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Rapid Review

Impact of recession and inflation on health outcomes and health systems

Prepared for the Ontario Ministry of Health

Jamieson M., Roerig M., Hoagland A., Laporte A., & Allin S.

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The opinions and conclusions expressed or implied in this report are those of the Partnership for Evaluation and Policy Research (PEPR) Team. The views expressed by the authors are not intended to represent the views of the North American Observatory on Health Systems and Policies nor necessarily reflect those of the Province of Ontario.

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About

The North American Observatory on Health Systems and Policies (NAO) is a collaborative partnership of interested researchers, research organizations, governments, and health organizations promoting evidence-informed health system policy decision-making.

Contact Information

North American Observatory on Health Systems and Policies
155 College Street, Suite 425
Toronto, ON M5T 3M6

 www.naohealthobservatory.ca

 naobservatory@utoronto.ca

 nao_health

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Executive Summary

Individual and population-level health can be impacted through a variety of channels that may be affected by macroeconomic conditions, such as access to health insurance, occupational hazards, availability of affordable housing and food, and stress levels. This rapid review explores the relationships between health outcomes and macroeconomic conditions.

We conducted a literature review to identify peer-reviewed and non-peer-reviewed literature exploring the relationships between macroeconomic conditions and health and health behaviours. Following screening, 35 papers that met the inclusion criteria were included. The majority of papers predated the COVID-19 pandemic, although 11 were published between 2019 and 2023. Research indicates that while unemployment negatively impacts individual health, aggregate-level studies challenge the notion that economic downturns harm population health, suggesting that deviations from long-term per capita GDP trends during recessions are associated with reduced mortality rates. Disparities in the impact of economic downturns on health are evident among population subgroups, with gender, age, and race playing crucial roles, highlighting the complex interplay between economic conditions and health outcomes and the necessity of tailored interventions for different population groups. Additionally, several papers looked at the importance of the healthcare system in protecting individuals from the negative impacts of economic contractions, through the provision of social programs and health insurance. There is some evidence that this and other forms of government intervention (such as control over interest rates to mitigate rising costs of health goods during periods of inflation), can help to minimize negative impacts on health.

The Great Recession (2007–2009) was a key focus of many of the papers (n=17), and there was evidence suggesting that milder fluctuations in the business cycle were less likely to impact mortality and other health outcomes. Consideration of long-term versus short-term impacts on health was minimal; this blind spot is consistent with another commentary on this topic and remains an area for improvement in this research space. The relationship between health and economic conditions can be explained by how job loss influences an individual's eligibility for certain social programs and safety nets, how the labour-leisure trade-off changes during periods of unemployment, and how economic stress creates emotional and mental duress that can negatively impact health. Most papers surveyed in this review use some form of fixed effects regression (often accounting for year-level, region-level, or individual-level variation) with robust standard errors; depending on the outcome and key input of interest, effects may be described as elasticities.

The findings from this rapid review identify a diversity of approaches and some standard practices and novel opportunities for analysing the effects of economic conditions on health and health systems. We also find limited evidence on the Canadian context, demonstrating a need for further research into how recessions and inflationary periods impact population health in Canada. Findings from this rapid review provide foundational knowledge to inform future quantitative analyses in the Ontario context, informing health systems planning in Ontario.

Introduction & Background

The impact of economic uncertainty and turbulence on health outcomes is of great interest to academics and policymakers looking to improve individual and system-level responses to periods of inflation and economic contraction. Individual and population-level health can be impacted through a variety of channels that may be affected by macroeconomic conditions, such as access to health insurance, occupational hazards, availability of affordable housing and food, and stress levels. Many of these relationships have been explored and documented as evidence of the ways that the macroeconomic health of a society impacts the physical and mental health of that society (Bellés-Obrero & Vall Castelló, 2018; Benach et al., 2022; Glonti et al., 2015; Karanikolos et al., 2016; Margerison-Zilko et al., 2016; Thompson et al., 2019).

The business cycle model describes how macroeconomic periods of expansion and contraction affect key variables influencing health and socioeconomic conditions for individuals and societies. During a recession, economic activity declines, corresponding with lower GDP, real income, employment levels, and industrial activity. The most recent examples are the economic contraction experienced by many countries triggered by the COVID-19 pandemic and the subprime mortgage crisis that began in 2007 and triggered the financial crisis of 2008 in a period described as the "Great Recession." After the lowest point of the business cycle (also known as the "trough"), economies begin recovering and rebuilding in an expansion phase—usually with the help of lower interest rates and government investment. The US non-profit National Bureau of Economic Research (NBER) emphasize that the natural state of most economies is expansion: recessions tend to be brief, yet it may take considerable time for economies to return to their pre-recession levels of output (National Bureau of Economic Research, 2023). During this expansion phase, economic activity begins to boom again, which is characterized by high employment and incomes, high interest rates, and increasing price levels (inflation). Although inflation is commonly seen as an unavoidable by-product of a booming economy and usually[1] accompanies growth in income and employment levels, it can potentially impact health when rising prices for essential goods and healthcare services outstrip income growth or if the inflation is caused by a factor other than economic growth (such as a drought) (He, 2018; Woldemichael et al., 2022).

The question of how recessions and economic conditions affect health in countries such as the US and Canada has been explored extensively over the last 50 years. Previous work exploring the relationships between economic downturns and health have revealed a nuanced relationship influenced by various factors (Bellés-Obrero & Vall Castelló, 2018; Benach et al., 2022; Glonti et al., 2015; Karanikolos et al., 2016; Margerison-Zilko et al., 2016; Thompson et al., 2019). For most modern academics, Ruhm's seminal 2000 paper provides the most comprehensive description and evidence around the procyclical and countercyclical[2] mechanisms by which economic conditions impact health (Ruhm, 2000). Ruhm's analysis spanned nearly 20 years of American data and concluded that between 1972–1991 there was strong evidence of procyclical mortality—aggregate-level mortality decreased during periods of economic contraction (as measured by increased unemployment).

[1] The term "stagflation" is used to describe the rare phenomenon wherein high inflation rates accompany low economic growth and high unemployment rates.

[2] Terms describing the tendency for a measurement, such as health, to move either in tandem with (procyclical) or against (countercyclical) fluctuations in the business cycle.

