



Rapid Review Update 2: What is the prevalence of household food insecurity in North America as a result of COVID-19 and associated public health measures?

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

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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 coronavirus 2019 (COVID-19) pandemic and associated public health measures on food insecurity is described in this rapid evidence review.

This rapid review was produced to support public health decision makers' response to the 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 May 5, 2021, to answer the question: **What is the prevalence of household food insecurity in North America as a result of COVID-19 and associated public health measures?**

What has changed in this version?

- This version is an update of a previous rapid evidence review released on December 18, 2020, with a specific focus on prevalence of household food insecurity in North America in this version.
- More studies are available that provide a comparison to pre-pandemic prevalence rates, confirming the earlier findings of increased prevalence of food insecurity during the pandemic, especially among low-income households and households with children.

Key Points

- Food insecurity appears to be more prevalent during the COVID-19 pandemic than before the pandemic, particularly among low-income populations across studies that included comparisons to pre-pandemic levels. Change in prevalence of food insecurity in the general population ranged from -2.8% to 4.1% in Canada and -0.7% to 26.2% in the United States. Change in the prevalence of food insecurity among low-income populations ranged from 10% to 47%. The overall certainty of this evidence is very low (GRADE), and findings are very likely to change as more evidence accumulates.
- The studies included in this review do not describe in detail the food insecurity experiences of all specific populations who live with social and structural inequities. In particular, citizen representatives who contributed to this rapid review noted gaps in knowledge related to Indigenous or racialized communities, newcomers, refugees, social assistance recipients, single parents, and people with disabilities. Knowing the specific populations who experience food insecurity, and the factors associated with their situations, should allow for a more nuanced and specific policy response. Further research is required to build understanding of the prevalence and impact of food insecurity and to ensure representation of these populations in decision making.

Overview of Evidence and Knowledge Gaps

- Reported prevalence of food insecurity in North America during the pandemic among the general population samples ranged widely across studies, from 1% to 17% in Canada and 15.4% to 69% in US.
- Three studies report prevalence of food insufficiency or very low food security, both of which are more extreme forms of food insecurity. These studies reported prevalence of 10% to 14%.
- Generally, food insecurity is noticeably more prevalent during the COVID-19 pandemic among low-income populations, with reported prevalence between 37.1% and 68%.
- Three Canadian studies each report prevalence of pandemic food insecurity of 14% in general population samples, and 4.8% of fathers / 8.5% of mothers in a middle- to high-income sample. In addition, two Québec studies report a prevalence of 17% in one study, and 1% in another study. The reasons for the low prevalence in the latter study are not clear: the authors note that the definition of food insecurity in their study (moderate and severe food insecurity categories) differed from those in other similar studies, but comparable categories in the other Québec study show a prevalence of 10%.
- Prevalence varies across populations and settings. Factors associated with food insecurity during the COVID-19 pandemic include: household loss of income, unemployment, or inability to work due to the pandemic; low income or education; larger household size; households with children; pre-existing food insecurity; receiving government assistance; younger age; Black or Hispanic identity, and having had COVID-19 infection or symptoms.
- Government or charitable programs may have become available during the COVID-19 pandemic, potentially reducing food insecurity. Two studies (1 US, 1 Canadian) found a small decrease in food insecurity among the general population during the pandemic as compared to pre-pandemic levels. This may have been due to receipt of funding or programs implemented due to COVID-19. No studies showed a reduction of food insecurity among households with children compared to previous levels.
- Overall, wide variation was seen across studies and reasons were not always clear. Food insecurity was assessed and reported using different methods and measures, which may contribute to heterogeneity. Similarly, populations included, and sample recruitment methods differ across studies.
- Citizen representatives noted that the increase in prevalence of food insecurity during the pandemic is a test of social policies and a 'social safety net'. The finding that food insecurity was prevalent before the pandemic, and exacerbated during the pandemic, shows that there is work to be done on social policy in Canada and elsewhere in North America. Populations that were already experiencing food insecurity before the pandemic continued to experience food insecurity at high rates, even with the implementation of COVID-related programs.
- Citizen representatives also commented that the contributions of volunteers, charities, communities and extended families go unmeasured in these studies. It is likely that many households received assistance through these non-governmental channels in the face of looming food insecurity due to COVID-19. Future research should seek to understand if, and describe how, these social assets averted food insecurity, particularly among population groups that live communally or with strong community ties.

