in the United States?	Quasi-experimental	Difference-in-differences	Health-related behaviours Biomarkers	EITC receipt was associated with both beneficial and detrimental short-term outcomes. On balance, there appeared to be more health benefits than detriments. For example, EITC-eligible individuals in the disbursement months experience less food insecurity, were less likely to smoke or be exposed to smoke, and were more likely to be trying to lose weight.

Table 2.5: Overview of the studies included in the review

Study Characteristic	n
Country	
Australia	2
Canada	1
New Zealand	4
Norway	1
Sweden	1
United States	14
United Kingdom	1
Multiple	2
Policy Exposure	
Social assistance	10
Unemployment benefits	3
Social assistance and unemployment benefits	4
Tax credits for low-income households	9
Data Source	
Nationally representative survey data	23
Population-based administrative data	2
Community cohort study data	1
Study Design	
Cross-sectional	7
Longitudinal	10
Quasi-experimental	7
Experimental	2
Health Outcome	
Self-rated general health	8
Psychological health	13
Health-related behaviors	5
Mortality	2
Biomarkers	2
Health-related quality of life	1
Chronic conditions	1

Table 2.6: Methodological quality assessment of the studies included in the review

	Quality rating	Methodological Criteria					
		The study uses a representative sample.	The study uses a direct measure of exposure.	The study describes the exposed and unexposed groups.	The study controls for observed confounders.	The study attempts to control for unobserved confounding.	The study tests the robustness of reported estimates.
Averett and Wang (2013)	Medium	*			*	*	*
Baigi et al (2008)	Low	*	*				
Basu et al (2016)	High	*		*	*	*	*
Boyd-Swan et al (2015)	Medium	*			*	*	*
Butterworth (2003)	Medium	*	*	*	*		
Cowan and Tefft (2012)	High	*		*	*	*	*
Dooley and Prause (2002)	Medium	*	*	*	*		
Ensminger and Juan (2001)	Low				*		
Evans and Garthwaite (2014)	High	*		*	*	*	*
Ford et al (2010)	Low	*	*				
Jayakody et al (2000)	Medium	*	*		*		
Kiely and Butterworth (2013)	Medium	*	*	*	*		
Løyland et al (2011)	Low		*	*			
Muennig et al (2013)	Medium		*		*	*	
Narain et al (2017)	High	*		*	*	*	*
Nordenmark et al (2006)	Medium	*	*		*		
Pega et al (2013)	Medium	*		*	*		*
Pega et al (2014)	Medium	*		*	*		*
Pega et al (2016)	High	*	*	*	*		*
Pega et al (2017)	Medium	*	*	*	*		
Rehkopf et al (2014)	High	*		*	*	*	*
Rodriguez et al (1997)	Medium	*	*	*	*		
Rodriguez (2001)	Medium	*	*		*		
Rodriguez et al (2001)	Medium	*	*		*		
Vozoris and Tarasuk (2004)	Medium	*	*	*			
Wilde et al (2014)	Medium		*	*	*	*	

Table 3.1a: Weighted demographic and socioeconomic characteristics: Ontario (CCHS 2003-2014)

	Full sample: 18-64 in the labour force					Analytic sample: Low-Income 18-64 in the labour force						
	Unemployed		Employed			Unemployed		Employed				
	Treated N=630	Untreated N=2354	Treated N=1443	Untreated N=81867		Treated N=444	Untreated N=372	Treated N=532	Untreated N=2621			
Age (years)	36.4	37.3	39.7	42.2	***	36.5	39.5	***	38.0	39.8	**	
Female	48.0%	49.1%	50.3%	44.6%	***	55.0%	59.1%	***	63.0%	57.1%	**	
Household Type												
Single	37.3%	12.8%	***	20.0%	14.2%	***	45.5%	39.0%	41.7%	31.2%	***	
Couple	30.3%	76.7%	***	9.7%	22.1%	***	4.5%	11.3%	***	5.1%	11.5%	***
Single with children	32.4%	10.4%	***	26.8%	8.0%	***	37.6%	19.9%	***	35.5%	17.4%	***
Couple with children	collapsed with couple		43.5%	55.7%	***	12.4%	29.8%	***	17.7%	39.9%	***	
Number of children (0-5 years old)	0.26	0.18	***	0.26	0.20	***	0.33	0.18	***	0.35	0.30	
Number of children (6-11 years old)	0.29	0.21	**	0.27	0.27		0.32	0.22	*	0.38	0.34	
Race												
White	61.2%	62.7%		68.3%	75.6%	***	70.9%	61.6%	*	25.0%	30.4%	**
Black	11.3%	3.9%	***	6.5%	3.3%	***	collapsed with other or mixed					
Aboriginal/Native	8.8%	2.5%	***	6.3%	1.8%	***	10.8%	5.6%	**	8.6%	3.7%	***
Asian	14.4%	24.6%	***	12.6%	15.5%	**	collapsed with other or mixed					
Other or mixed	4.3%	6.3%		6.3%	3.9%	***	18.3%	32.8%	***	66.4%	65.9%	***
Immigrant	34.0%	39.5%	*	28.8%	31.3%	*	20.0%	36.6%	***	18.2%	32.0%	***
Education												
Postsecondary degree	collapsed with some postsecondary		14.5%	27.9%	***	6.5%	17.5%	***	5.8%	16.4%	***	
Some postsecondary	48.1%	61.1%	***	36.3%	38.6%		33.1%	32.5%		34.4%	35.3%	***
Secondary	29.8%	28.9%		31.4%	25.9%	***	30.6%	32.5%		34.8%	30.3%	*
Less than secondary	22.1%	10.0%	***	17.8%	7.6%	***	29.7%	17.5%	***	25.0%	18.1%	***
Adjusted Household Income (CAD)	13505	40200	***	29351	58089	***	8393	9076	**	9289	9196	
Urban	91.8%	87.8%	**	89.7%	85.3%	***	92.6%	88.2%	*	91.5%	85.1%	***
Owner	14.9%	68.7%	***	40.9%	78.9%	***	7.7%	44.1%	***	9.4%	52.4%	***
Part-Time Employment				27.5%	10.3%	***				58.1%	30.1%	***
Mental Health Problem	28.3%	13.2%	***	18.8%	8.0%	***	30.0%	21.5%	***	29.7%	13.4%	***

Note: * = p<0.05, ** = p<0.01, *** = p<0.001; For the categorical variables, the associated numbers correspond to proportions. For continuous variables, numbers are means; Some categories were collapsed due to cell size restrictions imposed by Statistics Canada; Those who received Employment Insurance were excluded in both samples.

Table 3.1b: Weighted demographic and socioeconomic characteristics: Canada (CCHS 2003-2014)