The focus of many recent reviews and book chapters has specifically been on the impact of financial crises and recessions, usually with an emphasis on the Great Recession. There has not been the same degree of research looking at the relationship between inflation and health and to the best of our knowledge, no comprehensive reviews on the topic. Generally, existing reviews suggest that recessions can have both negative and positive effects on health, with results varying across outcome measures, population subgroups, and other important factors. Some of the reviews also emphasized that distinguishing between aggregate-level and individual-level health effects was important, since the population-level impact of recessions differed from individual experiences of being laid-off during a recession. Measuring the health impact of the macroeconomic contraction during and following the COVID-19 pandemic, and the accompanying period of inflation post-contraction, presents new challenges to researchers. Unlike the Great Recession, the pivotal cause of the contraction in 2020 was a public health emergency, so individual and population-level health outcomes could be due to either the COVID-19 virus itself, or the economic and policy-related by-products of the pandemic and accompanying lockdowns.

Thus, there is a need for further research and methodological improvements to better understand the intricate interplay between economic recessions and health outcomes. In this rapid review, we will identify and review literature that explores the relationships between macroeconomic conditions and health and health behaviours, to inform future work on how the Great Recession (2007–2009) and the economic conditions during the COVID-19 pandemic affected the health of Ontarians. We consider various contextual factors, including healthcare systems and socioeconomic disparities, in assessing the impact of economic downturns on public health, and expand the literature base to include economic shocks that occurred during the COVID-19 pandemic, as well as cover more material related to the impacts of inflationary periods on health and system outcomes. Findings will provide foundational knowledge to inform future quantitative analyses in the Ontario context, informing health systems planning in Ontario.

Methods

A rapid literature review was conducted to explore the relationship between macroeconomic conditions and health outcomes, as well as identify promising practices and novel analytical approaches. We relied on NBER working papers, Google Scholar, curriculum vitae (CV) of prominent authors, and Research Rabbit for the search. The search terms used were broad, combining health and economic key terms**.**

First, NBER working papers were reviewed to identify key papers and authors, particularly related to the United States (US) context. Although not peer-reviewed, NBER working papers offer access to newer analyses that may not yet be available in the peer-reviewed literature, and can generate discussion and feedback prior to their future publication in an academic journal. Because of this, relevant NBER working papers were also searched for in the scholarly literature to capture the peer-reviewed version and, when available, replaced the working paper version. If working papers did not have a corresponding peer-reviewed publication—analyses may be too recent to have undergone peer review—they were still included in this review if they were published within the last five years.

Google Scholar was also searched to identify papers in research areas where we knew our existing scope was lacking, such as other literature reviews and papers on countries that may be considered peers of Canada. We also searched CVs of prominent authors (such as Christopher Ruhm) to identify additional papers. The inclusion criteria were broad to capture a variety of research contexts and approaches. Papers were included if they looked at the impact of macroeconomic conditions on health outcomes and behaviours, were published or included data from 2008 onwards, and were available through open-access or the University of Toronto Library.

Finally, ResearchRabbit, an online citation-based literature mapping tool, helped to further identify articles that may have been missed during the above searches. ResearchRabbit creates maps of academic publications by connecting similar papers based on common authors and collaborators, citation lists, and user suggestions of comparable papers. We inputted all the academic publications identified in our NBER and Google Scholar into a ResearchRabbit search to locate similar articles that we had missed in our previous searches.

A standardized data extraction form was used to capture key information about each paper, including publication details (e.g., author, publication year, title), the population and context of interest, conceptual approach, quantitative methods, and findings (see **Appendix A** for additional information on the extracted data fields). A commentary published by Suhrcke and Stuckler in 2012 that explored the impact of the Great Recession on health (Suhrcke & Stuckler, 2012) was used to inform the analysis. We modified the content analysis presented by Suhrcke and Stuckler to better fit the context and purpose of this literature review, capturing details on how the analyses were conducted as well as their findings (**Table 1**).

TABLE 1. Content comparison between Suhrcke et al. (2012) and this review

	Suhrcke & Stuckler, 2012	*This review*
Individual vs. aggregate relationships	✓	✓
Poor countries vs. rich countries	✓	x
Average health effects vs. health equity effects	✓	✓
"Normal" fluctuations vs. "severe" crises	✓	✓
Short term vs. Long term effects	✓	✓
Crises with and without a "Welfare State"	✓	✓
Application of economic theory (NEW)	–	✓
Analytical approaches (NEW)	–	✓

Limitations

The findings from this rapid review highlight the many different approaches taken by academics to arrive at, or diverge from, consensus on the relationship between economic conditions and health outcomes. There are some limitations of our review, however. We were limited to papers published in the English language, and we did not employ the full methodologies used in traditional reviews of the academic literature, such as database searching and using multiple screeners for inclusion and exclusion of papers. Despite these limitations, our review highlights specific opportunities and considerations for research in the Canadian context, making this material of particular use for researchers in that space. To the best of our knowledge this review is also novel in its summary of the health and systems impacts of the post-COVID-19 inflationary period (although literature on this topic is limited).

Analytic Overview

We found 35 papers that fit our inclusion criteria, summarized in **Appendix B**. The majority (n=25) of these papers were published prior to the COVID-19 pandemic, and 10 were published between 2020 and 2023. Among those published during and post-pandemic, only four included data drawn during the pandemic itself (see **Table 2**). The US was the central country of interest in 17 papers, while Canada was the focus for three. Seven papers looked at multiple countries, seven at specific European countries, and one at Australia.

TABLE 2. Summary of papers focused on COVID-19 pandemic data

Author (date)	Key details

Bryan et al. (2021)	• Developed an economic model of the impact of COVID-19 lockdowns on long-term health outcomes.
	• Proposed the following series of relationships:
	  ○ Lockdowns lead to reductions in economic productivity
	  ○ Productivity losses decrease jobs and economic output in various sectors
	  ○ Excess mortality and long-run health issues increase as a consequence of job losses in specific sectors
	• Model predictions suggested that keeping upstream sectors of activity (such as manufacturing) leads to better economic and health outcomes than avoiding lockdowns in consumer-facing sectors.

Ruhm (2022)	• Disaggregated impacts on mortality between pandemic effects and recession effects:
	  ○ Pandemic effects (direct impacts on medical decision making, access to services); estimated based on the predictive effect of a 5.0 percentage point increase in unemployment (the difference in monthly unemployment rates in 2020 and 2019).
	  ○ Recession effects (accompanying the pandemic); difference between excess deaths and pandemic effect.

