



Rapid Review Update 1: Household food security in North America: 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 December 7, 2020 to answer the question: **Household food security in North America: What is the impact of COVID-19 and related public health measures?**

What has changed in this version?

- This version is an update of a previous rapid evidence review released on September 25, 2020, with a specific focus on household food security in North America in this version. Evidence from other regions and evidence not related to household food insecurity has been excluded.
- Evidence examining food insecurity trends across the months of the pandemic is now available and shows increased prevalence.
- More evidence is available related to the increased prevalence of food insecurity among low-income populations and households with children.
- Evidence is emerging related to a positive relationship between COVID-19 infection and food insecurity.

Key Points

- Food insecurity is prevalent during the COVID-19 pandemic, particularly among low-income populations. Two studies that include comparisons to pre-pandemic levels show that the prevalence of food insecurity is increasing among the general population or among families with children. The overall certainty of this evidence is very low (GRADE), and findings are very likely to change as more evidence accumulates.
- Food insecurity has become more prevalent with time, as the effects of the pandemic, such as job loss, become more pronounced. Studies of changes in food insecurity during the months of the pandemic reported increasing trends, from 30% in March to 43% in April in a US nationally representative sample, and an increase from 54% in April to 64% in June 2020 in a US sample of low-income households. 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

- Studies of food insecurity in North America during the pandemic among general population samples show prevalence rates between 14.8% and 43%. One moderate quality general population study that included a comparison of pandemic food insecurity prevalence to pre-pandemic levels reported no increase overall (prevalence of 15.4%), but an increase from 13.6% to 20.1% among families with children; another moderate quality study reported an increase from 18.8% in the prior year to 24.8% during the pandemic. 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.
- Among low-income samples, prevalence rates of between 14.5% and 60% are reported. One high quality study that included a comparison of pandemic food insecurity prevalence to pre-pandemic levels among low-income Latinx families reported a decline in food security (suggesting an increase in food *insecurity*) from 79% to 32%. The overall certainty of this evidence is very low (GRADE), and findings are very likely to change as more evidence accumulates.
- Food insecurity is generally found to be higher among households with children.
- Two Canadian studies reported prevalence of pandemic food insecurity of 14.8% in a general population sample, and 4.8% of fathers / 8.5% of mothers in a middle- to high-income sample.
- Prevalence varied across populations and settings. One study of young adults reported an increase from 28.4% pre-pandemic to 41% during the pandemic. 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; larger household size; pre-existing food insecurity; receiving government assistance in some studies; younger age; racial/ethnic minority or Hispanic identity in some studies.
- Having had COVID-19 infection or symptoms was correlated with food insecurity in two studies.
- Few studies provide a comparator to rates prior to the pandemic, limiting the potential to identify changes in prevalence 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.

Methods

Research Question

Household food security in North America: What is the impact of COVID-19 and related public health measures?

Search

On November 9 and 10, and December 8, 2020 the following databases were searched using key terms: “food security”, “food insecurity”, “diet” and “nutrition”.

- 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™
- [COVID-19 Living Overview of the Evidence \(L·OVE\)](#)
- [Prospero Registry of Systematic Reviews](#)
- NCCMT [COVID-19 Rapid Evidence Reviews](#)
- [MedRxiv preprint server](#)
- NCCDH [Equity-informed Responses to COVID-19](#)
- [Alberta Health Services](#)
- Statistics Canada’s [COVID-19: A Data Perspective](#)
- [Public Health England](#)

A copy of the full search strategy is available on at this [link](#).

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	Households or adults with children in North America	
Intervention	COVID-19 public health measures	
Comparisons	Usual circumstances	
Outcomes	Food insecurity	Effects on agriculture or supply chain

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
Cross-sectional	Joanna Briggs Institute (JBI) Checklist for Analytical Cross Sectional Studies
Prevalence	Joanna Briggs Institute (JBI) Checklist for Prevalence Studies
Cohort	Joanna Briggs Institute (JBI) Checklist for Cohort 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

In this update, 2 new in-progress syntheses, 8 new single studies and 2 in-progress single studies were identified, and 5 previously reported studies from outside North America were excluded, for a total of 20 publications included in this review.