	Full sample: 18-64 in the labour force				Analytic sample: Low-Income 18-64 in the labour force			
	Unemployed		Employed		Unemployed		Employed	
	Treated N=2271	Untreated N=6484	Treated N=4242	Untreated N=247744	Treated N=1556	Untreated N=1021	Treated N=1746	Untreated N=8279
Age (years)	38.2	37.3 *	40.0	42.1 ***	38.9	37.8 *	39.7	39.6
Female	43.8%	48.0% **	52.5%	44.4% ***	51.2%	54.3%	63.9%	57.0% ***
Household Type								
Single	36.3%	17.6% ***	23.3%	17.2% ***	51.0%	40.2% ***	45.9%	35.6% ***
Couple	6.5%	18.3% ***	8.4%	24.8% ***	6.4%	10.4% ***	5.8%	12.5% ***
Single with children	32.6%	12.2% ***	27.5%	7.8% ***	29.8%	21.2% ***	34.3%	18.0% ***
Couple with children	24.6%	51.9% ***	40.9%	50.2% ***	12.8%	28.3% ***	14.0%	33.8% ***
Number of children (0-5 years old)	0.27	0.17 ***	0.26	0.20 ***	0.29	0.22 ***	0.30	0.28
Number of children (6-11 years old)	0.26	0.20 ***	0.28	0.25 **	0.28	0.21 **	0.35	0.33
Race								
White	63.4%	68.5% ***	74.2%	80.9% ***	74.1%	68.1% ***	78.8%	74.2% ***
Black	8.9%	3.5% ***	4.0%	2.0% ***	collapsed with other or mixed			
Aboriginal/Native	10.7%	4.3% ***	7.9%	2.5% ***	13.2%	7.9% ***	12.0%	5.6% ***
Asian	12.0%	18.8% ***	8.8%	11.5% ***	collapsed with other or mixed			
Other or mixed	5.0%	4.8%	5.1%	3.0% ***	12.7%	24.0% ***	9.2%	20.2% ***
Immigrant	29.3%	30.8%	19.7%	22.7% ***	14.4%	27.7% ***	10.7%	24.8% ***
Education								
Postsecondary degree	8.7%	24.8% ***	11.9%	25.7% ***	6.7%	17.4% ***	5.1%	14.6% ***
Some postsecondary	33.7%	34.9%	39.2%	40.3%	32.5%	30.3%	33.2%	35.6%
Secondary	24.6%	28.2% **	26.0%	25.3%	24.9%	30.5% *	26.9%	29.1%
Less than secondary	33.1%	12.1% ***	22.9%	8.7% ***	35.9%	21.8% ***	34.9%	20.6% ***
Adjusted Household Income (CAD)	12840	38741 ***	27064	56207 ***	8065	8575 ***	8807	8953
Urban	89.1%	86.6% **	86.3%	83.0% ***	83.3%	83.8%	84.7%	81.7% **
Home Owner	14.5%	64.3% ***	39.8%	76.8% ***	13.1%	41.4% ***	13.5%	50.4% ***
Part-Time Employment			30.7%	10.5% ***			58.6%	27.8% ***
Mental Health Problem	26.9%	13.6% ***	20.6%	7.9% ***	30.2%	19.9% ***	30.5%	12.9% ***
Region								
Atlantic	6.9%	5.6% *	6.4%	5.9%	15.0%	11.3% **	13.5%	9.2% ***
Prairies	7.1%	15.4% ***	14.1%	19.0% ***	12.1%	13.6%	18.0%	23.3% ***
Northern	1.0%	0.4% **	0.6%	0.3% ***				
Quebec	37.5%	20.0% ***	24.4%	22.2% **	32.8%	18.0% ***	25.0%	19.1% ***
Ontario	38.6%	44.1% ***	42.1%	39.5% ***	28.5%	36.4% ***	30.5%	31.7%
BC	8.9%	14.5% ***	12.5%	13.1%	11.6%	20.7% ***	13.0%	16.8% ***

Note: * = p<0.05, ** = p<0.01, *** = p<0.001; For the categorical variables, the associated numbers correspond to proportions. For continuous variables, numbers are means; Some categories were collapsed due to cell size restrictions imposed by Statistics Canada; Those who received Employment Insurance were excluded in both samples. Northern region (Yukon, Northwest Territories, and Nunavut) was excluded in the analytic sample because the CCHS did not derive the income variable for this region.

Table 3.1c: Weighted demographic and socioeconomic characteristics: Unites States (NHIS 2003-2014)

	Full sample: 18-64 in the labour force				Analytic sample: Low-Income 18-64 in the labour force			
	Unemployed		Employed		Unemployed		Employed	
	Treated N=849	Untreated N=10585	Treated N=2154	Untreated N=173039	Treated N=609	Untreated N=3625	Treated N=1026	Untreated N=14561
Age (years)	30.8	34.5 ***	34.9	40.3 ***	31.8	34.8 ***	32.6	34.3 ***
Female	57.6%	45.6% ***	56.3%	45.7% ***	72.7%	54.7% ***	73.7%	56.4% ***
Household Type								
Single	6.9%	14.7% ***	4.2%	16.4% ***	12.3%	36.0% ***	7.7%	36.3% ***
Couple	15.0%	42.7% ***	13.5%	40.3% ***	5.1%	16.6% ***	3.9%	11.5% ***
Single with children	22.8%	5.2% ***	17.5%	3.7% ***	48.4%	20.0% ***	49.8%	21.4% ***
Couple with children	55.3%	37.4% ***	64.8%	39.6% ***	34.2%	27.4% ***	38.6%	30.7% ***
Number of children (0-18 years old)	1.45	0.68 ***	1.50	0.88 ***	1.83	0.94 ***	1.94	1.15 ***
Race								
White	34.0%	53.3% ***	43.7%	68.7% ***	21.2%	34.3% ***	27.0%	38.4% ***
Black	36.3%	21.1% ***	24.7%	11.0% ***	44.0%	31.8% ***	29.9%	20.0% ***
Native/Indian	1.5%	0.8% *	1.4%	0.6% ***	1.5%	1.1%	1.4%	0.8%
Asian	4.5%	4.9%	3.4%	4.9% **	2.8%	4.1%	2.0%	4.7% ***
Other or mixed	0.3%	0.5%	1.1%	0.3% ***	0.3%	0.6%	1.1%	0.4% **
Hispanic	23.2%	19.5% *	25.7%	14.5% ***	30.2%	28.1%	38.6%	35.6%
Immigrant	16.2%	19.4% *	19.9%	17.4% **	19.0%	25.6% ***	27.9%	34.2% ***
Education								
Postsecondary degree	3.1%	16.0% ***	7.8%	33.2% ***	2.6%	7.8% ***	3.1%	11.4% ***
Some postsecondary	23.4%	30.5% ***	32.6%	31.4%	25.1%	27.5%	30.6%	30.7%
Secondary	35.8%	33.4%	31.8%	25.3% ***	30.9%	33.3%	28.8%	28.6%
Less than secondary	37.7%	20.2% ***	27.7%	10.1% ***	41.4%	31.4% ***	37.5%	29.3% ***
Unadjusted famly income (USD)								
\$75,000 and over	1.3%	19.0% ***	10.4%	41.8% ***				
\$35,000-\$74,999	11.3%	30.2% ***	27.1%	35.1% ***				
\$15,000-\$34,999	29.8%	26.9%	32.7%	16.9% ***				
\$5,000-\$14,999	38.1%	16.0% ***	21.6%	4.6% ***				
0-\$4,999	19.5%	8.0% ***	8.2%	1.5% ***				
Health Insurance Coverage	71.0%	50.1% ***	72.4%	82.7% ***	78.0%	45.3% ***	68.3%	52.0% ***
Home Owner	21.1%	50.1% ***	36.5%	68.8% ***	7.6%	20.2% ***	9.6%	22.2% ***
Part-Time Employment			38.4%	19.9% ***			54.9%	45.2% ***
Mental Health Problem	5.7%	3.7% *	4.9%	1.2% ***	6.2%	5.1%	4.8%	2.2% ***
Region								
Northeast	18.7%	14.5% **	17.5%	17.6%	19.7%	11.5% ***	16.8%	12.9% ***
North Central/Midwest	29.2%	23.6% **	26.1%	24.3%	25.0%	21.5%	21.2%	20.4%
South	19.3%	38.7% ***	24.6%	36.3% ***	21.5%	43.8% ***	23.8%	41.5% ***
West	32.8%	23.1% ***	31.9%	21.8% ***	33.8%	23.1% ***	38.2%	25.3% ***

Note: * = p<0.05, ** = p<0.01, *** = p<0.001; For the categorical variables, the associated numbers correspond to proportions. For continuous variables, numbers are means; Those who received Employment Insurance were excluded in both samples. Continuous income was not available, and the categories were not calculated in the analytic sample since it's already the lowest income decile group.