Methods

Research Question

What is the prevalence of household food insecurity in North America as a result of COVID-19 and associated public health measures?

Citizen Involvement

Two citizens who are members of *COVID-END in Canada's* citizen pool, and who have a keen interest in the social and economic response to the COVID-19 pandemic, were engaged in this review. They contributed to the search framing, executive summary review, interpretation of findings and identification of gaps.

Search

On April 30 and May 5, 2021, the following databases were searched using key terms: “food security”, “food insecurity”, “diet” and “nutrition”. This search builds upon the previous search conducted in the first version of this rapid review.

- [Medline](#)
- [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](#)
- [Scopus](#)
- NCCDH [Equity-informed Responses to COVID-19](#)
- [Alberta Health Services](#)
- Statistics Canada’s [COVID-19: A Data Perspective](#)
- [Public Health England](#)
- NCCIH [Knowledge Resources & Publications](#)
- [INSPO](#)
- [Sociological Abstracts](#)

A copy of the full search strategy is available 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- 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.

When data came from the same surveillance source (e.g., four studies drew from the Household Pulse Survey), these studies were screened to ensure that the findings were not reported twice in the review. The four included studies from the Household Pulse Survey drew from distinct time points (April, June, October, November) and, thus, do not represent data duplications.

	Inclusion Criteria	Exclusion Criteria
Population	Households in North America	
Intervention	COVID-19 public health measures	
Comparisons	Pre-pandemic or no comparison	
Outcomes	Prevalence of food insecurity	Effects on agriculture or supply chain

Data Extraction and Synthesis

Data relevant to the research question, such as study design, jurisdiction, food insecurity measure, population characteristics, measure of food security and prevalence were extracted when reported.

If outcomes were reported from multiple survey waves during the pandemic, the most recent prevalence is presented.

Specific demographic or household characteristics associated with food insecurity were extracted if provided, and summarized in the tables under “Food Insecurity among Population Sub-Groups”:

- Age
- Gender
- Race or Ethnicity
- Education level
- Income
- Primary language
- Government program recipient
- Household size
- Households with children
- Employment status during COVID (e.g., job loss or disruption)
- Food insecurity pre-COVID
- COVID-19 illness (i.e., respondent or family member had COVID)

Measures of **food insufficiency** and **very low food security** were considered to be indicators of food insecurity for the purposes of this review, as they reflect extreme forms of food insecurity. Measures of food **security** were considered to be the inverse of food **insecurity** for the purposes of this review. We calculated prevalence rates of food insecurity for [one study](#) that provided food security rates.

We synthesized the results narratively due to the variation in methodology 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](#)) (Schünemann *et al.*, 2013) 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 the outcome (food insecurity) was determined by 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 Findings

In this update, 17 new single studies, and 4 updates to previously included studies were identified. Furthermore, the following were excluded because they did not include a specific prevalence rate in North America: 3 in-progress syntheses, 1 single study and 2 in-progress single studies. A full list of studies that were previously included that are now excluded is available [here](#). In total, 32 single studies and 1 in-progress synthesis are included in this review.

20 studies reported a pre-pandemic comparison prevalence rate and 12 did not include a comparator. These two categories of studies are presented in Tables 1 and 2, respectively, below.

Question:

	Inclusion Criteria
Population	Households in North America
Intervention	COVID-19 public health measures
Comparison	Pre-pandemic or no comparator
Outcome	Prevalence of food insecurity

Outcome	Studies included		Overall certainty in evidence (GRADE)
	Study design	n	
Prevalence of food insecurity	Observational	32	⊕○○○ Very low*

*In the GRADE approach to quality of evidence, **observational studies**, as included in this review, provide **low quality** evidence, and this assessment was further reduced to **very low** based on high risk of bias, inconsistency in effects and imprecision in effect estimate.