Research Question	Evidence included		Overall certainty in evidence
What is the impact of COVID-19 and related public health measures on household food security in North America?	In progress syntheses	4	Very low
	Single studies	14	
	In progress single studies	2	

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
New evidence reported December 18, 2020			
Brown, H., Bell, Z., Rankin, J., Simpson, J., Bamba, C., Defeyter, G., & Hart, A. (2020). Impact of COVID-19 on food poverty amongst children and mothers; a rapid review of health impacts . PROSPERO, CRD42020177987.	Dec 31, 2020	Children aged 0 to 18 years of age and their mothers experiencing food poverty at any age, any ethnicity in high income countries	This review seeks to determine the effects of food poverty from COVID-19 on maternal and child health and wellbeing.
Nirmalasari, P.I., Indriasari, R., & Salam, A. (2020). Changes in Dietary Pattern and Lifestyle in Adult During Lockdown Due to the COVID-19 Pandemic: A Systematic Review . PROSPERO, CRD42020221776.	Jan 29, 2021	Adults 18 years of age and older	This systematic review seeks to determine if there has been a change in dietary pattern and lifestyle in adult populations during lockdown during the COVID-19 pandemic.
Previously reported evidence			
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.

Table 2: Single Studies

Reference	Date Released	Study Design	Setting	Participants	Summary of findings	Quality Rating:
New evidence reported December 18, 2020						
Enriquez, D. & Goldstein, A. (2020). COVID-19's Socioeconomic Impact on Low-Income Benefit Recipients: Early Evidence from Tracking Surveys . <i>Socius</i> . Epub ahead of print.	Nov 25, 2020	Cross-sectional	USA	Low-income households	<p>This study examined the incidence of COVID-19-induced hardships among low-income/benefits-eligible households from late Mar to mid-Jun 2020 using five repeated online surveys.</p> <p>Food insecurity increased in prevalence between Apr to Jun 2020 from 54% to 64%.</p> <p>There was no comparison to food insecurity prior to the pandemic.</p>	Moderate
Larson, N., Slaughter-Acey, J., Alexander, T., Berge, J., Harnack, L., & Neumark-Sztainer, D. (2020). Emerging Adults' Intersecting Experiences of Food Insecurity, Unsafe Neighborhoods, and Discrimination during the COVID-19 Outbreak . <i>Public Health Nutrition</i> . Epub ahead of print.	Oct 23, 2020	Cross-sectional	Minnesota USA	n=218 young adults aged 18-26 years	<p>An online survey of young adults conducted in Apr and May 2020 to examine how food insecurity relates to food behaviours and experiences during a stay-at-home order in Minnesota USA.</p> <p>41.0% of the food insecure group reported food insufficiency in the last month (during the pandemic) compared to food insecurity in the past year of 28.4%.</p> <p>Participants with children had elevated prevalence of food insecurity in the past year and past month food insufficiency compared to those without children.</p> <p>There was no comparison to food insecurity prior to the pandemic.</p>	High