Table 3.1d: Weighted demographic and socioeconomic characteristics: England (HSE 1998-2014)

	Full sample: 18-64 in the labour force				Analytic sample: Low-Income 18-64 in the labour force			
	Unemployed		Employed		Unemployed		Employed	
	Treated N=992	Untreated N=1352	Treated N=503	Untreated N=60468	Treated N=747	Untreated N=652	Treated N=280	Untreated N=3908
Age (years)	39.2	36.7 ***	34.0	40.4 ***	39.5	38.3	32.9	39.8 ***
Female	25.3%	34.0% ***	54.0%	46.2% ***	27.2%	33.3% *	63.6%	56.0% *
Household Type								
Single	21.8%	25.7% *	17.5%	42.6% ***	56.4%	44.2% ***	28.6%	27.0%
Couple	53.9%	45.2% ***	35.6%	22.2% ***	16.7%	17.9%	11.4%	20.6% ***
Single with children	18.8%	16.3%	12.8%	29.9% ***	7.4%	19.3% ***	45.4%	17.9% ***
Couple with children	5.4%	12.8% ***	34.1%	5.3% ***	19.5%	18.6%	14.6%	34.6% ***
Number of children (0-18 years old)	0.44	0.48	0.75	0.58 ***	0.51	0.69 **	1.02	0.95 ***
Race								
White	82.8%	85.0%	85.7%	92.1% ***	84.5%	84.4%	84.3%	81.2%
Black	6.0%	4.1% *	3.8%	2.0% **	6.2%	5.2%	4.3%	4.2%
Asian	8.0%	7.0%	8.4%	4.3% ***	6.4%	7.7%	9.3%	11.9%
Other or mixed	3.2%	3.9%	2.0%	1.6%	2.9%	2.8%	2.1%	2.7%
Education								
Postsecondary degree	9.3%	19.4% ***	10.8%	27.6% ***	7.1%	9.2%	6.8%	11.8% *
Some postsecondary	8.9%	8.4%	6.9%	13.9% ***	8.3%	7.0%	6.4%	9.2%
Secondary	52.8%	49.8%	58.7%	46.9% ***	53.8%	53.9%	61.4%	53.1% **
Less than secondary	29.0%	22.4% ***	23.6%	11.7% ***	30.8%	29.8%	25.4%	25.9%
Adjusted Household Income (GBP)	9050	15871 ***	12214	35002 ***	5846	6174 *	6208	7072 ***
Urban	86.8%	82.1% **	83.2%	75.3% ***	86.9%	85.1%	84.3%	79.1% *
Home Owner	25.9%	48.0% ***	32.7%	78.0% ***	19.8%	31.0% ***	27.1%	53.2% ***
Part-Time Employment			47.3%	22.0% ***			60.0%	46.9% ***
Mental Health Problem	8.9%	12.0% *	5.5%	2.1% ***	8.4%	15.0% *	5.7%	3.2% *
Region								
North East	8.5%	7.2%	8.1%	5.1% **	12.0%	9.7%	9.6%	9.0%
North West	15.1%	13.3%	14.0%	13.1%	16.3%	17.3%	17.9%	14.9%
Yorkshire and Humberside	12.7%	10.6%	9.9%	10.2%	13.8%	10.1% *	10.7%	10.2%
West Midlands	10.4%	8.8%	7.8%	9.2%	9.5%	8.6%	7.9%	10.3%
East Midlands	13.6%	11.8%	12.1%	10.3%	13.8%	12.6%	11.4%	11.8%
Eastern	8.0%	9.8%	11.1%	12.3%	7.5%	7.5%	9.6%	9.3%
London	13.7%	16.1% *	16.3%	12.4% *	11.5%	15.3% *	13.2%	12.4%
South East	10.6%	12.7%	9.8%	16.1% ***	9.1%	10.0%	8.9%	11.6%
South West	7.5%	8.7%	10.6%	11.4%	6.4%	8.9%	10.7%	10.6%

Note: * = p<0.05, ** = p<0.01, *** = p<0.001; For the categorical variables, the associated numbers correspond to proportions. For continuous variables, numbers are means

Table 3.2a: Weighted health-related characteristics: Ontario (CCHS 2003-2014)

	Full sample: 18-64 in the labour force					Analytic sample: Low-Income 18-64 in the labour force				
	Unemployed		Employed			Unemployed		Employed		
	Treated N=630	Untreated N=2354	Treated N=1443	Untreated N=81867		Treated N=444	Untreated N=372	Treated N=532	Untreated N=2621	
Poor Self-Rated Health	23.7%	9.7% ***	14.4%	6.4% ***		25.2%	18.0% **	22.2%	12.6% ***	
Chronic Conditions	23.4%	14.1% ***	20.0%	14.6% ***		25.9%	20.7%	29.5%	20.1% ***	
Hypertension	11.8%	11.3%	12.8%	11.8%		12.4%	11.0%	16.0%	11.6% **	
Obesity	20.1%	16.8%	23.2%	17.6% ***		23.4%	19.6%	25.9%	18.0% ***	
Smoker	56.0%	29.5% ***	40.4%	23.1% ***		57.2%	32.8% ***	53.8%	32.8% ***	
Binge Drinker	24.1%	22.0%	19.2%	21.4% *		23.4%	12.9% ***	19.5%	19.1%	
Physical Inactivity	43.0%	43.5%	57.0%	48.5% ***		40.8%	43.3%	56.0%	53.9%	

Table 3.2b: Weighted health-related characteristics: Canada (CCHS 2003-2014)

	Treated	Untreated	***	Treated	Untreated	***	Treated	Untreated	***	Treated	Untreated	***
	N=2271	N=6484		N=4242	N=247744		N=1556	N=1021		N=1746	N=8279	
Poor Self-Rated Health	22.2%	10.3% ***		16.9%	6.1% ***		23.5%	16.9% ***		24.9%	12.6% ***	
Chronic Conditions	24.3%	15.3% ***		21.6%	14.3% ***		26.7%	18.9% ***		30.3%	18.8% ***	
Hypertension	12.8%	10.4% **		13.0%	11.2% ***		12.2%	10.4%		15.2%	11.1% ***	
Obesity	21.4%	16.8% ***		24.0%	17.7% ***		23.1%	16.0% ***		26.0%	17.8% ***	
Smoker	58.0%	31.0% ***		42.8%	23.7% ***		59.4%	38.3% ***		54.0%	34.0% ***	
Binge Drinker	24.1%	23.5%		19.3%	22.6% ***		23.3%	17.5% ***		18.9%	20.0%	
Physical Inactivity	44.5%	43.4%		57.3%	47.8% ***		42.8%	44.5%		55.2%	54.1%	

Table 3.2c: Weighted health-related characteristics: United States (NHIS 2003-2014)

	Treated	Untreated	***	Treated	Untreated	***	Treated	Untreated	***	Treated	Untreated	***
	N=849	N=10585		N=2154	N=173039		N=609	N=3625		N=1026	N=14561	
Poor Self-Rated Health	15.6%	11.0% ***		13.0%	5.3% ***		20.7%	17.9%		15.2%	11.6% ***	
Chronic Conditions	27.7%	24.7%		27.0%	21.2% ***		27.9%	25.8%		24.8%	20.4% ***	
Hypertension	19.3%	18.2%		19.3%	19.4%		20.5%	20.1%		18.0%	15.6% *	
Obesity	34.0%	27.6% ***		34.4%	26.4% ***		36.9%	29.6% ***		35.2%	27.2% ***	
Smoker	49.3%	33.8% ***		34.4%	19.9% ***		44.2%	37.0% ***		35.3%	26.3% ***	
Binge Drinker	8.8%	13.5% ***		11.5%	11.9%		8.5%	12.9% **		9.4%	13.6% *	
Physical Inactivity	35.9%	31.2% *		40.8%	28.8% ***		37.9%	36.2%		44.6%	41.5% ***	

Table 3.2d: Weighted health-related characteristics: England (HSE 1998-2014)

	Treated	Untreated	***	Treated	Untreated	***	Treated	Untreated	***	Treated	Untreated	***
	N=992	N=1352		N=503	N=60468		N=747	N=652		N=280	N=3908	
Poor Self-Rated Health	35.5%	34.4%		26.2%	13.5% ***		35.9%	41.9% *		26.1%	21.0% *	
Chronic Conditions	12.3%	11.2%		8.8%	8.5%		13.0%	12.0%		7.9%	9.6%	
Obesity	24.6%	24.3%		22.0%	22.6%		13.0%	12.0%		21.8%	24.1%	
Smoker	75.7%	65.9% ***		60.5%	52.9% **		78.4%	72.9% *		60.0%	55.6% *	
Binge Drinker	36.6%	39.8%		34.9%	37.4%		38.0%	37.0%		30.4%	29.2%	

Note: * = p<0.05, ** = p<0.01, *** = p<0.001; Those who received Employment Insurance were excluded in both samples for all jurisdictions except England. Due to data availability, some health outcomes were not calculated for England.

