




Rapid Review: Food security: What is the impact of COVID-19 and related public health measures?



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The authors declare they have no conflicts of interest to report.

Executive Summary

Background

[*Food security*](#) is a state in which all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life. Food security is a basic need that can be affected by changing economic and social conditions. [*Food insecurity*](#) is the inability to acquire or consume an adequate quality diet or sufficient quantity of food in socially acceptable ways, or the uncertainty that one will be able to do so. Household food insecurity is often linked with the household's financial ability to access adequate food. The influence of the COVID-19 pandemic and related public health measures on food security is described in this rapid evidence review.

This rapid review was produced to support public health decision makers' response to the coronavirus disease 2019 (COVID-19) pandemic. This review seeks to identify, appraise, and summarize emerging research evidence to support evidence-informed decision making. This rapid review includes evidence available up to September 11, 2020 to answer the question: **Food security: what is the impact of COVID-19 and related public health measures?**

Key Points

- In a limited number of studies that provided comparisons to pre-pandemic levels, increases in food insecurity during COVID-19 lockdown measures were reported. Three studies, in Bangladesh, the USA, and the UK, self-reported changes in rates of food insecurity from pre-pandemic to the early months of the pandemic: levels grew from 5.6% to 36.5%; 18.8% to 24.8%; and 7.6% to 16.2% in these three studies respectively. Prevalence varied across populations and settings. Two studies from the USA examined rates among populations who were food secure prior to the pandemic and reported rates of 30% having low or very low food security during the pandemic. The overall certainty of this evidence is very low (GRADE), and findings are very likely to change as more evidence accumulates.

Overview of Evidence and Knowledge Gaps

- Several studies reported higher food insecurity among families with children; one study from Brazil reported lower levels, perhaps due to government programs specifically for families with children. Other factors associated with food insecurity during the COVID-19 pandemic were: household loss of income, unemployment, or inability to work due to the pandemic; low income or education; receiving government assistance; families headed by person with unskilled job; younger age; disability; racial/ethnic minority, Australian Aboriginal, or Hispanic identity; rurality.
- Few studies provide a comparator to rates prior to the pandemic, limiting the potential to identify changes in rates of food insecurity.
- Food security and insecurity are measured and reported using different methods, making comparisons across studies difficult. Similarly, samples and populations differ across studies. Across studies, reported rates of food insecurity during the pandemic ranged from 14.8% in Canada to 56% in low-income Brazil.
- Access to free school meals was interrupted during lockdown for 49% of eligible students in one UK study.

Methods

Research Question

Food security: What is the impact of COVID-19 and related public health measures?

Search

On September 11, 2020, the following databases were searched:

- Pubmed’s curated COVID-19 literature hub: [LitCovid](#)
- [Trip Medical Database](#)
- World Health Organization’s [Global literature on coronavirus disease](#)
- [COVID-19 Evidence Alerts](#) from McMaster PLUS™
- [Public Health +](#)
- [COVID-19 Living Overview of the Evidence \(L·OVE\)](#)
- [McMaster Health Forum](#)
- [Prospero Registry of Systematic Reviews](#)
- NCCMT [COVID-19 Rapid Evidence Reviews](#)
- [MedRxiv preprint server](#)
- NCCDH [Equity-informed Responses to COVID-19](#)
- NCCEH [Environmental Health Resources for the COVID-19 Pandemic](#)
- NCCHPP [Public Health Ethics and COVID-19](#)
- NCCID [Disease Debrief](#)
- NCCIH [Updates on COVID-19](#)
- [Institute national d’excellence en santé et en services sociaux \(INESSS\)](#)
- [Uncover \(USHER Network for COVID-19 Evidence Reviews\)](#)
- [Public Health Ontario](#)

A copy of the search strategy is available on request.

Study Selection Criteria

The search results were first screened for recent guidelines and syntheses. Single studies were included if no syntheses were available, or if single studies were published after the search was conducted in the included syntheses. English-language, peer-reviewed sources and sources published ahead-of-print before peer review were included. Surveillance sources were excluded. English- and French-language, peer-reviewed sources and sources published ahead-of-print before peer review were included. When available, findings from syntheses and clinical practice guidelines are presented first, as these take into account the available body of evidence and, therefore, can be applied broadly to populations and settings.

