NCCHPP NATIONAL COLLABORATING CENTRE FOR HEALTHY PUBLIC POLICY

# A Socio-Ecological Analysis of the Interactions Between the COVID-19 Pandemic and Health Inequalities

SUMMARY 2026

## FOREWORD

This summary presents key findings from *A Socio-Ecological Analysis of the Interactions Between the COVID-19 Pandemic and Health Inequalities*, published by the National Collaborating Centre for Healthy Public Policy (NCCHPP). Drawing on our literature review of member countries of the OECD with socio-economic profiles similar to those in Canada, it explores how COVID-19 and pre-existing health inequities interacted. Aimed at public health practitioners, policymakers, and emergency preparedness teams, it highlights multi-level interventions to advance health equity, strengthen resilience, and improve responses to future public health crises.

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## KEY MESSAGES

The international literature revue revealed notable findings across many of the Organisation for Economic Co-operation and Development (OECD) countries considered:

- COVID-19 disproportionately affected individuals according to age, race, gender, and health conditions, with elderly populations, ethnic minorities, and those with chronic diseases experiencing more severe outcomes. Women, particularly caregivers, faced significant mental health challenges.
- The pandemic also strained interpersonal relationships, with low-income families in crowded living conditions and those belonging to marginalized groups without support networks being the most affected.
- The suspension of community and educational services deepened existing inequalities, especially for low-income children.
- Lockdowns and economic shutdowns closures disproportionately impacted essential workers from minority groups.
- Public health interventions require adaptable, multifaceted, multilevel, and equity-focused actions that target the most vulnerable groups.

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# 1 INTRODUCTION

The COVID-19 pandemic, triggered by the novel SARS-CoV-2 virus in late 2019, rapidly escalated into one of the most severe global health emergencies of the modern era (Sawicka et al., 2022). From its origins in Wuhan, China, the virus spread globally, overwhelming healthcare systems and disrupting every aspect of daily life. Governments worldwide were forced to implement lockdowns, quarantine measures, and social distancing mandates to curb the spread (Cucinotta & Vanelli, 2020). However, while these measures were critical in mitigating the virus's impact, they simultaneously exposed the deep-rooted inequities within societies, particularly among the most vulnerable populations (Bambra et al., 2020).

Even before the pandemic, many disadvantaged groups—such as ethnic minorities, low-income families, and individuals with pre-existing health conditions—experienced significant barriers to healthcare, economic opportunities, and social mobility. The arrival of COVID-19 amplified these challenges (Green et al., 2021). Marginalized populations faced higher rates of infection, limited access to healthcare, and poorer overall health outcomes, reinforcing what has been termed a syndemic. This term, first proposed by medical anthropologist Merrill Singer in the 1990s, refers to the synergistic interaction between biological factors (in this case, the virus) and social inequalities, resulting in compounded adverse health outcomes (Singer et al., 2017).

Understanding the syndemic nature of COVID-19 requires a comprehensive analytical framework. This report adopts the Socio-Ecological Model (SEM) to examine how individual behaviours, interpersonal relationships, community organizations, social structures, and policy interventions interacted to influence health outcomes during the pandemic (Bronfenbrenner, 1977). This multi-level approach highlights the complexity of COVID-19's impact and underscores the urgent need for targeted, multi-dimensional public health interventions.

# 2 AIMS AND JUSTIFICATIONS

The aims of the full report are:

1. To analyze how COVID-19 and related policy measures exacerbated health inequalities, through a syndemic perspective.

2. To comprehensively elucidate the interactions between individual behaviours, social relationships, organizational structures, and social contexts during the pandemic.

3. To inform the development of equitable public health strategies by identifying multifaceted interventions for future health crises.

Using the SEM allows for an understanding of how different social layers (microsystem or individual level, mesosystem or interpersonal level, exosystem or community level, macrosystem or institutional level, and chronosystem or temporal dimension) contributed to the differential impacts of the pandemic. This approach ensures that policy strategies consider short-term and long-term approaches to improving public health outcomes for disadvantaged communities.

# 3 METHODS

The research employs a purposive literature review method, strategically selecting studies most relevant to the pandemic and health inequalities (Cook, 2019). The search was conducted across multiple academic databases, including Ovid MEDLINE and SocINDEX, to ensure comprehensive coverage of relevant literature.

Key search terms such as “COVID-19,” “health inequalities,” “syndemic interactions,” and “public health policy” were used. Studies included peer-reviewed articles, government reports, and qualitative analyses focusing on disadvantaged populations affected by the pandemic. The inclusion criteria focused on populations from OECD countries, emphasizing marginalized communities, such as low-income families, ethnic minorities, and individuals with chronic health conditions.