Table 3.3: Average treatment effect on the treated (ATT) of social assistance on the health of low-income unemployed individuals

	Ontario			Canada			United States			England		
	ATT	SE	p-value	ATT	SE	p-value	ATT	SE	p-value	ATT	SE	p-value
Poorhealth												
Caliper Match	0.096*	0.046	0.035	0.013	0.024	0.596	0.046	0.027	0.090	-0.051	0.036	0.156
Kernel Weight Match	0.052	0.036	0.151	0.029	0.022	0.186	0.039*	0.020	0.046	-0.071*	0.029	0.014
Hypertension												
Caliper Match	0.040	0.034	0.235	-0.016	0.021	0.450	-0.012	0.027	0.664			
Kernel Weight Match	-0.004	0.030	0.894	-0.002	0.018	0.914	0.014	0.019	0.466			
Chronic condition												
Caliper Match	0.086*	0.042	0.043	0.067*	0.027	0.012	0.037	0.031	0.226	0.001	0.025	0.959
Kernel Weight Match	0.053	0.037	0.153	0.054*	0.023	0.019	0.020	0.021	0.343	0.000	0.017	0.983
Smoking												
Caliper Match	0.123*	0.056	0.028	0.053	0.029	0.070	0.053	0.038	0.165	0.022	0.028	0.425
Kernel Weight Match	0.088	0.046	0.056	0.060**	0.023	0.010	0.063**	0.024	0.010	0.048*	0.025	0.049
Binge Drinking												
Caliper Match	0.016	0.051	0.752	0.034	0.025	0.169	-0.007	0.021	0.743	-0.014	0.037	0.710
Kernel Weight Match	0.059	0.037	0.110	0.030	0.021	0.140	-0.003	0.015	0.846	0.006	0.027	0.836
Physical Inactivity												
Caliper Match	-0.048	0.056	0.387	-0.035	0.029	0.230	-0.048	0.037	0.200			
Kernel Weight Match	-0.022	0.050	0.658	-0.035	0.028	0.210	-0.003	0.027	0.910			
Obese												
Caliper Match	0.043	0.044	0.328	0.028	0.022	0.206	0.012	0.033	0.716	0.006	0.028	0.827
Kernel Weight Match	0.051	0.032	0.115	0.048*	0.019	0.012	0.022	0.022	0.321	-0.004	0.023	0.875
Sample size												
Unmatched	T=444	C=372		T=1556	C=1021		T=609	C=3625		T=825	C=744	
Caliper Match		C=160			C=503		T=589	C=435		T=798	C=378	
Kernel Weight Match		C=372			C=1021		T=603	C=3625		T=813	C=744	
% of treated individuals outside of common support												
Caliper Match		15%			5%			3.28%			3.27%	
Kernel Weight Match		0-3%			0-3%			0.99%			1.45%	

Note: * = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$; Balancing property is satisfied in all models; Common support is imposed on all models; Caliper estimator is computed with replacement and a distance of 0.015. Kernel weight matching for estimations use a band width of 0.06. Standard errors for the average treatment on the treated effect are computed using bootstrap with 100 replications. Treated sample sizes for the Canadian analysis are not reported, and the outside common support percent is rounded due to administrative restrictions imposed by Statistics Canada.

Table 3.4: Average treatment effect on the treated (ATT) of social assistance on the health of low-income employed individuals

	Ontario			Canada			United States			England		
	ATT	SE	p-value	ATT	SE	p-value	ATT	SE	p-value	ATT	SE	p-value
Poorhealth												
Caliper Match	0.058*	0.027	0.034	0.079***	0.017	0.000	0.022	0.021	0.287	0.134**	0.044	0.003
Kernel Weight Match	0.05*	0.021	0.018	0.068***	0.013	0.000	0.032*	0.014	0.029	0.058	0.034	0.092
Hypertension												
Caliper Match	0.037	0.028	0.183	0.034*	0.017	0.043	0.044*	0.020	0.031			
Kernel Weight Match	0.036	0.020	0.069	0.019	0.012	0.107	0.027*	0.013	0.042			
Chronic condition												
Caliper Match	0.029	0.034	0.393	0.051**	0.019	0.007	0.022	0.020	0.261	0.012	0.029	0.673
Kernel Weight Match	0.046	0.025	0.067	0.067***	0.014	0.000	0.031*	0.016	0.047	-0.017	0.022	0.448
Smoking												
Caliper Match	0.11***	0.032	0.001	0.078***	0.022	0.000	0.073**	0.025	0.003	-0.041	0.058	0.486
Kernel Weight Match	0.088***	0.026	0.001	0.079***	0.016	0.000	0.069***	0.016	0.000	0.015	0.041	0.706
Binge Drinking												
Caliper Match	-0.029	0.031	0.344	-0.025	0.017	0.134	0.028*	0.133	0.034	-0.012	0.054	0.822
Kernel Weight Match	-0.011	0.018	0.530	-0.024*	0.012	0.043	0.005	0.011	0.559	-0.020	0.039	0.604
Physical Inactivity												
Caliper Match	0.008	0.039	0.841	0.001	0.021	0.956	-0.003	0.028	0.914			
Kernel Weight Match	0.020	0.027	0.445	-0.003	0.014	0.824	-0.014	0.017	0.384			
Obese												
Caliper Match	0.085*	0.033	0.011	0.054**	0.018	0.003	0.030	0.024	0.216	-0.008	0.039	0.835
Kernel Weight Match	0.073**	0.025	0.004	0.063***	0.012	0.000	0.027	0.017	0.106	0.031	0.026	0.235
Sample size												
Unmatched	T=532	C=2621		T=1746	C=8279		T=1026	C=14561		T=279	C=3733	
Caliper Match		C=366			C=1190		T=994	C=855		T=246	C=202	
Kernel Weight Match		C=2621			C=8279		T=998	C=14264		T=278	C=3733	
% of treated individuals outside of common support												
Caliper Match		3%			1%			3.12%			11.83%	
Kernel Weight Match		0-3%			0-3%			0.03%			0.36%	

Note: * = p<0.05, ** = p<0.01, *** = p<0.001; Balancing property is satisfied in all models; Common support is imposed on all models; Caliper estimator is computed with replacement and a distance of 0.015. Kernel weight matching for estimations use a band width of 0.06. Standard errors for the average treatment on the treated effect are computed using bootstrap with 100 replications. Treated sample sizes for the Canadian analysis are not reported, and the outside common support percent is rounded due to administrative restrictions imposed by Statistics Canada.

**Table 3.5a: Quality of the match: t-tests for equality of means before and after matching:
Ontario (CCHS 2003-2014)**

	Unemployed			Employed			
	unmatched	caliper	kernel	unmatched	caliper	kernel	
	t	t	t	t	t	t	
Age (years)	-3.29**	-0.31	-0.31	-2.91**	-0.78	-0.10	
Female	-1.20	1.32	1.59	2.51*	0.19	-0.61	
Household Type							
Single	1.88	0.07	-0.64	4.72***	-0.50	0.56	
Couple	-3.67***	0.51	-0.40	-4.43***	0.14	-0.05	
Single with children	5.63***	1.03	0.78	9.56***	0.07	-0.28	
Couple with children	-6.31***	-1.81	0.12	-9.87***	0.49	-0.34	
Number of child <= 5 years old	4.00***	0.15	1.19	1.58	-0.73	0.14	
Number of child 6-11 years old	2.36**	-0.49	0.31	1.09	-0.09	0.32	
Race							
White	2.84**	-1.49	0.03	2.50**	-0.14	-0.17	
Aboriginal/native	2.65**	0.52	0.37	5.07***	0.11	0.16	
Other or mixed	-4.85***	1.33	0.31	-5.07***	0.08	0.08	
Immigrant	-5.34***	1.45	-0.52	-6.38***	-0.40	0.04	
Education							
Postsecondary degree	-4.94	0.14	0.10	-6.32***	0.13	-0.17	
Some postsecondary	0.18	-1.22	-0.64	-0.38	0.07	-0.12	
Secondary	-0.58	0.72	0.05	2.04*	-0.97	0.07	
Less than secondary	4.11	0.50	0.58	3.70***	0.95	0.15	
Family size adjusted hh income	-2.84	0.49	1.06	0.52	-0.73	-0.10	
Urban living	2.14*	1.39	0.45	3.92***	-0.80	0.01	
Home Owner	-13.33***	-0.26	-0.03	-19.21***	0.76	-0.45	
Part-Time Employment				12.66***	0.50	0.19	
Mental Health Problem	2.75**	0.64	0.24	9.48***	0.27	0.57	
	Ps R2	0.225	0.018	0.006	0.225	0.006	0.001
	LR chi2	253.45	18.37	6.73	644.14	8.82	2.15
	p>chi2	0	0.626	0.999	0	0.994	1
	B	121.5	31.4	17.7	137	18.4	9
	R	0.43	1.2	1.09	0.48	1.14	1.14