<p>Morales, D.X., Morales, S.A., & Beltran, T.F. (2020). Racial/ethnic disparities in household food insecurity during the COVID-19 pandemic: a nationally representative study. <i>Journal of Racial and Ethnic Health Disparities</i>. Epub ahead of print.</p>	<p>Oct 14, 2020</p>	<p>Cross-sectional</p>	<p>USA</p>	<p>n=74,413 households</p>	<p>This study examined racial/ethnic disparities in household food insecurity in the context of the COVID-19 pandemic.</p> <p>The overall prevalence of household food insecurity increased as the pandemic evolved from 30% to 43% from Mar to Apr, 2020.</p> <p>Households headed by Blacks, Asians, Hispanics, or other racial/ethnic minorities were not significantly more food insecure than White households during the pandemic ($p > 0.05$).</p> <p>Households with higher levels of preexisting food insecurity experienced higher levels of food insecurity during the pandemic ($p < 0.0001$).</p> <p>Household Food insecurity was associated with:</p> <ul style="list-style-type: none"> • Younger age ($p < 0.0001$) • Larger household size ($p = 0.047$) • Being unmarried ($p = 0.036$) • Low income ($p = 0.036$), • Not working for pay ($p < 0.0001$) <p>Racial/ethnic minorities were significantly less confident about their household food security for the next 4 weeks than Whites.</p>	<p>High</p>
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<p>Escobar, M., DeCastro Mendez, A., Romero Encinas, M., & Wojcicki, J.M. (2020). High food insecurity in Latinx families associated COVID-19 infection in the Greater Bay Area, California. Preprint.</p>	<p>Oct 14, 2020</p>	<p>Cross-sectional</p>	<p>USA</p>	<p>n=375 low income Latinx households</p>	<p>This study examined the impact of COVID-19 on household and child food security in three preexisting, longitudinal, Latinx urban cohorts in the San Francisco Bay Area.</p> <p>In the months prior to the COVID-19 pandemic, 79% of one low-income, disadvantaged cohort had household food security and 89.2% had child food security. During the pandemic, 32% of this cohort reported being food secure, and 54.1% reported child food security.</p> <p>There were large differences between the cohorts during the pandemic in levels of food security ranging from 29.2% to 60% and child food security ranging from 54.1% and 78.0%. The cohorts differed in education levels, unemployment and primary language of English versus Spanish.</p> <p>Reported history of COVID-19 infection in households was associated with food insecurity in two larger cohorts (p=0.03 and p=0.01 respectively).</p>	<p>High PREPRINT</p>
<p>Sharma, S.V., Haidar, A., Noyola, J., Tien, J., Rushing, M., Naylor, B.M. ... Markham, C. (2020). Using a rapid assessment methodology to identify and address immediate needs among low-income households with children during COVID-19. PLOS ONE 15(10): e0240009.</p>	<p>Oct 1, 2020</p>	<p>Cross-sectional</p>	<p>Houston, Dallas, Washington DC, and Southwest Florida</p>	<p>n=1048 low-income families</p>	<p>An online survey collected data in Apr 2020 from families enrolled in a low-income school-based health promotion program.</p> <p>71 families (6.7%) were high risk, and all of these were food insecure (although others might have been food insecure as well; thus, this rate is likely to be an underestimate).</p> <p>There was no comparison to food insecurity prior to the pandemic.</p>	<p>Moderate</p>