A rigorous screening process was applied, reviewing over 1,000 studies. After full-text screening, 126 studies were included for detailed analysis. Data extraction focused on identifying critical socio-ecological factors contributing to health inequalities, which were categorized according to the SEM framework (microsystem, mesosystem, exosystem, macrosystem, and chronosystem dimensions). All of the studies were conducted in OECD countries with socio-economic conditions similar to those in Canada but neither the findings synthesized here, nor the full analysis are intended to be specific to any single social or policy context.

# 4 RESULTS

## 4.1. Study characteristics

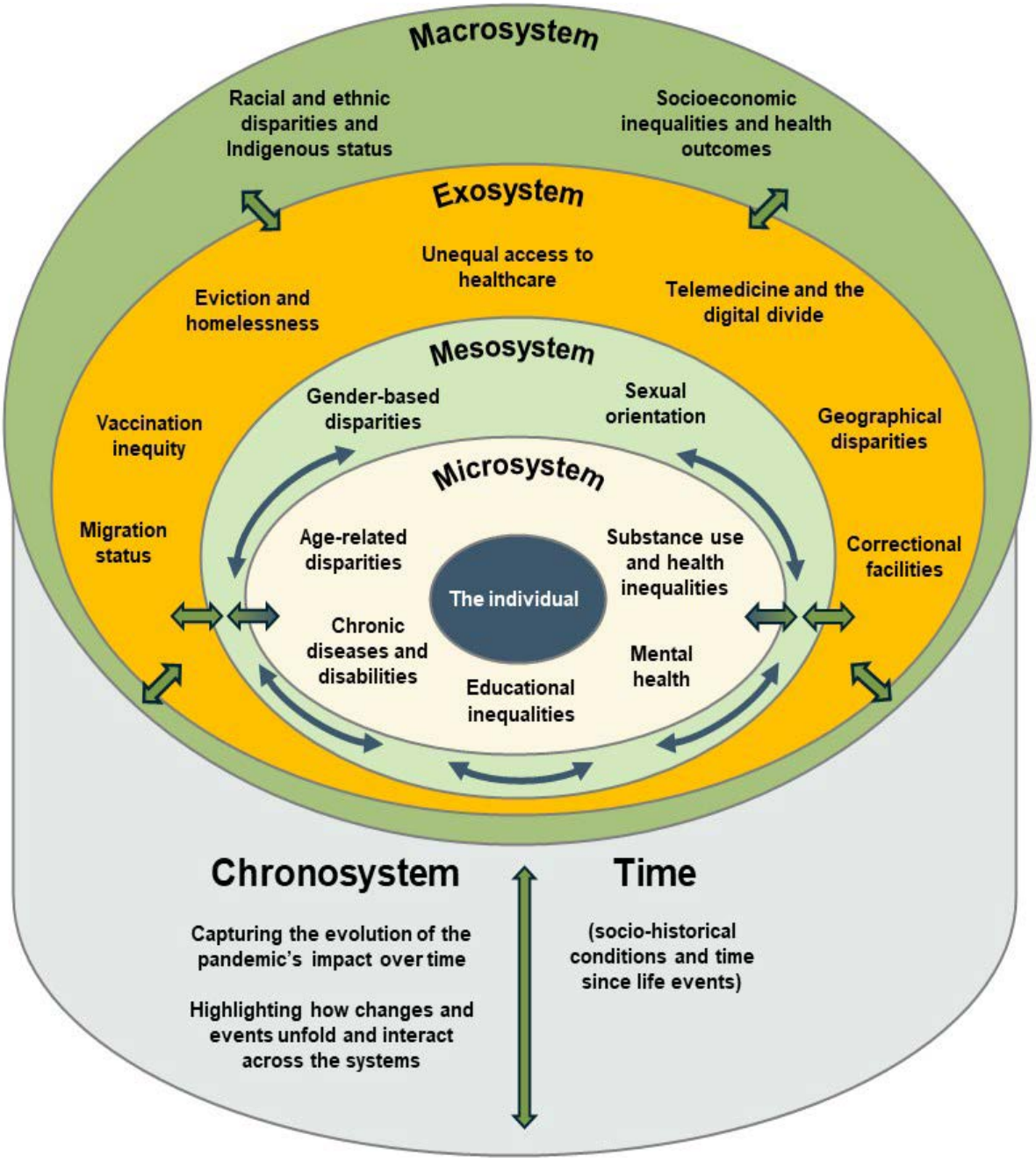
The 126 studies reviewed were conducted between 2020 and 2023, covering a broad geographic range of OECD countries and focusing primarily on marginalized populations. These included ethnic minorities, low-income households, refugees, elderly individuals, and those with chronic health conditions. The studies analyzed the disproportionate impact of COVID-19 on these groups, revealing widespread disparities in healthcare access, disease outcomes, and economic resilience.