	Inclusion Criteria	Exclusion Criteria
Population	General	
Intervention	COVID-19 public health measures	
Comparisons	Usual circumstances	
Outcomes	Food insecurity	

Data Extraction and Synthesis

Data relevant to the research question, such as study design, setting, location, population characteristics, interventions or exposure and outcomes were extracted when reported. We synthesized the results narratively due to the variation in methodology and outcomes for the included studies.

Appraisal of Evidence Quality

We evaluated the quality of included evidence using critical appraisal tools as indicated by the study design below. Quality assessment was completed by one reviewer and verified by a second reviewer. Conflicts were resolved through discussion.

Study Design	Critical Appraisal Tool
Cohort	Critical Appraisal Skills Programme (CASP) Cohort Study Checklist
Cross-sectional	Joanna Briggs Institute (JBI) Checklist for Analytical Cross Sectional Studies
Quasi-experimental	Joanna Briggs Institute (JBI) Checklist for Quasi-Experimental Studies
Prevalence	Joanna Briggs Institute (JBI) Checklist for Prevalence Studies

Completed quality assessments for each included study are available on request.

The Grading of Recommendations, Assessment, Development and Evaluations ([GRADE](#)) approach was used to assess the certainty in the findings based on eight key domains.

In the GRADE approach to quality of evidence, **observational studies**, as included in this review, provide **low quality** evidence, and this assessment can be further reduced based on other domains:

- High risk of bias
- Inconsistency in effects
- Indirectness of interventions/outcomes
- Imprecision in effect estimate
- Publication bias

and can be upgraded based on:

- Large effect
- Dose-response relationship
- Accounting for confounding.

The overall certainty in the evidence for each outcome was determined taking into account the characteristics of the available evidence (observational studies, some not peer-reviewed, unaccounted-for potential confounding factors, different tests and testing protocols, lack of valid comparison groups). A judgement of 'overall certainty is very low' means that the findings are very likely to change as more evidence accumulates.

Findings

Summary of Evidence Quality

This document includes two in-progress syntheses and 11 single studies for a total of 13 publications included in this review.

Research Question	Evidence included		Overall certainty in evidence
Food security: What is the impact of COVID-19 and related public health measures?	In progress syntheses Single studies	2 11	Very low

Warning

Given the need to make emerging COVID-19 evidence quickly available, many emerging studies have not been peer reviewed. As such, we advise caution when using and interpreting the evidence included in this rapid review. We have provided a summary of overall certainty of the evidence to support the process of decision making. Where possible, make decisions using the highest quality evidence available.

Table 1: In-progress Syntheses

Title	Anticipated Release Date	Population	Description of Document
Doustmohammadian, A. (2020). The impact of COVID-19 on food security: a systematic review and meta-analysis protocol. PROSPERO, CRD42020185843.	Aug 31, 2021	Households and individuals, including adults and children	This review seeks to determine whether the COVID-19 pandemic has affected the food security of households and individuals.
University of Ottawa and Canadians of African Descent Health Organization (CADHO). (2020). Food insecurity and African Caribbean Black (ACB) populations during the COVID-19 pandemic.	Not reported	African Caribbean Black populations	This review seeks to explore the perceptions and experiences of food insecurity among African Caribbean Black people during the COVID-19 pandemic.

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Table 2: Single Studies

Reference	Date Released	Study Design	Setting	Participants	Summary of findings	Quality Rating:
Kent, K., Murray, S., Penrose, B., Auckland, S., Visentin, D., Godrich, S., & Lester, E. (2020). Prevalence and socio-demographic predictors of food insecurity in Australia during the covid-19 pandemic . <i>Nutrients</i> , 12(9), 2682.	Sep 2, 2020	Cross-Sectional	Tasmania, Australia	N=1170 general population	<p>An online survey of adults in May-June 2020, using the U.S. Household Food Security Survey Module: Six-Item Short Form, found that 12.3% reported marginal food security, 10.1% low food security and 3.7% very low food security.</p> <p>The following factors were associated with reduced levels of food security:</p> <ul style="list-style-type: none"> • Income loss due to pandemic, especially for loss of >25% income • Living with dependents • Younger age (18-25 years) • Disability • Identifying as Aboriginal or Torres Strait Islander • Living in rural area <p>There was no comparison to food security prior to the pandemic.</p>	Moderate
Hamadani, J.D., Hasan, M.I., Baldi, A.J., Hossain, S.J., Shiraji, S., Bhuiyan, M.S.A.B., ... Pasricha, S.R. (2020). Immediate impact of stay-at-home orders to control COVID-19 transmission on socioeconomic conditions, food insecurity, mental health, and intimate partner violence in Bangladeshi women and their families: an interrupted time series . <i>The Lancet Global Health</i> . Epub ahead of print.	Aug 25, 2020	Time-Series	Rural Bangladesh	N=2424 mothers	<p>Participants were enrolled in trial that collected baseline data for food security July 2017-February 2019, using the Household Food Insecurity Access Scale. A follow-up survey was conducted May-June 2020.</p> <p>During the COVID-19 pandemic lockdown,</p> <ul style="list-style-type: none"> • 96.0% of families experienced a reduction in income, with 39.1% having lost all income. • The proportion of food secure households reduced from 80.7% to 30.6%. • The proportion of severely food insecure households increased 2.7% to 15.3%. • Families where the father held an unskilled job prior to the pandemic were most affected. 	High