Louie et al. (2023)	• Drew upon list of 18 inflation-related hardships (including purchasing less food, working more hours, etc.) to demonstrate that exposure to these hardships caused an increase in mental distress in the post COVID-19 inflationary period in the US. • Found evidence of a stronger association among men compared to women, theorized as due to differences in coping mechanisms, and differences in the perceived level of financial burden within a household.
Donnelly & Farina (2021)	• Examined how income shocks affected mental health during the early months of the COVID-19 pandemic in various US states. • Prevalence of depression and anxiety differed across states by household income shock status. • Presence of supportive state-level social policies mitigated the impact of income shocks on mental health.

Generally, these papers found some level of connection between health outcomes and periods of economic downturn. Among the connections, there is evidence of pro-cyclical mortality, wherein additional deaths occur at an aggregate level when the economy is strong, due to the effects of increased industrial accidents, air pollution, and other factors that influence mortality when there are higher levels of economic activity. Belotti et al. (2022) highlight that prolonged economic downturns can pose additional external risks to individual health rather than offering temporary benefits. These risks

are often associated with negative mental health impacts, including increased psychological distress and suicide rates, particularly among specific demographic groups. Other scholarship, such as Ruhm (2016), suggested that economic crises may lead to improvements in physical health, with mortality rates decreasing during economic downturns. However, these effects are not universal and may depend on the severity and duration of the recession, as well as the presence of social safety nets.

Moreover, the literature emphasized the importance of considering individual and contextual factors, such as sociodemographic variables and geographic contexts. Black et al. (2015) underscore the importance of adjusting for individual fixed effects in identifying causal relationships between unemployment and health. Additionally, the impact of economic downturns on mortality and health behaviors can vary across different countries, regions, and time periods (Thompson et al., 2019; Toffolutti & Suhrcke, 2014). Overall, the conclusions drawn from these studies underline the intricate and diverse ways in which economic fluctuations can shape health outcomes, making it crucial to account for a range of factors when analyzing this complex relationship.

To better contextualize the findings of these papers within these crucial factors, we have further broken our discussion into seven core considerations based on the framework mentioned above that was adapted from Suhrcke and Stuckler's (2012) commentary (**Table 1**). These core considerations cover a variety of topics that go beyond basic information in each paper, and into greater depth on issues such as equity considerations and distinctions between major economic crises and normal fluctuations.

Core Considerations

1. Individual vs. aggregate relationships

A core consideration in the discussion of how economic conditions influence health outcomes is how analyses aggregate both economic conditions and health outcomes. The key conceptual difference is that aggregate and individual-level health outcomes may be moderated through different channels, as shown in **Figure 1.** For example, during periods of economic decline, there may be less industrial activity and fewer people commuting to work—leading to fewer traffic accidents and lower incidence of air-pollution-derived illness (Ruhm, 2000). At an individual level, however, unemployment often means reduced access to health insurance, lower income, and increased risk of diseases of despair, such as opioid overdoses or suicides (Currie et al., 2015; Hollingsworth et al., 2017; McInerney & Mellor, 2012; Stuckler et al., 2009; Toffolutti & Suhrcke, 2014; Vandoros et al., 2019; Wang et al., 2018). **Figure 1** summarizes some of these relationships, although it should be noted that there may be some instances in which the direction of impact is reversed. It is recognized that economic conditions exert varying effects on health outcomes at individual and aggregate levels. Research consistently demonstrates that unemployment negatively impacts individual health, leading to higher mortality rates and greater morbidity (Black et al., 2015). Low socioeconomic status, marked by factors like low income and education, is linked to poor physical and psychological health.

Population health improves as a result of economic downturns

- Less industrial activity, leading to fewer pollution-related illnesses
- Fewer industrial accidents
- Fewer car crashes, commute-related injuries

Individual-level health deteriorates as a result of economic downturns

- Decreased access to health insurance as a result of unemployment
- Less disposable income for affording health goods
- Increased risk for deaths of despair (deaths due to psychological impact of repeated social stressors)

FIGURE 1. Relationship between economic downturns and aggregate and individual-level health outcomes

Conversely, aggregate-level studies confirm Ruhm's (2000) evidence on procyclical mortality, suggesting that increases in aggregate-level unemployment trends during recessions are associated with reduced mortality rates (Ariizumi & Schirle, 2012; Bonamore et al., 2015; Cervini-Plá & Vall-Castelló, 2021; Haaland & Telle, 2015; Ruhm, 2016, 2022; Strumpf et al., 2017; Tapia Granados & Ionides, 2017; Tekin et al., 2018; Toffolutti & Suhrcke, 2014). Some examples of individual and aggregate-level health effects and economic conditions are shown in **Table 3** and **Appendix B**. This complex relationship indicates that the negative health effects experienced by those who become unemployed during a recession may be offset by improved health behaviors and reduced risk-taking among the general population, although findings may vary by country and additionally by subpopulation.

TABLE 3. Individual and aggregate level indicators capturing health and economic conditions in the reviewed literature

	Individual-Level	Aggregate-Level
Health Indicators	• Disease incidence (2 papers) • Insurance coverage, medical spending (4 papers) • Disease symptoms, risk (7 papers) • Health status (4 papers) • Probability of death (1 paper) • Health habits (2 papers)	• Overall and cause-specific mortality (13 papers) • ED visit rates (1 paper) • Medicare payments (1 paper) • Suicide incidence (1 paper) • Life expectancy (1 paper)
Economic Indicators	• Employment status (1 paper) • Job displacement (1 paper) • Personal wealth and income shocks (2 papers) • Inflation hardship (1 paper)	• Regional unemployment rates (24 papers) • Local house prices/rent (3 papers) • Regional gross product (3 papers) • Pre-post indicators for economic crises (3 papers) • Uncertainty index (1 paper) • Inflation (3 papers) • Productivity (1 paper)

2. Average health effects vs. health equity effects

Related to the first consideration (individual vs. aggregate-level effects) is how different subgroups of a population experience economic downturns. Several studies highlighted disparities based on gender, age, and race. For instance, men were found to be disproportionately affected by economic downturns, particularly with regard to health insurance coverage (Cawley et al., 2015) and mortality (Strumpf et al., 2017; Vandoros et al., 2019). Men and those nearing retirement were also found to disproportionately experience depression (Belotti et al., 2022; Cawley et al., 2015). However, women and older adults were found more likely to experience worsened cardiovascular health (Belotti et al., 2022). Furthermore, age-specific effects were observed, with booms during adolescence potentially raising adult incomes and improving mental health in the long run, while recessions in one's late 50s or early 60s was associated with adverse long-term health outcomes (Coile et al., 2014). Racial disparities were also evident in several papers focusing on the US (Cawley et al., 2015; Currie et al., 2015; Cutler & Sportiche, 2022; Wang et al., 2018). Black and non-white homeowners, for example, may suffer greater impacts in terms of depression and functional limitations during economic crises compared to white homeowners (Cutler & Sportiche, 2022). Maternal health impacts also differ, with racialized populations experiencing worse health outcomes as a consequence of increasing unemployment rates while white mothers experience an improvement in health outcomes (Currie et al., 2015). These variations underscore the complex interplay between economic conditions and health, emphasizing the need for targeted interventions to address the specific needs of different population groups during economic downturns. **Table 4** describes some of the suggested government policies and interventions that could be used to mitigate the impact of an economic downturn on specific populations.