Note: * = p<0.05, ** = p<0.01, *** = p<0.001

**Table 3.5b: Quality of the match: t-tests for equality of means before and after matching:
Canada (CCHS 2003-2014)**

	Unemployed			Employed			
	unmatched	caliper	kernel	unmatched	caliper	kernel	
	t	t	t	t	t	t	
Age (years)	2.28*	-1.01	-0.05	0.17	-1.75	-0.41	
Female	-1.54	-0.22	-0.43	5.30***	-0.25	-0.55	
Household Type							
Single	5.41***	-0.26	0.20	8.11***	-0.03	0.71	
Couple	-3.63***	0.15	-0.08	-8.01***	-0.99	-0.30	
Single with children	4.90***	0.00	0.04	15.33***	0.98	0.01	
Couple with children	-10.02***	0.27	-0.30	-16.61***	-0.58	-0.81	
Number of child <= 5 years old	3.20**	1.80	0.16	1.52	-0.35	0.13	
Number of child 6-11 years old	2.65**	0.78	0.30	0.83	-0.25	-0.61	
Race							
White	3.33**	0.21	-0.04	4.05***	-1.89	-0.05	
Aboriginal/native	4.20***	-1.49	-0.91	9.73***	1.36	0.24	
Other or mixed	-7.55***	1.30	1.03	-10.86***	1.15	0.20	
Immigrant	-8.43***	1.66	1.31	-12.98***	0.78	-0.33	
Education							
Postsecondary degree	-8.60***	-1.70	-0.36	-10.83***	0.55	-0.20	
Some postsecondary	1.17	-0.58	-0.86	-1.96	-1.61	-1.28	
Secondary	-3.13**	1.02	0.55	-1.90	1.00	0.69	
Less than secondary	7.69***	0.62	0.54	12.94***	0.43	0.73	
Adjusted Household Income (CAD)	-4.10***	-0.27	-0.19	-1.49	-1.67	-0.81	
Urban living	-0.37	-0.44	-0.55	3.01**	-0.05	0.15	
Home Owner	-17.31***	0.59	0.31	-29.42***	0.96	-0.28	
Part-Time Employment				25.60***	0.48	0.79	
Mental Health Problem	5.87***	-0.89	-0.40	18.58***	0.26	0.22	
Region							
Atlantic	2.70**	-0.47	-0.11	5.41***	0.66	0.53	
Prairies	-1.14	-0.44	-0.67	-4.81***	2.99**	0.12	
Quebec	8.40***	-0.31	1.24	5.66***	-1.36	0.20	
Ontario	-4.23***	0.97	-0.93	-0.97	-0.81	-0.64	
British Columbia	-6.34***	0.06	0.34	-3.89***	-1.04	-0.04	
	Ps R2	0.185	0.007	0.003	0.221	0.007	0.001
	LR chi2	639.18	27.77	11.09	2053.26	32.33	6.32
	p>chi2	0	0.319	0.993	0	0.182	1
	B	106.6	19.4	11.9	133	19.4	8.5
	R	0.45	1.09	1.34	0.63	1.03	0.99

Note: * = p<0.05, ** = p<0.01, *** = p<0.001

**Table 3.5c: Quality of the match: t-tests for equality of means before and after matching:
United States (NHIS 2003-2014)**

	Unemployed			Employed		
	unmatched t	caliper t	kernel t	unmatched t	caliper t	kernel t
Age (years)	-5.58***	-0.17	-0.85	-4.34***	-0.36	-0.37
Female	8.41***	-1.39	0.15	10.89***	-0.88	0.29
Household Type						
Single	-11.71***	0.44	-0.45			
Couple	-7.41***	-0.51	-0.38	-22.90***	0.14	-1.45
Single with children	15.59***	-1.17	0.23	21.08***	-0.63	0.26
Couple with children	3.41***	1.17	0.26	5.25***	0.55	0.72
Number of children (0-18 years old)	15.14***	0.04	0.06	17.54***	-0.32	-0.06
Race						
White	-6.42***	0.35	-0.33	-7.30***	-0.65	-0.34
Black	5.91***	0.47	-0.09	7.57***	-0.83	-0.01
Native/Indian	0.80	0.50	0.05	1.81	-0.58	0.39
Asian	-1.52	-1.11	0.27	-3.96***	0.33	-0.92
Other or mixed	-0.71	0.00	0.15	2.98**	2.15*	1.27
Hispanic	1.05	-0.50	0.27	1.93	1.07	0.29
Immigrant	3.46***	0.36	0.07	4.16	0.25	-0.19
Education						
Postsecondary degree	-4.59***	0.00	-0.48	-8.24***	-1.20	-0.84
Some postsecondary	-1.22	1.02	0.40	-0.09	2.13*	0.73
Secondary	-1.18	-0.19	-0.32	0.10	-1.70	-0.63
Less than secondary	4.84***	-0.71	0.11	5.58***	0.09	0.23
Health Insurance Coverage	15.33***	0.62	0.38	10.15***	-0.34	0.29
Home Owner	-7.53***	0.11	-0.37	-9.49***	0.38	-0.31
Part-Time Employment				5.93***	0.54	-0.13
Mental Health Problem	1.16	0.64	0.13	5.13***	-1.22	-0.41
Region						
Northeast	5.65***	-1.36	0.15	3.56***	1.36	0.13
North Central/Midwest	1.88	0.40	-0.56	0.64	-0.43	0.02
South	-10.50***	-0.07	-0.35	-11.20***	-1.09	-0.51
West	5.68***	0.88	0.70	9.16***	0.32	0.33
Ps R2	0.199	0.007	0.002	0.165	0.009	0.003
LR chi2	694.36	11.76	2.78	1218.32	24.39	7.49
p>chi2	0	0.983	1	0	0.44	0.999
B	125	20	9.6	122.8	21.9	12.2
R	0.86	1.15	1.14	0.72	1.51	1.09