<p>Parnham, J., Laverty, A., Majeed, A., & Vamos, E. (2020). Half of children entitled to free school meals do not have access to the scheme during COVID-19 lockdown in the UK. <i>Public Health</i>. Epub ahead of print.</p>	<p>Aug 19, 2020</p>	<p>Cross-Sectional</p>	<p>United Kingdom</p>	<p>N=635 children eligible for free school meal program</p>	<p>Participants enrolled in a longitudinal study between 2017 and 2019 participated in an additional survey in April 2020.</p> <p>During the COVID-19 pandemic lockdown, for children who were eligible to receive free school meals,</p> <ul style="list-style-type: none"> • 49.0% did not receive any free school meals during April 2020. • Those who did access free school meals were more likely to have been in junior or secondary schools rather than elementary schools. • Students who accessed their free school meals were much more likely to have recently used a foodbank. • There was no association between accessing free school meals and food insecurity as measured by the statement “feeling hungry but being unable to eat in the previous week”. 	<p>Low</p>
<p>Carroll, N., Sadowski, A., Laila, A., Hruska, V., Nixon, M., Ma, D., & Haines, J. (2020). The impact of COVID-19 on health behavior, stress, financial and food security among middle to high income Canadian families with young children. <i>Nutrients</i>, 12(8), 2352.</p>	<p>Aug 7, 2020</p>	<p>Cross-sectional</p>	<p>Guelph, Ontario, Canada</p>	<p>N=254 middle-to-high income families (mothers, fathers and children)</p>	<p>Participants enrolled in a longitudinal study in 2017 participated in an additional survey in Apr-May 2020. A two-item food security measure was adapted from Gundersen.</p> <p>8.5% of mothers and 4.8% of fathers reported food security concerns.</p> <p>There was no comparison to food security prior to the pandemic.</p>	<p>Moderate</p>

<p>Adams, E., Caccavale, L., Smith, D., & Bean, M. (2020). Food insecurity, the home food environment, and parent feeding practices in the era of COVID-19. <i>Obesity</i>. Epub ahead of print.</p>	<p>Aug 6, 2020</p>	<p>Cross-Sectional</p>	<p>United States</p>	<p>N=584 parents of children ages 5-18</p>	<p>An online survey of parents in April-May 2020 using the 6-item United States Department of Agriculture Household Food Security Module found that compared to prior to the pandemic, 23.5% reported less food in the home, 42.0% more food in the home and 34.6% same amount of food in the home.</p> <p>Of families who were food secure prior to the pandemic, 15.6% reported low food security and 15.3% reported very low food security during the pandemic.</p> <p>The survey was retrospective and asked participants to report their food security prior to the pandemic and is therefore subject to recall bias.</p>	<p>Low</p>
<p>Manfrinato, C.V., Jr, Marino, A., Conde, V.F., do Carmo Pinho Franco, M., Stedefeldt, E., & Tomita, L.Y. (2020). High prevalence of food insecurity, the adverse impact of COVID-19 in Brazilian favela. <i>Preprint</i>.</p>	<p>Aug 4, 2020</p>	<p>Cross-Sectional</p>	<p>São Paulo, Brazil</p>	<p>N= 909 residents of favelas (low-income slums)</p>	<p>An online survey of adults in March-June 2020 using the Brazilian Food Insecurity Scale found that 56% reported moderate or severe food insecurity.</p> <p>The following factors were associated with food insecurity:</p> <ul style="list-style-type: none"> • Low income • Lower education level • Household without children • Receiving federal cash transfer <p>Families with children were less likely to report food insecurity, which may be due to government programs for families with children.</p> <p>There was no comparison to food insecurity prior to the pandemic.</p>	<p>Moderate</p>