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: Single Studies with Comparator to Pre-Pandemic

Reference	Date Released	Study Design	Sample size, Population, Jurisdiction, Date of Data Collection	Prevalence of Food Insecurity During Pandemic (Measure)	Comparison Prevalence of Food Insecurity (Date)	Food Insecurity among Population Sub-Groups	Quality Rating
New evidence reported June 2, 2021							
Morales, D. X., Morales, S. A., & Beltran, T. F. (2021). Food insecurity in households with children amid the COVID-19 pandemic: Evidence from the Household Pulse Survey . <i>Social Currents</i> . Epub ahead of print.	Apr 23, 2021	Cross-sectional	n=20,543 Households with children, United States Oct 28 - Nov 9, 2020	38% (Household Pulse Survey)	27% (Before March 2020)	Household food insecurity was more common among: <ul style="list-style-type: none"> Females (p=0.0017) Hispanics (p<0.001) Lower educated; less than college (p<0.001) Low-income households (p<0.001) Those with low food security pre-pandemic (p<0.001) Households with more children are more likely to become food insecure (p=0.016) 	High
Vasudevan, V., Karpur, A., Shih, A., & Frazier, T. (2021). Food insecurity in households of people with autism spectrum disorder during the COVID-19 pandemic . <i>Preprint</i> .	Apr 4, 2021	Cross-sectional	n=1515 Households including someone with Autism Spectrum Disorder, United States Nov 18 - Dec 7, 2020	51.8% (Modified Household Pulse Survey)	10.5% (2019)	Household food insecurity was more common among respondent households that were: <ul style="list-style-type: none"> Hispanic (74.5%) Black (65.7%) High school education or less (71.2%) Below the 200% federal poverty line, (80%) Medicaid/ Medicare recipients (69.9%) 	Moderate PREPRINT

Reference	Date Released	Study Design	Sample size, Population, Jurisdiction, Date of Data Collection	Prevalence of Food Insecurity During Pandemic (Measure)	Comparison Prevalence of Food Insecurity (Date)	Food Insecurity among Population Sub-Groups	Quality Rating
Siddiqi, S. M., Cantor, J., Dastidar, M. G., Beckman, R., Richardson, A. S., Baird, M. D., & Dubowitz, T. (2021). SNAP participants and high levels of food insecurity in the early stages of the COVID-19 pandemic . <i>Public Health Reports</i> .	Mar 31, 2021	Cohort	n=270 People enrolled in the USDA's Supplemental Nutrition Assistance Program (SNAP), predominantly (88.8%) Black participants (low-income adults aged > 18) living in "food deserts", Pittsburgh, Pennsylvania, United States Mar - May 2020	47.8% (6-item USDA Food Security Survey Module)	18.9% (2018)	No breakdown reported.	Moderate
Fang, D., Thomsen, M. R., & Nayga, R. M., Jr (2021). The association between food insecurity and mental health during the COVID-19 pandemic . <i>BMC Public Health</i> , 21(1), 607.	Mar 29, 2021	Cross-sectional	n=2714 Adults (aged >18) in low-income households, United States Jun 29 - Jul 21, 2020	51.6% (10-item USDA Food Security Survey Module)	28% (2019)	Household food insecurity was more common among: <ul style="list-style-type: none"> • Younger populations • Hispanic • Households with children • SNAP government program recipients 	High

Reference	Date Released	Study Design	Sample size, Population, Jurisdiction, Date of Data Collection	Prevalence of Food Insecurity During Pandemic (Measure)	Comparison Prevalence of Food Insecurity (Date)	Food Insecurity among Population Sub-Groups	Quality Rating
Men, F. & Tarasuk, V. (2021). Food insecurity amid the COVID-19 pandemic: food charity, government assistance and employment . <i>Canadian Public Policy/Analyse de politiques</i> . Epub ahead of print.	Mar 2, 2021	Cross-sectional	n=4410 Adults from ten provinces, Canada Apr 27 - May 3, 2020	14.4% (6-item USDA Food Security Survey Module)	12.7%, 2019	Household food insecurity was more common among: <ul style="list-style-type: none"> • Younger populations; 25-34 (22.8%) • Households with children (19.3%) • Those unemployed due to COVID-19 business closure or layoff (32%) 	Moderate
Wolfson, J. A., Garcia, T., & Leung, C. W. (2021). Food insecurity is associated with depression, anxiety, and stress: Evidence from the early days of the COVID-19 pandemic in the United States . <i>Health Equity</i> , 5(1), 64–71.	Feb 25, 2021	Cross-sectional	n=1476 Low-income adults below the 250% poverty line, United States Mar 19 - 24, 2020	44% (18-item USDA Household Food Security Module)	11%, 2018	No breakdown reported.	Moderate