Note: * = p<0.05, ** = p<0.01, *** = p<0.001

**Table 3.5d: Quality of the match: t-tests for equality of means before and after matching:
England (HSE 1998-2014)**

	Unemployed			Employed		
	unmatched t	caliper t	kernel t	unmatched t	caliper t	kernel t
Age (years)	-0.87	-1.28	0.17	-9.07***	-0.26	-0.34
Female	-11.53***	-0.64	-0.07	0.54	-0.09	0.30
Household Type						
Single	-0.96	-0.82	-0.23	-3.52***	-0.39	-0.08
Couple	-7.03***	1.08	0.24	-7.29***	0.00	-0.40
Single with children	14.27***	-0.27	-0.02	-0.71	0.86	0.33
Couple with children	-7.88***	0.10	0.02	13.30***	-0.51	0.04
Number of children (0-18 years old)	-9.88***	0.93	0.58	2.42*	-0.12	-0.03
Race						
White	1.4	-0.37	-0.52	0.03	1.55	0.88
Black	2.84**	1.32	0.56	1.19	-0.95	-0.02
Asian	-4.42***	-0.92	0.02	-0.86	-0.57	-0.75
Other or mixed	1.39	0.49	0.31	0.01	-1.23	-0.63
Education						
Postsecondary degree	-2.98**	1.07	0.21	-3.51***	0.34	-0.22
Some postsecondary	0.05	0.90	0.21	-1.27	0.17	0.04
Secondary	0.49	0.63	0.37	0.97	-0.88	0.09
Less than secondary	1.49	-1.74	-0.64	2.16*	0.69	0.01
Adjusted Household Income (GBP)	-10.43***	-0.11	0.33	-7.70***	1.82	-0.12
Urban	4.48***	0.98	0.07	3.94***	1.00	-0.11
Home Owner	-15.43***	-1.28	-0.32	-12.29***	0.58	-0.36
Part-Time Employment				0.61	0.17	-0.03
Mental Health Problem	3.45**	-0.37	-0.05	5.62***	1.43	-0.60
Region						
North East	2.66**	-1.58	-1.01	0.00	-0.55	0.50
North West	-0.09	-0.49	-0.90	2.83**	0.34	-0.31
Yorkshire and Humberside	3.19**	-1.00	-0.24	-0.70	-0.91	0.36
West Midlands	-0.28	1.62	0.71	-1.50	-1.43	-0.20
East Midlands	1.31	1.75	0.61	0.44	1.28	-0.14
Eastern	-1.06	0.21	0.16	-1.27	0.75	0.44
London	-0.84	1.27	0.54	2.42*	0.78	0.08
South East	-1.83	0.55	-0.22	-2.86**	0.00	0.02
South West	-3.10**	0.77	0.83	-0.19	-0.27	-0.60
	Ps R2	0.217	0.016	0.003	0.303	0.027
	LR chi2	1060.28	30.99	5.78	622.00	21.00
	p>chi2	0.000	0.467	1.000	0.000	0.786
	B	129	24.6	12.5	162.4	39.2
	R	0.77	0.95	1.08	0.8	0.9

Note: * = p<0.05, ** = p<0.01, *** = p<0.001

Table 3.6: Detailing how the final sample sizes were arrived at

	CCHS 2003-2014	NHIS 2003-2014	HSE 1998-2014
	n	n	n
Full pooled survey sample	779,304	356,736	223,829
Working age adults in the labour force (no EI)	302,619	202,378	83,655
Working age adults in the labour force (no EI) - no missing	260,741	186,627	63,315
Low-income working age adults in the labour force (no EI)- no missing	12,602	19,821	5,587
Employed	10,025	15,587	4,188
Unemployed	2,577	4,234	1,399
Ontario: Low-income working age adults in the labour force (no EI)- no missing	3,969		
Employed	3,153		
Unemployed	816		

**Table 3.7: Weighted baseline demographic, socioeconomic, and self-rated health characteristics:
18-64 in the labour force (no EI)**

	Ontario		Canada		United States		United Kingdom	
	(SLID 2002-2010)		(SLID 2002-2010)		(SIPP 2001-2011)		(BHPS 2001-2008)	
	Full i=5367	Analytic i=608	Full i=18184	Analytic i=1983	Full i=98556	Analytic i=6921	Full i=7793	Analytic i=3084
Age (years)	39.9	42.9	40.0	43.2	40.1	43.7	40.8	40.1
Female	47.5%	48.5%	47.4%	49.1%	47.2%	48.7%	44.8%	44.9%
Household Type								
Single	22.7%	24.3%	23.4%	25.2%	23.4%	25.5%	11.7%	11.2%
Couple	18.2%	16.3%	21.5%	20.8%	19.5%	20.4%	44.3%	41.6%
Single with children	7.6%	9.7%	7.3%	8.0%	13.1%	17.0%	7.2%	7.7%
Couple with children	51.6%	49.8%	47.8%	46.0%	44.0%	37.1%	36.8%	39.6%
Have children	52.7%	56.6%	48.8%	50.6%	57.1%	54.1%	36.0%	38.8%
Number of children	1.00	1.04	0.92	0.90	1.09	1.01	0.63	0.69
Visible minority	21.7%	25.3%	17.9%	23.4%	17.5%	22.1%	3.5%	3.9%
Immigrant	28.2%	33.3%	19.9%	25.6%	15.3%	17.3%	5.3%	5.3%
Education								
Postsecondary	25.3%	15.4%	22.7%	17.4%	29.7%	18.5%	19.6%	17.9%
Some postsecondary	49.7%	54.8%	50.2%	49.2%	34.9%	34.4%	31.0%	31.1%
Secondary	14.4%	13.7%	15.3%	14.5%	26.5%	32.1%	34.6%	35.6%
Less than secondary	10.7%	16.1%	11.8%	18.9%	9.0%	15.1%	14.8%	15.4%
Home Owner	76.6%	75.8%	74.2%	72.1%	70.7%	64.8%	83.6%	82.5%
Birth cohort								
pre or 1940+	12.2%	14.4%	12.5%	17.2%	13.2%	19.0%	22.9%	19.8%
1950+	25.0%	33.4%	25.9%	32.1%	24.5%	31.7%	25.7%	26.6%
1960+	30.8%	34.5%	29.2%	31.9%	26.0%	25.0%	27.8%	30.3%
1970+	20.8%	12.3%	20.9%	12.5%	22.6%	16.5%	18.9%	18.4%
1980+	11.2%	5.4%	11.5%	6.3%	13.7%	7.8%	4.7%	4.9%
Annual household income	50219	45257	46990	42306	49645	41174	21823	20925
Health Insurance Coverage					80.2%	71.9%		
Regions*								
Region1			5.9%	6.1%	18.2%	16.2%	4.2%	4.7%
Region2			19.7%	22.0%	23.4%	23.0%	11.4%	11.7%
Region3			23.7%	16.6%	36.2%	39.5%	9.1%	10.3%
Region4			37.7%	39.6%	22.3%	21.3%	8.4%	9.6%
Region5			12.9%	15.7%			8.5%	8.3%
Region6							9.6%	8.6%
Region7							9.3%	8.8%
Region8							16.0%	15.5%
Region9							7.9%	7.8%
Region10							5.1%	5.0%
Region11							9.1%	8.5%
Region12							1.6%	1.2%
Social assistance recipient	5.2%	8.5%	5.1%	8.7%	1.5%	3.2%	4.0%	4.0%
Unemployed	4.0%	6.2%	3.8%	5.6%	4.8%	5.1%	3.7%	3.6%
Poor self-rated health	5.5%	27.5%	5.7%	29.2%	6.7%	45.7%	21.6%	34.5%
Baseline years	2002, 2005		2002, 2005		2001, 2004, 2009		2001	

*Regions are: For Canada: 1=Atlantic, 2=Prairies, 3=QC, 4=ON, 5=BC

For U.S.: 1=Northeast, 2=North Central/Midwest, 3=South, 4=West

For U.K.: 1=North East, 2=North west, 3=Yorkshire & Humber, 4=East midlands, 5=West midlands. 6=East of England, 7=London, 8=South east, 9=South west, 10=Wales, 11=Scotland, 12=Northern Ireland

Note: Full sample consists of working age adults in the labour force who are not in receipt of Employment Insurance whereas analytic sample consists of only those individuals from the full sample who had reported variation in the health outcome over the study period; For the categorical variables, the associated numbers correspond to proportions. For continuous variables, numbers are means; Household income is in 2015 currency of each country adjusted by household size; Ontario sample is comprised of those who remained in Ontario during all of their interviews.