TABLE 4. Government policies and interventions mitigating impact of economic downturn

Author (date)	Key details
Stuckler et al. (2009)	• Explored the impact of economic downturns on premature deaths, especially associated with intentional violence • Demonstrated that larger and unexpected rises in unemployment pose a greater risk to suicides and alcohol-related deaths. • Emphasizes the role of **social spending** on active labor market programs[3], suggesting that investments exceeding $190 per head purchasing power parity can effectively counteract the impact of unemployment on suicide rates, providing a specific opportunity for health-promoting stimulus packages.
Vandoros et al. (2019)	• Synthesizes policy options available with the aim of suicide prevention in times of economic policy uncertainty[4] • Specific options include increasing **public messaging** around mental health supports and treatment, improving **employment supports and unemployment protections**
Donnelly & Farina (2021)	• Examined how income shocks affected mental health during the early months of the COVID-19 pandemic in various US states. • Demonstrated higher prevalence of anxiety and depression in states lacking essential social policies during income shocks. • Underscores the critical role of state-level policies, suggesting policy options like **unemployment insurance and Medicaid expansion** as key factors in mitigating distress and promoting overall health

3. Normal fluctuations vs. severe crises

Regardless of whether an economy is in recession, there will be normal month-to-month fluctuations in employment levels and economic output across an economy; what characterizes a recession is a sustained decline in economic activity across sectors that lasts for at least a few months (National Bureau of Economic Research, 2023). Although most of the papers examined the effect of recessions or specific instances of economic downturns upon health (n=22, of which 17 focused specifically upon the Great Recession of 2008), some papers (n=8) looked more broadly at changes in the business cycle, rather than focusing on periods of economic downturn. Those that more broadly looked at business cycle fluctuations typically covered longer periods of time, usually at least 15 years of data, and sometimes as many as 100+ years of historical data. To analyse the differences between normal fluctuations and severe crises, Suhrcke and Stuckler (2012) compared the relative impact of a 1% (fluctuation) and 3% (severe crisis) increase in unemployment rates among EU countries between 1971 and 2006, finding that some cause-specific mortality rates were more affected by severe crises (Suhrcke

[3] Defined as: active labour market programmes contain all social expenditure (other than education) aimed at improving beneficiaries' prospects of finding gainful employment or to otherwise increase their earnings capacity. This expenditure includes spending on public employment services and administration, labour market training, special programmes for youth when in transition from school to work, labour market programmes to provide or promote employment for unemployed and other people (excluding young and disabled people), and special programmes for disabled people (OECD, 2008).

[4] Economic policy uncertainty is a metric that captures articles from the archives of the Access World News NewsBank service, utilizing terms and keywords found in news articles from the United Kingdom (UK) to create an index of policy uncertainty across time in the UK (Baker et al., 2016).

& Stuckler, 2012). Analyzing the differential effects of these fluctuations, especially during significant crises, provides valuable insights into understanding the nuanced relationship between economic conditions and health outcomes over extended periods.

4. Short-term vs. long-term effects

Of the papers reviewed, discussion about the differential impact of economic conditions in the short and long run was rare. Importantly, no paper offered a definition of what was meant by "short and long run." Vandoros et al. (2019) proposed that the shape of the economic crisis (whether it was V, U, W, or L-shaped downturn) would lead to different recovery times. For the Great Recession in particular, Cutler and Sportiche (2022) offered some consideration of how to capture a more complete picture of the impact by measuring changes in house prices, which they note declined for several years beyond the initial shock of the Great Recession. In a more recent economic analysis of the COVID-19 pandemic, Bryan et al. (2021) developed a model of for how long-term health outcomes would be impacted by sector-specific lockdowns, citing how economic shocks would have downstream effects on economic equilibrium and health. In general, there was minimal consideration of short vs. long-term impacts in the surveyed papers—a finding that is generally consistent with a commentary by Suhrcke and Stuckler (Suhrcke & Stuckler, 2012).

5. Crises with and without a Welfare State

The resilience of populations and their ability to cope following economic crises can be influenced by various protective factors, many of which (including publicly funded health systems) can be provided in a welfare state (Glonti et al., 2015). Several papers referenced, either explicitly or implicitly, the importance of having a healthcare system that protects individuals from the negative impacts of economic contractions upon health. Government programs often work counter-cyclically to protect the health of children and the elderly (Ariizumi & Schirle, 2012; Cawley et al., 2015; Coile et al., 2014). Cawley et al.'s findings around the impact of changes in the unemployment rate on health insurance coverage suggest some protective effects of government-sponsored health insurance programs for older adults and young children (Cawley et al., 2015). Others suggest the longer-run impact of recessions on survival are moderated by the availability of social insurance programs for older adults (Coile et al., 2014; Cutler & Sportiche, 2022).

A key factor pertinent to health systems is how costly it is to provide treatment during periods of economic uncertainty. **Box 1** highlights some of the specific specific challenges faced by the health system of the province of Ontario during the post-COVID-19 inflationary period. Most governments play a critical role in influencing the level of healthcare inflation, either through control of interest rates, and more specifically through regulatory and legal control of the environment in which health insurance and health systems operate. A study of the US health system found that healthcare policy uncertainty[5] induced a decline in the growth rate of real health expenditure and healthcare inflation, consistent with the decline seen following the Great Recession (Cheng & Witvorapong, 2021).

[5] Healthcare policy uncertainty (HCPU) is a metric that captures the frequency of articles in 10 leading US newspapers that jointly contain words such as "uncertain" or "uncertainty," "congress" or "legislation," and "healthcare" or "health insurance" to create an index of HCPU across time in the US (Baker et al., 2016).