<p>Ahn, S., & Norwood, F.B. (2020). Measuring food insecurity during the COVID-19 pandemic of spring 2020. <i>Applied Economic Perspectives and Policy</i>. Epub ahead of print.</p>	<p>Sep 9, 2020</p>	<p>Cross-sectional</p>	<p>USA</p>	<p>n=1047 households</p>	<p>An online survey regarding food security, administered on May 13 and 14, 2020. Data collected were compared to data from previous identical and similar surveys done in past years.</p> <p>Overall, there was a non-significant rise in food insecurity for all households compared to previous years, with 15.4% classified as food insecure in May 2020 versus 16.1% in 2016 and 12.8% in 2017 (differences n.s.).</p> <p>For families with children, however, 20.1% percent of households were classified as food insecure (compared to 13.6% of households without children), and this prevalence rate was significantly higher in May 2020 than in previous years (18.8% in 2016 and 14.1% in 2017).</p> <p>One-quarter of those with a household member who lost a job were classified as food insecure, compared to only 7% of those whose employment status had not changed.</p> <p>30% of households who experienced COVID-19 symptoms were food insecure.</p>	<p>Moderate</p>
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<p>Raifman, J., Bor, J., & Venkataramani, A. (2020). Unemployment insurance and food insecurity among people who lost employment in the wake of COVID-19. <i>Preprint</i>.</p>	<p>Jul 30, 2020</p>	<p>Cohort</p>	<p>USA</p>	<p>n=2185 households earning less than \$75,000 and who lost their jobs during COVID-19</p>	<p>This study assessed the relationship between unemployment insurance and food insecurity among people who lost their jobs during the COVID-19 pandemic. Data were collected over 6 waves, between Apr 1 and Jul 8, 2020.</p> <p>Food insecurity fluctuated over the first several months of the pandemic. The mean proportion of participants reporting food insecurity at any given time was 14.5%. Overall, 31% reported food insecurity during at least one wave of the survey.</p> <p>Receipt of unemployment insurance was associated with a 4.4% (95% CI: -7.8 to -0.9) decline in food insecurity.</p> <p>Food insecurity was more common among people who were non-White, lived in lower-income households, younger, and who were sexual or gender minorities.</p> <p>There was no comparison to food insecurity prior to the pandemic.</p>	<p>Moderate PREPRINT</p>
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<p>Wolfson, J.A. & Leung, C.W. (2020). Food insecurity and COVID-19: Disparities in early effects for US adults. <i>Nutrients</i> 12(6): 1648.</p>	<p>May 15, 2020</p>	<p>Cross-sectional</p>	<p>USA</p>	<p>n=1478 low-income adults</p>	<p>This national web-based survey conducted from Mar 19 to 24, 2020 explored the early effects of the COVID-19 pandemic among low-income adults in the US as social distancing measures began to be implemented.</p> <p>Overall, 36% of low-income adults in the US were food secure, 20% had marginal food security, and 44% were food insecure (17% low food security, 27% very-low food security).</p> <p>Less than one in five (18.8%) adults with very-low food security reported being able to comply with public health recommendations to purchase two weeks of food at a time.</p> <p>41.3% of adults with very-low food security reported not having enough food to feed themselves or their family compared to 10.7% with low food security, 3.1% of those with marginal food security and 1.6% of those with high food security.</p> <p>There was no comparison to food insecurity prior to the pandemic.</p>	<p>Moderate</p>
<p>Previously reported evidence</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 to 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>, 28(11): 2056-2063.</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 Apr-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>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 households</p>	<p>An online survey of adults in Mar to Apr 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>

Statistics Canada. (2020, Jun 24). Food insecurity during the COVID-19 pandemic, May 2020.	Jun 24, 2020	Prevalence	Canada	n=4600 general population	<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>	Low
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.	Jun 18, 2020	Cross-Sectional	Texas, United States	n=200 low-income families attending routine pediatric visits at a primary care clinic	<p>A survey in Apr to 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>	Moderate
Lauren, B.N, Silver, E.R., Faye, A.S., Woo Baidá, 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>	Jun 12, 2020	Cross-Sectional	United States	n=1527 adults reporting food security prior to the COVID-19 pandemic	<p>An online survey of previously food-secure adults in Mar to Apr 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>	Moderate PREPRINT

Table 3: In-progress Single Studies

Title	Anticipated Release Date	Population	Description of Document
New evidence reported December 18, 2020			
Niles, M.T., Belarmino, E.H., Bertmann, F., Biehl, E., Acciai, F., Josephson, A., ... Neff, R. (2020). Food insecurity during COVID-19: A multi-state research collaborative . <i>Preprint</i> .	Dec 4, 2020	Adults living in the USA	This study aims to explore impacts the COVID-19 pandemic has had on food access and security in the USA including challenges and concerns related to food access, dietary intake and use of food assistance programs.
Boston Medical Centre. (2020). Reducing Food Insecurity During COVID-19 .	Oct 2022	250 adults living in Boston	This study aims to compare the effectiveness of two interventions using a parallel group randomized control trial to address food insecurity among 250 low-income families with young children over a 12-month period during the COVID-19 pandemic.

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