### A NOTE ON TERMS

**The publications that we present in this review use a variety of terms to describe the differences in relative advantage of population groups as related to health, generally, and the COVID-19 pandemic, specifically. At the NCCHPP, we most commonly use health inequalities to discuss differences in health and social outcomes between groups but other commonly used terms such as health disparities or health inequities, appear frequently in the documents we examined, often without an explicit definition. For this reason, we have attempted to incorporate this variety so as not to impute meaning to other authors (by, for example, adopting a single term which was not used uniformly). This is also the case for some terms used to differentiate between categories as these sometimes change in different contexts (for example, Hispanic is more commonly used as an ethnic or racial category in the United States than it is in Europe; or while 2SLGBTQI+ is now commonly used in Canada, it is not necessarily used elsewhere and it may not be used consistently – some studies, for example, refer to men who have sex with men while others use gay or LGBT). We have done our best to use these terms in ways that are consistent with the documents under study and hope that this strikes a balance between clarity and accuracy.**

The results are presented according to the SEM, with findings categorized into the microsystem, mesosystem, exosystem, macrosystem, and chronosystem levels. Each level provides a unique lens for understanding the complex interactions between COVID-19 and social inequalities.

**Figure 1** **Socio-Ecological Model of Interactions Between the COVID-19 Pandemic and Health Inequalities**




Socio-Ecological Model of Interactions Between the COVID-19 Pandemic and Health Inequalities. Adapted from Bronfenbrenner's Ecological Systems Theory (Bronfenbrenner, 1977), with results derived from the present study. Licensed under Creative Commons CC-By-4.0.

## 4.2. The microsystem level (individual behaviours)

The microsystem level focuses on individual characteristics, including age, gender, race, ethnicity, and underlying health conditions, and how these factors influenced individuals' risk and outcomes during the COVID-19 pandemic. Health inequalities were especially evident at this level as the pandemic disproportionately affected certain groups based on these personal factors.

Age was a significant determinant of health outcomes. Elderly populations faced the highest risks of severe illness and mortality, particularly those with pre-existing conditions like diabetes, hypertension, and respiratory illnesses. The introduction of protective measures such as "cocooning" for older adults, though intended to safeguard their physical health, often resulted in isolation, cognitive decline, and worsened mental health outcomes, particularly among those in long-term care facilities. The social isolation endured by this group led to exacerbated feelings of loneliness, depression, and a deterioration in both mental and physical well-being. While providing an alternative during the pandemic, telemedicine was not always accessible to older individuals, particularly those unfamiliar with digital tools, highlighting a digital divide that worsened health outcomes for this population.

Gender-based disparities were also pronounced. Women, particularly those in caregiving roles or employed in essential services such as healthcare, faced disproportionate physical and mental health burdens. Women with caregiving responsibilities encountered heightened stress, anxiety, and burnout due to school closures and increased childcare demands. Additionally, the economic insecurity caused by job losses disproportionately impacted women, especially those in lower-wage jobs, further exacerbating mental health issues. Domestic violence against women also surged during lockdown periods, as many were trapped in abusive environments without access to the usual support systems. These challenges illustrate how the pandemic intensified gender inequalities at the individual level.

Racial and ethnic minorities experienced higher rates of infection, hospitalization, and mortality due to historical and structural inequalities in healthcare access and the social determinants of health. Black, Indigenous, and other racialized groups, in particular, faced compounded challenges, as they were more likely to live in overcrowded conditions, work in high-risk jobs, and have limited access to healthcare services. Pre-existing health disparities such as higher rates of hypertension, diabetes, and obesity in these communities led to more severe COVID-19 outcomes, further widening the health equity gap. The pandemic revealed the cumulative effects of social and environmental stressors that had long disadvantaged these populations.

Chronic diseases and disabilities further complicated individual outcomes at the microsystem level. Individuals with chronic illnesses or disabilities were at heightened risk of severe COVID-19 complications. The healthcare disruptions caused by the pandemic, including postponed treatments and the shift to virtual healthcare, disproportionately affected these individuals, leading to poorer management of their conditions. The pandemic also exposed the vulnerability of people with disabilities living in congregate settings, where infection rates and mortality were significantly higher than in the general population.