In periods of inflation, however, the price level of healthcare services, medications, and insurance premiums can rise—making it more challenging for individual consumers to afford healthcare. One study provided evidence from 61 countries that out-of-pocket spending on healthcare as a percentage of total spending declined during periods of inflation (He, 2018). The author recommends that government financing of healthcare for the poor during inflationary periods can offset the associated reduction in health investments made by people experiencing inflationary pressures (He, 2018). However, the specific mechanisms through which this expenditure could impact health was not explored, making these findings limited in their applicability to this review.

Ariizumi and Schirle (2012) noted that despite the availability of programs in the US such as the Children's Health Insurance Program and Medicaid, Canada's universal healthcare coverage helped to insulate children and infants in particular from the negative impacts of the Great Recession (Ariizumi & Schirle, 2012). Nearly 10% of American children under 19 were uninsured in 2009, and 24% of households with incomes below US$25,000 were uninsured and ineligible for Medicaid (DeNavas-Walt et al., 2009). The care arrangements of seniors are more comparable between the US and Canada, although the quality of institutional and nursing care provided in Canada does not vary as much across the business cycle as it does in the US.

Box 1. Focus on Ontario Health System Context

Macroeconomic conditions impact health through a variety of channels (as already discussed), but it is important to highlight how these conditions impact the health system. Population health and the health system are interconnected, as unhealthy populations are required to draw more upon the health system, while strong health systems typically support and reinforce healthy communities. Belotti et al. (2022) conducted a specific calculation, estimating that the healthcare cost due to increased disease incidence during the Great Recession reached €135 million – demonstrating the financial cost of economic downturns to health systems. Other literature suggests that the rise in specific diseases, particularly mental health or substance use conditions and other causes of "deaths of despair" cost over USD$1 trillion annually in the US (Rockett et al., 2023). Ontario faces many of the same specific population health concerns, yet the precise impact on health system stress in the province is less clear. Additional to the challenges posed by COVID-19 and the current inflationary period, Ontario's health system is overburdened and facing staffing crises. The provincial government's warning that the twin crises of healthcare workforce shortages and inflation due to COVID-19 would not be easily solved serves as a reminder that the health system faces challenges that cannot be overcome with band-aid solutions (Benzie et al., 2022). The promise of more Canadian-focused research will help to identify the impact of recessions on Ontario's health system and opportunities for system improvement.

6. Application of economic theories

The theory underpinning how economic conditions impact health is intricate and encompasses diverse pathways. Health is conceptualized as a valuable resource, its level dictating mortality rates. Economic conditions exert influence on health outcomes through numerous conduits, encompassing shifts in the accessibility of fundamental resources like food and healthcare, changes in health-related behaviors such as smoking and exercise, and modifications in environmental factors like pollution. These components collectively contribute to the overall reservoir of an individual's health. Most models included in this review model either individual-level health "stocks," or population-level health;

however, papers that model individual-level health do usually account for determinants of mortality at the regional or national level by including geography-specific fixed effects.

Furthermore, economic fluctuations can yield enduring consequences on mortality by shaping the composition of the population that survives into older age, referred to as the selection effect (Bellés-Obrero & Vall Castelló, 2018). Carey et al. (2022) describe two pivotal channels for comprehending the influence of economic conditions on health, including the "health shocks" channel, which pertains to individuals whose health deteriorates during recessions, rendering them medically eligible for disability programs, and the "entry cost" channel, involving those already medically qualified but joining disability programs during economic downturns due to reduced program entry costs.

As in many economic theories, the level of investment in an individual's stock of health depends on how that health stock is treated in a model. For example, Bonamore et al. (2015) argue that an individual's behavioural response to economic shocks can take one of two forms: 1) suffering from increased stress and more risky behaviours (increasing risk of mortality), or 2) benefiting from reduced job-related stress and using extra leisure time for health-producing activities (lowering risk of mortality). They model and find evidence to suggest that both responses are valid and depend on the intensity of unemployment. When unemployment rates are low, the positive effect prevails, as individuals expect to be able to find work easily. When rates are high, the negative effect prevails—highlighting the importance of government intervention to mitigate the negative impact of very high unemployment rates on worker morale and health behaviours (Bonamore et al., 2015).

Additionally, macroeconomic conditions can impact health through the generation of production externalities and stressors, encompassing psychosocial and physical factors. Economic stress, in turn, can engender negative health outcomes, spanning physiological and psychological realms. Periods of inflation make day-to-day purchases more expensive, which can in turn result in increased stress. Louie et al. (2023) found evidence that the inflationary period post-COVID-19 was causing an increase in inflation-related hardships,[6] which led to an increase in mental distress symptoms among Americans (Louie et al., 2023). Changes in disposable income and the opportunity cost of time during economic fluctuations can also shape health behaviors, affecting aspects such as alcohol and tobacco consumption, access to nutritious food, and engagement in physical exercise. For example, He (2018) incorporated endogenous health investment into a Schumpeterian growth model to demonstrate that

[6] *The Phase 3.6 Household Pulse Survey* conducted in 2022 by the US Census Bureau asked respondents "What changes, if any, have you made to cope with the increases in prices? Select all that apply." Respondents were allowed to choose from 18 "inflation hardships," which included: shop at stores that offer lower prices, look for sales and/or use coupons, switch from name brand to generic products, purchased less fresh produce and/or meat, go out to eat less often or order food for delivery less often, cancel or reduce subscription services, cancel or decreases plan to attend events, drive less or change mode of transportation, delay major purchases, delay medical treatment, work additional job(s)/shift(s) to supplement income, contribute less to savings and/or retirement accounts, increase use of credit cards, landlords, and/or pawnshops, decrease use of utilities, move to less expensive housing, ask friends/and or family for help, change or reduce plans for childcare arrangements to save money, utilize benefits from charities, and other. Respondents were scored from 0–18 based on how many of these hardships they experienced (Louie et al., 2023; US Census Bureau, 2023).

monetary policy has the potential to impact out-of-pocket healthcare spending, depending on whether or not healthcare spending is paid for via cash or on credit (He, 2018).

Overall, economic conditions exert their influence on health outcomes through a complex interplay of factors, comprising resource accessibility, health-related behaviors, environmental elements, stress, and alterations in income and time allocation. Bryan et al. (2021) describe a comprehensive economic model connecting the economic shocks of sector-specific lockdowns during COVID-19 and long-term health outcomes, which encompasses many of these factors (shown in **Figure 2**). Their model describes a complex network of relationships where lockdowns cause sector-specific productivity shocks, impacting GDP and employment both directly and indirectly. The downstream effects on productivity create a ripple effect across sectors, leading to unemployment, reduced household income, and a probabilistic increase in morbidity and mortality among unemployed workers, highlighting the multifaceted consequences of lockdown policies. These mechanisms underscore the imperative need for an understanding of the relationship between economics and health to formulate effective policies and interventions for mitigating adverse health effects during economic downturns.