Reference	Date Released	Study Design	Sample size, Population, Jurisdiction, Date of Data Collection	Prevalence of Food Insecurity During Pandemic (Measure)	Comparison Prevalence of Food Insecurity (Date)	Food Insecurity among Population Sub-Groups	Quality Rating
Litton, M. M., & Beavers, A. W. (2021). The relationship between food security status and fruit and vegetable intake during the COVID-19 pandemic . <i>Nutrients</i> , 13(3), 712.	Feb 24, 2021	Cross-sectional	n=484 Adults aged ≥ 18, Michigan, United States Jun 17 - 29, 2020	36.2% (6-item USDA Food Security Survey Module)	10%, Mar 2020 (Estimate as per the COVID Impact Survey)	Household food insecurity was more common among: <ul style="list-style-type: none"> • Females (p=0.016) • Hispanic or Latinx respondents (p=0.042) • Less than college (p<0.001) • Low income <\$24,999 (p<0.001) • Households with children (p<0.001) • Employment disruption (p<0.001) 	High
Perry, B. L., Aronson, B., & Pescosolido, B. A. (2021). Pandemic precarity: COVID-19 is exposing and exacerbating inequalities in the American heartland . <i>Proceedings of the National Academy of Sciences of the United States of America</i> , 118(8), e2020685118.	Feb 5, 2021	Cross-sectional	n=994 Households across Indiana, United States Mar 28 - May 31, 2020	27% (Measure not reported)	14%, 2019	Household food insecurity was more common among: <ul style="list-style-type: none"> • Black respondents (55%, p>0.001) • Having less than high school, high school or some college education • Having pre-pandemic food insecurity 	Moderate

Reference	Date Released	Study Design	Sample size, Population, Jurisdiction, Date of Data Collection	Prevalence of Food Insecurity During Pandemic (Measure)	Comparison Prevalence of Food Insecurity (Date)	Food Insecurity among Population Sub-Groups	Quality Rating
Jones, S., Boland, J. H., Harris, S. C., Grzejdzia, M., Heberlein, E., & Crockett, A. (2021). 615 Food and housing insecurity: The effects of the COVID-19 pandemic on the obstetric population . <i>American Journal of Obstetrics and Gynecology</i> , 224(2), S386.	Feb 1, 2021	Cohort	n=224 Pregnant women, United States May - Sep 2020	18% (6-item USDA Food Security Survey Module)	25% (Mar 2017 - Aug 2019)	No breakdown reported.	Low
Dou, Z., Stefanovski, D., Galligan, D., Lindem, M., Rozin, P., Chen, T., & Chao, A. M. (2021). Household food dynamics and food system resilience amid the COVID-19 pandemic: A cross-national comparison of China and the United States . <i>Frontiers in Sustainable Food Systems</i> , 4, 577153.	Jan 12, 2021	Cross-sectional	n=1547 General population, Louisiana, United States Apr 17 - 27, 2020	38% (Measure not reported)	4%, 2019	Household food insecurity was more common among respondents with: <ul style="list-style-type: none"> • Low-income <\$25,000 • Loss of income 	Moderate

Reference	Date Released	Study Design	Sample size, Population, Jurisdiction, Date of Data Collection	Prevalence of Food Insecurity During Pandemic (Measure)	Comparison Prevalence of Food Insecurity (Date)	Food Insecurity among Population Sub-Groups	Quality Rating
Nagata, J. M., Ganson, K. T., Whittle, H. J., Chu, J., Harris, O. O., Tsai, A. C., & Weiser, S. D. (2021). Food insufficiency and mental health in the U.S. during the COVID-19 pandemic . <i>American Journal of Preventive Medicine</i> , 60(4), 453–461.	Jan 9, 2021	Cross-sectional	n=63,674 Adults, United States Jun 11 - 16, 2020	10.0% (Food insufficiency, Household Pulse Survey)	8.1%, before Mar 13, 2020	Household food insufficiency was more common among certain respondents: <ul style="list-style-type: none"> • Lower age (Mean ± SD; Food insufficient: 41.09 ± 0.56 vs. food sufficient: 49.26 ± 0.23, p<0.001) • Hispanic (RR=2.58, 95% CI=2.14, 3.11, p<0.001) • Black (RR=2.57, 95% CI=2.15, 3.08, p<0.001) • High school or less (RR=2.74, 95% CI=2.39, 3.13, p<0.001) • Income below the federal poverty line (RR=4.25, 95% CI=3.69, 4.90, p<0.001) • Job loss in the past 7 days (RR=3.45, 95%CI=2.93, 4.06, p<0.001) 	High