## 4.3. The mesosystem level (interpersonal and inter-group relationships)

At the mesosystem level, the COVID-19 pandemic profoundly affected interpersonal relationships within families, neighbourhoods, and communities. Families in low-income settings, where overcrowded housing is standard, faced significant challenges in adhering to social distancing guidelines. Limited living space increased their exposure to the virus, leading to disproportionately higher infection rates in these communities. The inability to isolate within households and the need for essential workers to continue employment outside the home placed these families at greater risk.

Social isolation measures, while crucial for controlling the spread of COVID-19, had severe mental health consequences, particularly for marginalized groups that relied heavily on interpersonal networks for emotional and social support. The closure of community centers, schools, and other support structures left many vulnerable individuals without the resources they depended on. Communities with limited access to digital technologies faced heightened isolation as public services, education, and health consultations moved online. This digital divide was especially harmful to elderly individuals, refugees, and low-income families, further amplifying their isolation and limiting their ability to access critical resources, including virtual healthcare and social support.

Gender dynamics within households also shifted dramatically. Women, already disproportionately responsible for caregiving tasks, took on even greater responsibilities during the pandemic, particularly in caring for children during school closures and providing care for sick family members. This increased burden significantly affected their mental health, with many women experiencing higher levels of anxiety, stress, and burnout. Furthermore, the need to prioritize caregiving duties often led to delayed or neglected healthcare for women themselves, further worsening their physical and mental well-being. Women from lower-income households, in particular, faced the compounded challenges of economic insecurity and increased caregiving responsibilities, making them especially vulnerable during the pandemic.

## 4.4. The exosystem level (community and organizational structures)

The exosystem level explores how community organizations and institutions, including schools, workplaces, and healthcare systems, adapted and responded to the challenges posed by the COVID-19 pandemic. The widespread disruptions caused by the pandemic—such as school closures, job losses, and the shift to remote services—profoundly affected disadvantaged populations, amplifying pre-existing inequalities.

One of the most significant impacts was the transition to online education, disproportionately affecting children from low-income households who lacked access to the necessary technology and reliable internet connectivity. The digital divide became particularly evident during this period, as affluent students could continue their education with minimal disruption while disadvantaged students struggled to participate in virtual learning environments. This disparity widened the educational gap between socioeconomic groups, leading to long-term consequences for educational achievement and future opportunities. For many low-income students, the lack of access to digital resources led to learning setbacks from which it may take years to recover.

In the healthcare sector, barriers to accessing COVID-19 testing, treatment, and vaccination were particularly pronounced for marginalized communities. Racial minorities and immigrant populations faced systemic challenges, including racism, language barriers, and a deep-seated lack of trust in healthcare institutions. These factors limited their access to essential COVID-19-related healthcare services and exacerbated broader disparities in healthcare outcomes. Many individuals from these communities delayed seeking treatment due to fears of discrimination or uncertainty about navigating the healthcare system, leading to more severe outcomes when they did contract the virus. The pandemic underscored the urgent need to address these systemic inequities within healthcare systems, which left many already vulnerable groups further marginalized during the crisis.

The pandemic also highlighted the workplace vulnerabilities faced by low-income and essential workers, many of whom could not transition to remote work. These individuals were disproportionately exposed to the virus in workplaces that often lacked adequate protective measures. Additionally, job losses in retail, hospitality, and manufacturing sectors disproportionately impacted lower-wage workers, worsening economic instability for many families. The shift to remote work for some and the inability to work from home for others highlighted notable inequalities in employment opportunities and worker protections.

## 4.5. The macrosystem level (societal and policy environments)

The macrosystem level examines the broader social and policy environments that shaped the pandemic response and their impacts on different populations. Government policies—such as lockdown measures, public health mandates, and economic relief programs—played a pivotal role in determining how various communities were affected by COVID-19. However, these policies often had unequal impacts, disproportionately affecting marginalized groups, particularly those in low-wage or essential jobs.

Essential workers, many of whom belonged to racial minority groups, faced heightened risks during the pandemic due to their inability to work remotely. Their roles in healthcare, transportation, retail, and food services placed them on the front lines of exposure. The necessity of continuing in-person work—combined with inadequate protective measures in many workplaces—made these workers more vulnerable to infection. At the same time, economic shutdowns severely impacted industries with higher concentrations of low-income workers, such as retail, hospitality, and service sectors. These shutdowns exacerbated economic disparities, as many workers lost jobs or faced reduced hours, leading to financial instability and increased poverty.