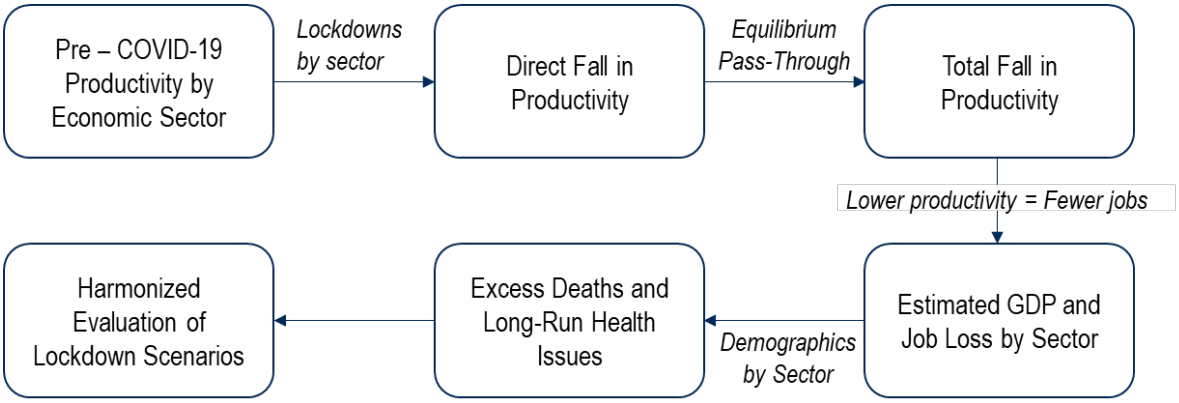

FIGURE 2. Connections between economic conditions and long-term health models

A summary of the connection between economic and long-term health models. Adapted from *The Economic and Long-Term Health Consequences of Canadian COVID-19 Lockdowns (pg. 284) by K. Bryan et al. (2021)*

7. Analytical approaches

Papers examining the impact of economic downturns on health employed a variety of analytical approaches to investigate this complex relationship. A common strategy involved using measures that capture the impact of recessions or changes in the business cycle, such as changes in unemployment rates or house prices. For instance, Cutler and Sportiche (2022) emphasized the importance of assessing the effects of economic downturns by looking at house prices, particularly when examining the Great Recession (Cutler & Sportiche, 2022). This was recommended because effects are captured over a longer period; since house prices continued to decline for several years following the Great Recession (up until at least 2011), they suggested house prices better capture the full impact of the recession on health after the initial shock. Using this metric for pre-retirement adults over the age of 51 may also capture a more meaningful measure of wealth among a population experiencing long-term declines in the value of their housing assets as they approach retirement.

Other studies used indicator variables for the periods before and after the initial shock of a recession, capturing the difference between pre- and post-recession (Lamba & Moffitt, 2023; McInerney et al., 2013; Ruhm, 2016). In other instances, such as in repeated cross-sectional survey, individual-level effects are necessarily estimated as static effects because there is only one period of observation. These analytical choices allow researchers to explore how economic conditions affect health outcomes.

Analytical methods used in these studies vary, including Ordinary Least Squares (OLS) regression with fixed effects, multi-variable OLS, logistic regression, and multi-level modeling. Some papers present their results as elasticities, expressing how a percentage-point change in one variable leads to a percentage-point change in another. Notably, Ruhm (2022) takes a unique approach by decomposing total mortality during the pandemic into pandemic effects (direct impacts on medical decision-making and access to services) and recession effects (accompanying the pandemic) (Ruhm, 2022) (see **Table 2** for greater detail). To account for the influence of macroeconomic factors on microeconomic outcomes, many studies cluster standard errors by state, addressing potential bias in their models. These methodological choices ensure that the analysis considers the broader economic context when investigating the impact of recessions on health, providing valuable insights into this multifaceted relationship.

All papers included recognized the importance of accounting for various factors impacting mortality, such as sociodemographic, sector-specific, and geographic variables, but there were different approaches to incorporating those variables. Some authors, such as Belotti et al. (2022) used individual-level health data but only had region-level information on education levels (which were incorporated as covariates in the regression model) (Belotti et al., 2022), while others had both individual-level health and sociodemographic controls available (Birgisdóttir et al., 2020; Black et al., 2015). Most papers included sociodemographic variables as controlling parameters, rather than running separate analyses by population subgroup; there were some papers that did, however. Cawley et al. (2015) conducted specific subgroup analyses by race, and age group, while Louie et al. (2023) used different specifications to account for the interaction between gender and inflation-related hardships. In summary, we found that a range of approaches could be used to determine the impact of economic conditions on health, depending on the available variables, level of aggregation, and specific research question.

Conclusions

The relationship between health and fluctuations in macroeconomic conditions is complex and moderated by many important variables and analytical choices. The reviewed literature provides evidence on the mental health impacts during prolonged downturns, nuanced effects on physical health, and the importance of considering individual and contextual factors in analyzing these intricate connections. Much of the evidence is gleaned from the US context following the Great Recession, and so there are some important considerations in applying this scholarship to a Canadian post-COVID-19 context.

The protective impact of the healthcare system is a key distinguishing factor in the Canadian context. Canada's universal healthcare system ensures that all Canadian citizens and permanent residents are eligible to access its publicly provided healthcare system that covers physician/medical and hospital services. Compared to the US, it is usually only extended medical benefits (including prescription drugs, vision care, dental care, and other expenses) that are tied to employment (via employer-based health insurance) in Canada. Several of the papers highlighted the positive role played by social services available to older adults and children in the US (Cawley et al., 2015; Coile et al., 2014; Cutler & Sportiche, 2022). Universal access to healthcare in Canada makes this specific protective role harder to tease out in a quantitative analysis. However, it does provide an opportunity to better isolate the direct effect of recession and inflationary periods on health since changes in employment and the price of healthcare does not change baseline access to care.

Downstream impacts of recessions and inflationary periods on the health system were not typically a key focus of these papers; however, Belotti et al. (2022) offers a specific back-of-the-envelope calculation suggesting that the healthcare cost of increased disease incidence due to the Great Recession amounted to some €135 million. Increases in the incidence of specific diseases (such as mental health or substance use conditions) weigh particularly heavy upon health systems (Rockett et al., 2023). Currently, it is not clear what impact these periods have upon health system stress in Canada. There has been only limited insight into the health impacts of recession and inflationary periods upon the health of Canadians, and even less on how resulting changes in population health impact health expenditure and system stress.