<p>Niles, M., Bertmann, F., Belarmino, E., Wentworth, T., Biehl, E., & Neff, R. (2020). The Early Food Insecurity Impacts of COVID-19. <i>Nutrients</i>, 12(7), 2096.</p>	<p>Jul 15, 2020</p>	<p>Cross-Sectional</p>	<p>Vermont, United States</p>	<p>N=3219 general population</p>	<p>An online survey of adults in March-April 2020 using the United States Department of Agriculture six-item validated food security module found that 24.8% reported food insecurity during the COVID-19 pandemic, compared to 18.8% in the year prior to the pandemic. Among those reporting food insecurity, 35.5% were newly food insecure and 59.5% reported very low food security.</p> <p>The following factors were associated with food insecurity:</p> <ul style="list-style-type: none"> • Loss of income • Low income in previous year • Lower education level • Household with children <p>The survey was retrospective and asked participants to report their food security prior to the pandemic and is therefore subject to recall bias.</p>	<p>Moderate</p>
<p>Statistics Canada. (2020, June 24). Food insecurity during the COVID-19 pandemic, May 2020.</p>	<p>Jun 24, 2020</p>	<p>Prevalence</p>	<p>Canada</p>	<p>N=4600 general population</p>	<p>An online survey of adults in May 2020 using the short form (6-item) version of the Household Food Security Survey Module found that 14.8% reported food insecurity in the previous month.</p> <p>Households with children were more likely to report food insecurity. Participants who were unable to work due to job or personal circumstances related to the pandemic were also more likely to report food insecurity.</p> <p>There was no comparison to food insecurity prior to the pandemic.</p>	<p>Low</p>

<p>Abrams, S., Avalos, A., Gray, M., & Hawthorne, K. (2020). High level of food insecurity among families with children seeking routine care at federally qualified health centers during the coronavirus disease 2019 pandemic. <i>The Journal of Pediatrics</i>: 4, 100044.</p>	<p>Jun 18, 2020</p>	<p>Cross-Sectional</p>	<p>Texas, United States</p>	<p>N=200 families attending routine pediatric visits at a primary care clinic</p>	<p>A survey in April-May 2020 using the American Academy of Pediatrics 2-question food insecurity screen found that 47% of these low-income families reported food insecurity, of which 10% reported frequent food insecurity.</p> <p>The following factors were associated with food insecurity:</p> <ul style="list-style-type: none"> • Hispanic ethnicity • Receiving government food assistance <p>There was no comparison to food insecurity prior to the pandemic.</p>	<p>Moderate</p>
<p>Lauren, B.N, Silver, E.R., Faye, A.S., Woo Baida, A.J., Ozanne, E.M., & Hur, C. (2020). Predictors of household food insecurity in the United States during the COVID-19 2 pandemic. <i>Preprint</i>.</p>	<p>Jun 12, 2020</p>	<p>Cross-Sectional</p>	<p>United States</p>	<p>N=1527 adults reporting food security prior to the COVID-19 pandemic</p>	<p>An online survey of previously food-secure adults in March-April 2020 using a 2-item measure from Hager found that 30.1% reported food insecurity during the COVID-19 pandemic.</p> <p>The following factors were associated with food insecurity:</p> <ul style="list-style-type: none"> • Younger age (25-34 years) • Lower income • Racial/ethnic minority • Household with children <p>The survey was retrospective and asked participants to report their food security prior to the pandemic.</p>	<p>Moderate</p>

<p>Loopstra, R. (2020, April 14). <i>Vulnerability to food insecurity since the COVID-19 lockdown.</i> King's College London.</p>	<p>Apr 14, 2020</p>	<p>Cross-Sectional</p>	<p>United Kingdom</p>	<p>N=4343 general population</p>	<p>An online survey of adults in April 2020 using questions adapted from the United States Department of Agriculture's Food Security Survey module found that 16.2% reported food insecurity during the COVID-19 pandemic, compared to 7.6% in a separate survey conducted in 2018.</p> <p>The following factors were associated with food insecurity:</p> <ul style="list-style-type: none"> • Unemployment • Racial/ethnic minority • Household with children • Health conditions or disabilities 	<p>Moderate</p>
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