Table 3.8: Weighted trends in unemployment, social assistance coverage (SA), and poor self-rated health (PSRH) over time: 18-64 in the labour force (no EI)

	Ontario				Canada				United States				United Kingdom			
	(SLID 2002-2010)				(SLID 2002-2010)				(SIPP 2001-2011)				(BHPS 2001-2008)			
	Unemp	SA	PSRH	N	Unemp	SA	PSRH	N	Unemp	SA	PSRH	N	Unemp	SA	PSRH	N
Panel A: Full Sample																
2001									4.1%	1.5%	6.8%	27,805	3.7%	4.0%	21.6%	7,793
2002	4.3%	4.6%	5.2%	2,661	4.2%	4.9%	5.4%	8,871	2.7%	1.0%	6.4%	20,025	2.9%	2.7%	22.4%	6,212
2003	3.0%	3.8%	5.1%	1,866	2.6%	3.5%	4.7%	6,204	2.4%	0.8%	5.7%	17,912	2.8%	2.7%	21.9%	5,655
2004	1.1%	4.3%	6.0%	1,630	1.2%	3.7%	5.9%	5,427	4.2%	1.5%	6.9%	39,148	2.6%	2.0%	22.1%	5,141
2005	3.0%	5.2%	5.8%	4,229	2.8%	4.7%	5.9%	14,396	2.2%	1.0%	6.0%	27,598	2.9%	2.2%	21.5%	4,826
2006	1.3%	4.6%	6.8%	3,139	1.6%	3.7%	5.6%	10,923					2.5%	2.2%	21.0%	4,529
2007	1.7%	4.3%	6.8%	2,791	1.6%	3.4%	6.4%	9,871					2.1%	1.7%	23.4%	4,090
2008	2.2%	3.6%	5.9%	1,357	1.8%	3.0%	5.9%	4,852					3.1%	2.5%	23.6%	3,804
2009	2.4%	3.7%	6.8%	1,224	2.2%	3.1%	6.5%	4,368	6.2%	1.6%	6.5%	31,603				
2010	2.4%	3.6%	6.1%	1,174	1.5%	3.0%	6.2%	4,146	3.8%	1.0%	5.6%	21,411				
2011									3.4%	0.9%	5.8%	18,221				
Panel B: Analytic Sample																
2001									5.2%	3.5%	43.7%	2,365	3.6%	4.0%	34.5%	3,084
2002	7.5%	7.8%	26.2%	302	7.0%	8.6%	27.2%	1,020	4.1%	2.8%	44.7%	2,163	3.8%	3.0%	37.0%	2,814
2003	1.7%	7.2%	33.5%	481*	3.0%	5.8%	27.2%	832	4.2%	2.4%	40.6%	1,900	3.0%	3.4%	36.3%	2,682
2004					1.6%	6.8%	35.1%	754	3.4%	3.2%	50.5%	2,085	3.1%	2.8%	36.4%	2,523
2005	4.2%	9.1%	31.7%	521	4.2%	8.0%	32.5%	1,686	3.3%	2.7%	49.5%	2,085	3.5%	2.7%	35.1%	2,419
2006	2.4%	9.5%	41.0%	445	3.9%	7.8%	35.3%	1,437					2.8%	2.4%	34.5%	2,298
2007	2.2%	11.0%	38.8%	389	3.3%	8.3%	39.8%	1,320					2.6%	2.4%	39.2%	2,098
2008	2.5%	7.6%	36.8%	204	2.3%	6.7%	36.4%	655					3.9%	3.2%	38.7%	1,968
2009	4.5%	9.1%	42.1%	181	4.2%	7.6%	42.0%	591	6.3%	2.7%	44.4%	2,471				
2010	4.2%	8.6%	40.8%	178	2.3%	5.6%	42.5%	575	5.2%	1.6%	41.2%	2,245				
2011									4.4%	1.5%	44.9%	1,958				

Note: Full sample consists of working age adults in the labour force who are not in receipt of Employment Insurance whereas analytic sample consists of only those individuals from the full sample who had reported variation in the health outcome over the study period; Ontario sample is comprised of those who remained in Ontario during all of their interviews. 2003/2004 collapsed due to small sample size for Ontario.

Table 3.9a: Logit regression results for binary poor health variable in odds ratio: Ontario (SLID 2002-2010)

	Pooled logit		Fixed effect	
	M1	M2	M3	M4
Received social assistance	2.380*** (0.340)	1.16 (0.307)	1.173 (0.310)	1.194 (0.314)
Unemployed	2.315*** (0.483)	2.241** (0.588)	2.219** (0.584)	2.373** (0.634)
Couple headed	0.819* (0.082)		0.814 (0.190)	0.758 (0.178)
Have children	0.826* (0.073)		0.818 (0.167)	0.833 (0.170)
Annual household income in thousand	0.986*** (0.002)			1.010* (0.004)
Year fixed effects	Yes	Yes	Yes	Yes
Number of obs	20071	2701	2701	2701
Number of groups		608	608	608
Log likelihood	-5441.03	-1250.88	-1249.76	-1246.8
Chi-squared	425.06	107.24	109.49	115.4

* p<0.05, ** p<0.01, *** p<0.001; For Ontario, we look into those who remained in Ontario during all of their interviews. In M1, we further controlled for age, gender, minority status, education, immigrant status, birth cohort and home ownership. Standard errors are in parentheses

Table 3.9b: Logit regression results for binary poor health variable in odds ratio: Canada (SLID 2002-2010)

	Pooled logit		Fixed effect	
	M1	M2	M3	M4
Received social assistance	2.023*** (0.177)	1.525* (0.253)	1.524* (0.253)	1.525* (0.253)
Unemployed	2.224*** (0.268)	1.614** (0.270)	1.619** (0.271)	1.620** (0.272)
Couple headed	0.830** (0.048)		0.799 (0.112)	0.798 (0.113)
Have children	0.893* (0.046)		1.008 (0.129)	1.008 (0.129)
Annual household income in thousand	0.988*** (0.001)			1 (0.002)
Year fixed effects	Yes	Yes	Yes	Yes
Number of obs	69058	8870	8870	8870
Number of groups		1983	1983	1983
Log likelihood	-14551.22	-3243.36	-3242.05	-3242.05
Chi-squared	1101.72	203.2	205.82	205.83

* p<0.05, ** p<0.01, *** p<0.001

In M1, we further controlled for age, gender, minority status, education, immigrant status, province, birth cohort and home ownership. Standard errors are in parentheses

**Table 3.9c: Logit regression results for binary poor health variable in odds ratio:
United States (SIPP 2001-2011)**

	Pooled logit		Fixed effect	
	M1	M2	M3	M4
Received social assistance	1.493*** (0.095)	0.926 (0.140)	0.917 (0.139)	0.92 (0.139)
Unemployed	1.484*** (0.064)	1.322** (0.121)	1.262* (0.116)	1.253* (0.115)
Couple headed	0.873*** (0.021)		1.056 (0.111)	1.06 (0.111)
Have children	0.921*** (0.022)		0.956 (0.093)	0.947 (0.092)
Has health insurance	0.609*** (0.018)		0.676*** (0.048)	0.680*** (0.048)
Annual household income in thousand	0.991*** (0.000)			0.998 (0.001)
Year fixed effects	Yes	Yes	Yes	Yes
Number of obs	203723	17272	17272	17272
Number of groups		6921	6921	6921
Log likelihood	-43832.6	-6056.33	-6040.49	-6039.13
Chi-squared	5931.22	9.9	41.58	44.3

* p<0.05, ** p<0.01, *** p<0.001

In M1, we further controlled for age, gender, minority status, education, immigrant status, state, birth cohort and home ownership. Standard errors are in parentheses

**Table 3.9d: Logit regression results for binary poor health variable in odds ratio:
United Kingdom (BHPS 2001-2008)**

	Pooled logit		Fixed effect	
	M1	M2	M3	M4
Received social assistance	1.114 (0.116)	1.302* (0.159)	1.295* (0.158)	1.294* (0.158)
Unemployed	1.655*** (0.162)	1.351* (0.159)	1.351* (0.159)	1.351* (0.159)
Couple headed	0.971 (0.043)		0.881 (0.080)	0.884 (0.082)
Have children	0.813*** (0.032)		1.106 (0.080)	1.104 (0.081)
Annual household income in thousand	0.983*** (0.002)			0.999 (0.003)
Year fixed effects	Yes	Yes	Yes	Yes
Number of obs	42050	19886	19886	19886
Number of groups		3084	3084	3084
Log likelihood	-22683.46	-8039.03	-8037.26	-8037.24
Chi-squared	529.68	59.23	62.78	62.81

* p<0.05, ** p<0.01, *** p<0.001

In M1, we further controlled for age, gender, minority status, education, immigrant status, region, birth cohort and home ownership. Standard errors are in parentheses

Table 3.10a: LPM results for binary poor health variable: Ontario (SLID 2002-2010)