Related to the differential impacts of the macroeconomy on the health of older adults and children is the fact that cause-specific mortality rates tell a particular story about the inequitable distribution of health impacts upon the populace. The increases in suicides and drug-related deaths and health conditions as an exception to the procyclical mortality trends highlight the importance of disaggregating mortality by cause, and considering whether there are health equity concerns around which socioeconomic groups are most likely to experience increased risks through those channels. Historically, economic downturns have displayed the potential to widen health disparities between socioeconomic groups (Cutler & Sportiche, 2022) and potentially between individuals with different baseline levels of economic security (Bonamore et al., 2015). The post COVID-19 macroeconomic contraction is likely to be no different.

Recommendations for Future Research and Policy

The complex relationship between health and macroeconomic conditions, primarily explored in the US context post the Great Recession, presents challenges and opportunities for application to the Canadian

post-COVID-19 scenario. While the protective role of Canada's universal healthcare system complicates quantitative analysis, it also provides a unique opportunity to isolate direct effects of economic fluctuations on health. For example, the finding that there are differential impacts on health between population subgroups highlights the importance of researching cause-specific mortality and sub-group analysis to better understand the diverse and nuanced impacts of economic fluctuations on different segments of the population. In the Ontario context, this could mean concentrating on individual communities within Ontario, enabling a detailed examination of health and health system impacts at a localized level. This would also account for location-specific social policies that moderate the relationship between economic conditions and health.

Limited insights into the downstream impacts of economic shocks on the health system stress in Canada underscore the need for more research in this area. Although some of the research highlighted in this review does examine the protective impact of social services and health systems, there is not much research conducted on the impacts of specific policies. Focusing on specific communities in Ontario may add to the literature base in a meaningful way. Moreover, examining cause-specific mortality rates reveals potential health disparities exacerbated by economic downturns, emphasizing the importance of disaggregated analyses. Despite the gaps in the literature base, this rapid review offers valuable insights and directions for future health systems research in the Ontario context, addressing gaps in understanding the impact of economic fluctuations on local health systems.

This rapid review serves to inform health systems researchers on how to conduct similar analyses in the Ontario context, with a view to estimating the impact of these economic fluctuations on local health systems. We have demonstrated that there have been relatively few papers exploring this topic in the Canadian context—highlighting the importance of this work, and the opportunity to answer questions around the impact of the Great Recession and post-COVID-19 inflationary period on health in Ontario.

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Appendix A. Detailed Methodology

TABLE A1. Search terms applied to NBER and Google Scholar

Health	Macroeconomic Conditions
• "Health outcomes" • "Health behaviors" • "Health insurance" • "Population health" • "Mental health" • "Physical health:	• "Macroeconomic conditions" • "Recession" • "Inflation" • "Economic crisis" or "Economic crises"

TABLE A2. Extracted data fields

Paper publication details	• Title • Authors • Publication year
Population/Context of Interest	• Country of analysis • Population of interest • Datasets and years of data used • Whether the paper was looking at periods of recession, inflation, or both • Whether the paper looked at a specific period of recession/inflation (such as the Great Recession, COVID-19)
Conceptual Approach	• Key research question(s) • Supporting economic theories • Level of aggregation of health/economic variables
Quantitative Methods	• Variables capturing health/macroeconomic conditions • Controlling or stratifying variables • Empirical strategy
Findings	• Sub-group specific findings (i.e., role of gender, age, etc.) • Conclusions

Appendix B. Summary Tables

TABLE B1. Summary details of included papers

Author (Year)	Country of interest	Population focus	Years of data	Focus of economic activity (e.g., recession, inflation, etc.)	Focus on specific period of economic activity (e.g., Great Recession)
Ariizumi & Schirle (2012)	Canada	Entire population	1977-2009	Business cycle	n/a - explored business cycle fluctuations between 1977-2009
Atalay et al. (2017)	Australia	Individuals between ages 20-75 years	2001-2015	House prices	n/a
Bao et al. (Bao et al., 2022)	Canada, France, Japan, Netherlands, Spain, Switzerland, Sweden, UK, USA	Entire population	1996-2019	Inflation	n/a
Belotti et al. (2022)	Italy	Individuals between 15 and 64	2004-2017	Recession	Great Recession
Birgisdóttir et al. (2020)	Iceland	Icelanders aged 16+	2000-2014	Recession	Great Recession
Black et al. (2015)	Norway	Adults in their early 40s, both displaced and not displaced	1986-1999	Macroeconomic conditions	n/a - explored individual-level unemployment
Bonamore et al. (2015)	23 European countries	Entire population	2000-2012	Business cycle	n/a - explored business cycle fluctuations
Bryan et al. (2021)	Canada	Canadians aged 18-74	Uncertain, likely 2020	Economic shocks	COVID-19
Carey et al. (2022)	USA	Older adults	1990-2017	Recession	Various, including Great Recession
Cawley et al. (2015)	USA	Americans over 15	2004-2010	Recession	Great Recession
Cervini-Plá & Vall-Castelló (2021)	Spain	Entire population	1999-2016	Business cycle	n/a - explored business cycle fluctuations
Coile et al. (2014)	USA	Workers aged 55-79	1969-2010	Recession	Various
Colombo et al. (2018)	Italy	Entire population	1993-2012	Macroeconomic conditions	n/a – explored macroeconomic conditions
Currie et al. (2015)	USA	Mothers	2007-2010	Recession	Great Recession
Cutler & Sportiche (2022)	USA	Americans between 51-61 ("pre-retirement" adults)	2000-2016	Recession	Great Recession
Donnelly & Farina (2021)	USA	Aduls over the age of 18	2020	Inflation	COVID-19 inflationary pressures