Government relief programs, such as stimulus payments and unemployment benefits, aimed to provide support during the crisis. While these measures offered temporary relief to some, many vulnerable populations struggled to access these benefits. Bureaucratic barriers, such as complex application processes, language obstacles, and a lack of clear information, made it difficult for marginalized groups—mainly immigrants, non-native speakers, and individuals in informal employment—to obtain the assistance they needed. As a result, these groups often fell through the cracks of the social safety net, intensifying their economic challenges during the pandemic.

The vaccine rollout, a critical component of the pandemic response, also highlighted inequities within the healthcare system. Wealthier and more privileged communities had earlier and more consistent vaccine access, benefiting from better infrastructure and resources. In contrast, marginalized populations—such as racial minorities, immigrants, and those living in rural areas—faced delays in vaccine access due to logistical challenges, systemic biases, and disparities in healthcare infrastructure. The unequal distribution of vaccines further underscored the persistent health inequities faced by disadvantaged groups throughout the pandemic.

## 4.6. The chronosystem (temporal dimension)

The chronosystem emphasizes the role of time in shaping health outcomes, showing how historical and evolving factors influenced the progression of inequalities throughout the pandemic. The long-term effects of COVID-19 are still unfolding, but it is evident that the disparities exposed during the pandemic are deeply rooted in pre-existing social and health inequities. As the pandemic evolved rapidly, so did public health responses, highlighting the critical need for adaptive, time-sensitive policies that respond effectively to changing circumstances.

As the pandemic progressed, the compounded adverse effects on specific populations—particularly racial minorities and those in lower socioeconomic brackets—became increasingly apparent. These groups faced sustained challenges such as extended unemployment, heightened mental health issues, and reduced access to healthcare services. The impact of these disparities was not uniform; it evolved, with these populations experiencing more profound and lasting negative consequences than others.

The pandemic's temporal dimension underscores the importance of policies that address an immediate crisis and anticipate and mitigate its long-term effects. As health and economic outcomes shifted over time, so did the needs of vulnerable populations, calling for sustained support and resilience-building measures. The chronosystem demonstrates that public health interventions should be flexible, prioritizing short-term needs and long-term recovery for disadvantaged communities.

# 5 CONCLUSION

The COVID-19 pandemic acted as a catalyst for revealing and exacerbating pre-existing health inequalities, making it a classic example of a syndemic. The interaction of biological and social factors resulted in a disproportionate burden falling on disadvantaged populations. For instance, those living in poverty or working in precarious jobs faced greater exposure to the virus while having limited access to healthcare services. This multi-level analysis conducted using the SEM underscores the complexity of the pandemic's impact on health outcomes.

The syndemic nature of the COVID-19 crisis—where multiple social and environmental stressors interacted—highlighted the urgent need for public health interventions addressing the virus as well as the broader social determinants of health.

The socio-ecological analysis demonstrated that the pandemic's impact was felt across multiple levels, affecting aspects ranging from individual and interpersonal factors to organizational and social structures. Addressing these disparities requires a multi-level public health response that extends beyond biomedical interventions. To ensure that interventions reach the most vulnerable populations, future public health policies would benefit from prioritizing equity by focusing on the specific needs of marginalized populations.

Moreover, public health strategies would benefit from adapting to evolving crises and considering long-term social and economic support, particularly for communities facing systemic barriers to health and wellbeing.

To address the multi-level impact of pandemics, policymakers should implement multi-faceted intervention strategies, including:

- Ensuring equitable access to healthcare services, including vaccines, for marginalized communities.
- Strengthening social safety nets, such as unemployment benefits, food security programs, and affordable housing, to provide support during and after crises.
- Expanding access to mental health services, particularly for those disproportionately affected by a pandemic's socioeconomic fallout.
- Developing community-based public health programs that target the specific needs of racial minorities, refugees, and low-income populations.

This report highlights current knowledge while emphasizing the need for further research on syndemic interactions in various contexts and on the long-term effects of public health strategies used during the pandemic. Future studies should focus on developing predictive models for better crisis preparedness, focusing on equity and social justice. The findings stress the importance of multi-level, culturally sensitive responses, and the lessons learned should guide future public health approaches toward addressing immediate and long-term pandemic impacts effectively.

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# A Socio-Ecological Analysis of the Interactions Between the COVID-19 Pandemic and Health Inequalities - Summary


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