	Fixed effect	
	M5	M6
Received social assistance	0.021 (0.027)	0.022 (0.028)
Unemployed	0.042 (0.026)	0.044 (0.031)
Unemployed x Received social assistance		-0.013 (0.072)
Couple headed	-0.008 (0.009)	-0.008 (0.009)
Have children	-0.016 (0.014)	-0.016 (0.014)
Annual household income in thousand	0 (0.000)	0 (0.000)
Year fixed effects	Yes	Yes
Number of obs	20071	20071
Number of groups	5367	5367
Log likelihood	8062.8	8062.9

* p<0.05, ** p<0.01, *** p<0.001

Robust standard errors are in parentheses. Individual and year fixed effects are controlled; M5 is a replication of M4 of logit models, M6 includes interaction terms

Table 3.10b: LPM results for binary poor health variable: Canada (SLID 2002-2010)

	Fixed effect	
	M5	M6
Received social assistance	0.029 (0.017)	0.029 (0.016)
Unemployed	0.028 (0.015)	0.027 (0.017)
Unemployed x Received social assistance		0.003 (0.057)
Couple headed	-0.005 (0.006)	-0.005 (0.006)
Have children	-0.004 (0.006)	-0.004 (0.006)
Annual household income in thousand	0 (0.000)	0 (0.000)
Year fixed effects	Yes	Yes
Number of obs	69058	69058
Number of groups	18184	18184
Log likelihood	29956.35	29956.36

* p<0.05, ** p<0.01, *** p<0.001

Robust standard errors are in parentheses. Individual and year fixed effects are controlled; M5 is a replication of M4 of logit models, M6 includes interaction terms

Table 3.10c: LPM results for binary poor health variable: United States (SIPP 2001-2011)

	Fixed effect	
	M5	M6
Received social assistance	-0.006 (0.013)	-0.008 (0.014)
Unemployed	0.012* (0.005)	0.012* (0.005)
Unemployed x Received social assistance		0.012 (0.029)
Couple headed	0.003 (0.005)	0.003 (0.005)
Have children	-0.002 (0.004)	-0.002 (0.004)
Annual household income in thousand	0 (0.000)	0 (0.000)
Has health insurance	-0.020*** (0.004)	-0.020*** (0.004)
Year fixed effects	Yes	Yes
Number of obs	203723	203723
Number of groups	98556	98556
Log likelihood	112393.88	112394.29

* p<0.05, ** p<0.01, *** p<0.001

Robust standard errors are in parentheses. Individual and year fixed effects are controlled; M5 is a replication of M4 of logit models, M6 includes interaction terms

Table 3.10d: LPM results for binary poor health variable: United Kingdom (BHPS 2001-2008)

	Fixed effect	
	M5	M6
Received social assistance	0.036 (0.021)	0.027 (0.023)
Unemployed	0.041* (0.020)	0.032 (0.024)
Unemployed x Received social assistance		0.028 (0.042)
Couple headed	-0.016 (0.016)	-0.016 (0.016)
Have children	0.01 (0.012)	0.01 (0.012)
Annual household income in thousand	0 (0.000)	0 (0.000)
Year fixed effects	Yes	Yes
Number of obs	42050	42050
Number of groups	7793	7793
Log likelihood	-8241.73	-8241.18

* p<0.05, ** p<0.01, *** p<0.001

Robust standard errors are in parentheses. Individual and year fixed effects are controlled; M5 is a replication of M4 of logit models, M6 includes interaction terms

Table 3.11 Detailing how the final sample sizes were arrived at:

	SLID 2002-2010		SIPP 2001-2011		BHPS 2001-2008	
	T=6		T=2-3		T=8	
	n	i	n	i	n	i
Working age adults	182,567	45092	351,536	167,329	78,826	16,105
After dropping nonpositive and top 1% income			345,731	165,618	77,809	16,050
Working age adults in the labour force (no EI)			238,447	126,016	59,198	13,160
Working age adults in the labour force (no EI) - no missing	102,149	32391	229,096	118,524	55,499	12,189
Working age adults in the labour force (no EI) with first year data - no missing = Final full sample	69,058	18184	203,723	98,556	42,050	7,793
Analytic sample (dropped because of all positive or all negative outcomes)	8,870	1,983	17,272	6,921	19,886	3,084
Ontario final full sample	20,071	5,367				
Analytic sample (dropped because of all positive or all negative outcomes)	2,701	608				

Note: Some sample sizes for the SLID are not reported due to administrative restrictions imposed by Statistics Canada. Our analysis from the SIPP data does not include 2006-2008.

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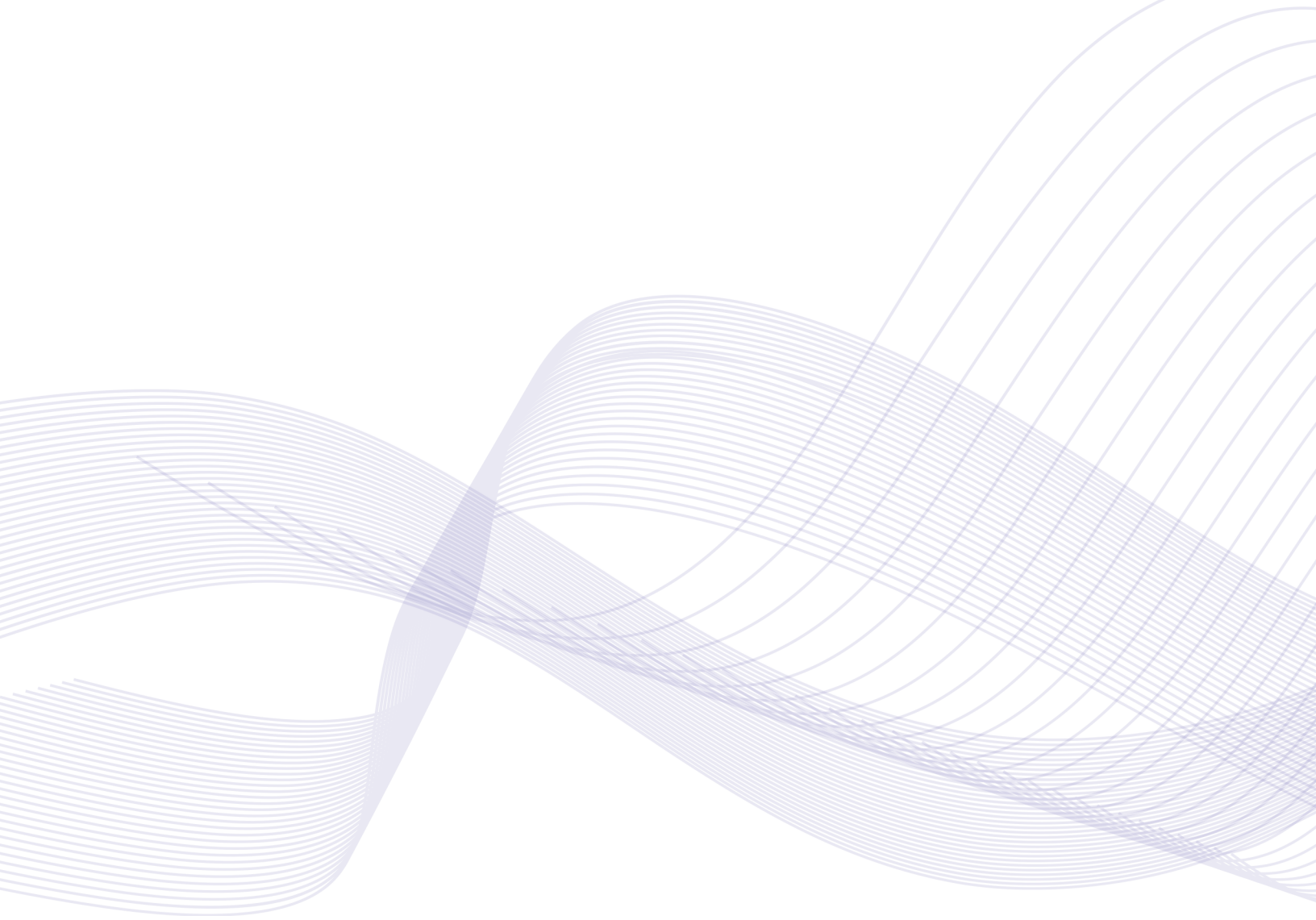
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