Author (Year)	Country of interest	Population focus	Years of data	Focus of economic activity (e.g., recession, inflation, etc.)	Focus on specific period of economic activity (e.g., Great Recession)
Haaland & Telle (2015)	Norway	Entire population	1977-2008	Macroeconomic conditions	n/a - explored macroeconomic conditions
He (2018)	61 countries	Entire poulation	1995-2014	Inflation	n/a - explored long-term changes in price level
Hollingsworth et al. (2017)	USA	Entire population	1999-2014	Macroeconomic conditions	Various, including Great Recession
Lamba & Moffitt (2023)	USA	Americans aged 25-79	2007-2010	Recession	Great Recession
Lee et al. (2016)	95 developing countries	Children and infants	2011-2011	Inflation	n/a
Louie et al. (2023)	USA	Adults over the age of 18	2022	Inflation	COVID-19 inflationary pressures
McInernery & Mellor (2012)	USA	Adults aged 65+	1994-2008	Recession	Great Recession
McInernery et al. (2013)	USA	Americans over 50	2006-2008	Recession	Great Recession
Ruckert & Labonté (2014)	Canada	n/a - based on key informant interviews	2012	Recession	Great Recession
Ruhm (2015)	USA	Entire population	1976-2010	Recession	n/a - explored recessions in general
Ruhm (2016)	USA	Entire population	1976-2013	Economic crises	Various, including Great Recession
Ruhm (2022)	USA	Entire population	March 2020-February 2021 (with data dating back to 2009)	Recession	First year of COVID-19 (decomposing into "recession effect" and "pandemic effect"
Strumpf et al. (2017)	USA	Entire population	2005-2010	Recession	Great Recession
Stuckler et al. (2009)	26 EU countries	Entire population	1970-2007	Recession	n/a - explored recessions in general
Tapia Granados & Ionides (2017)	27 European countries	Entire population	1995-2013	Recession	Great Recession
Tekin et al. (2018)	USA	Individuals aged 25-55	1990-2014	Recession	Great Recession
Toffolutti & Suhrcke (2014)	23 European countries	Entire population	2000-2010	Recession	Great Recession
Vandoros et al. (2019)	England and Wales	Entire population	2001-2015	Economic policy uncertainty	n/a
Wang et al. (2018)	USA	Individuals aged 25-55	2003-2013	Recession	Great Recession

TABLE B2. Health indicators used by included papers

Author (year)	Individual-Level Health Indicators						Aggregate-Level Health Indicators				
	Disease incidence	*Insurance coverage, spending*	*Disease symptoms, risk*	*Health status*	*Probability of death*	*Health habits*	*Overall, cause-specific mortality*	*ED visit rates*	*Medicare payments*	*Suicide incidence*	*Life expectancy*
Ariizumi & Schirle (2012)							✓				
Atalay et al. (2017)				✓							
Bao et al. (2022)							✓				✓
Belotti et al. (2022)				✓							
Birgisdóttir et al. (2020)	✓										
Black et al. (2015)			✓								
Bonamore et al. (2015)							✓				
Bryan et al. (2021)											
Carey et al. (2022)		✓									
Cawley et al. (2015)		✓									
Cervini-Plá & Vall-Castelló (2021)							✓				
Coile et al. (2014)		✓					✓				
Colombo et al. (2018)	✓		✓								
Currie et al. (2015)			✓	✓							
Cutler & Sportiche (2022)			✓								
Donnelly & Farina (2021)			✓								
Haaland & Telle (2015)					✓		✓				
He (2018)		✓									
Hollingsworth et al. (2017)								✓			
Lamba & Moffitt (2023)											
Lee et al. (2016)							✓				
Loui et al. (2023)			✓								

Author (year)	Individual-Level Health Indicators						Aggregate-Level Health Indicators				
	Disease incidence	*Insurance coverage, spending*	*Disease symptoms, risk*	*Health status*	*Probability of death*	*Health habits*	*Overall, cause-specific mortality*	*ED visit rates*	*Medicare payments*	*Suicide incidence*	*Life expectancy*
McInernery & Mellor (2012)				✓			✓		✓		
McInernery et al. (2013)			✓								
Ruckert & Labonté (2014)	n/a – key informant interviews										
Ruhm (2015)							✓				
Ruhm (2016)							✓				
Ruhm (2022)							✓				
Strumpf et al. (2017)							✓				
Stuckler et al. (2009)							✓				
Tapia Granados & Ionides (2017)							✓				
Tekin et al. (2018)				✓		✓					
Toffolutti & Suhrcke (2014)							✓				
Vandoros et al. (2019)										✓	
Wang et al. (2018)				✓		✓					

TABLE B3. Economic indicators used by included papers

Author (year)	Individual-Level Economic Indicators				Aggregate-Level Economic Indicators						
	Employment status	*Job displacement*	*Personal wealth & income shocks*	*Inflation hardship*	*Regional unemployment rates*	*Local house prices/ rent*	*Regional gross product*	*Pre-post indicators for economic crises*	*Uncertainty index*	*Inflation*	*Productivity*
Ariizumi & Schirle (2012)					✓						
Atalay et al. (2017)						✓					
Bao et al. (2022)					✓	✓	✓			✓	
Belotti et al. (2022)					✓						
Birgisdóttir et al. (2020)					✓						
Black et al. (2015)		✓									
Bonamore et al. (2015)					✓						
Bryan et al. (2021)					✓		✓				✓
Carey et al. (2022)					✓						
Cawley et al. (2015)	✓				✓		✓				
Cervini-Plá & Vall-Castelló (2021)					✓						
Coile et al. (2014)					✓						
Colombo et al. (2018)					✓						
Currie et al. (2015)					✓						
Cutler & Sportiche (2022)						✓					
Donnelly & Farina (2021)			✓								
Haaland & Telle (2015)					✓						
He (2018)										✓	
Hollingsworth et al. (2017)					✓						

Author (year)	Individual-Level Economic Indicators				Aggregate-Level Economic Indicators						
	Employment status	*Job displacement*	*Personal wealth & income shocks*	*Inflation hardship*	*Regional unemployment rates*	*Local house prices/ rent*	*Regional gross product*	*Pre-post indicators for economic crises*	*Uncertainty index*	*Inflation*	*Productivity*
Lamba & Moffitt (2023)								✓			
Lee et al. (2016)										✓	
Louie et al. (2023)				✓							
McInernery & Mellor (2012)					✓						
McInernery et al. (2013)			✓					✓			
Ruckert & Labonté (2014)	n/a -key informant interviews										
Ruhm (2015)					✓						
Ruhm (2016)					✓			✓			
Ruhm (2022)					✓						
Strumpf et al. (2017)					✓						
Stuckler et al. (2009)					✓						
Tapia Granados & Ionides (2017)					✓						
Tekin et al. (2018)					✓						
Toffolutti & Suhrcke (2014)					✓						
Vandoros et al. (2019)									✓		
Wang et al. (2018)					✓						

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naobservatory@utoronto.ca

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