Reference	Date Released	Study Design	Sample size, Population, Jurisdiction, Date of Data Collection	Prevalence of Food Insecurity During Pandemic (Measure)	Comparison Prevalence of Food Insecurity (Date)	Food Insecurity among Population Sub-Groups	Quality Rating
Molitor, F., & Doerr, C. (2021). Very low food security among low-income households with children in California before and shortly after the economic downturn from COVID-19 . <i>Preventing Chronic Disease, 18</i> , E01.	Jan 7, 2021	Cross-sectional	n=11,653 Low-income households; mothers with children, California, United States Apr 27 - Jul 21, 2020	14% (Very Low Food Security, 6-item USDA Food Security Survey Module)	2020 pre-pandemic: 19.3% (adjusted OR=1.49, p=0.003) 2019: 22.2% (adjusted OR=1.77, p<0.001) 2018: 19.0% (adjusted OR=1.47, p=0.004)	Rates of very low food security decreased during pandemic, related to rapid increases in the number of families receiving food support through the CalFresh/SNAP program.	High
Lamarche, B., Brassard, D., Lapointe, A., Laramée, C., Kearney, M., Côté, M., ... & Plante, C. (2021). Changes in diet quality and food security among adults during the COVID-19-related early lockdown: Results from NutriQuébec . <i>The American Journal of Clinical Nutrition, 113</i> (4), 984–992.	Jan 5, 2021	Cohort	n=922 Adults (aged > 18), Québec, Canada Apr - May 2020	1.0% (Household Food Security Survey Module)	3.8% (Jun 2019 - Feb 2020)	No breakdown reported.	Moderate

Reference	Date Released	Study Design	Sample size, Population, Jurisdiction, Date of Data Collection	Prevalence of Food Insecurity During Pandemic (Measure)	Comparison Prevalence of Food Insecurity (Date)	Food Insecurity among Population Sub-Groups	Quality Rating
Gaitán-Rossi, P., Vilar-Compte, M., Teruel, G., & Pérez-Escamilla, R. (2020). Measurement lessons of a repeated cross-sectional household food insecurity survey during the COVID-19 pandemic in Mexico. <i>Preprint.</i>	Aug 6, 2020	Cross-sectional	n=3357 Adults aged >18 who had a mobile phone, Mexico Apr - Jun 2020	69% Jun 2020 (Latin American and Caribbean Food Security Scale)	55% (2018)	Household food insecurity was more common among: <ul style="list-style-type: none"> Households with children (75%) than without children (64%) Food insecurity was negatively correlated with socioeconomic status (-0.4, 95%CI=-0.37,-0.43).	Moderate <i>PREPRINT</i>
Previously reported evidence							
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	n=approx 5,000/ wave Low-income households eligible for benefits, United States Late Mar - mid-Jun 2020 using five repeated online surveys	64% Jun 2020 (Measure not reported)	54% Apr 2020	No breakdown reported.	Moderate

Reference	Date Released	Study Design	Sample size, Population, Jurisdiction, Date of Data Collection	Prevalence of Food Insecurity During Pandemic (Measure)	Comparison Prevalence of Food Insecurity (Date)	Food Insecurity among Population Sub-Groups	Quality Rating
Escobar, M., DeCastro Mendez, A., Romero Encinas, M., & Wojcicki, J.M. (2020). High food insecurity in Latinx families and associated COVID-19 infection in the Greater Bay Area, California. <i>Preprint.</i>	Oct 14, 2020	Cross-sectional	n=375 from 3 samples Low income Latinx households, San Francisco Bay Area, United States May - Sep 2020	68% (18-item USDA Household Food Security Module) [Findings were calculated in terms of food <i>insecurity</i> based on 100%-food secure%.]	21%	Differences between the 3 samples in levels of food insecurity ranged from 40% to 70.8%. Samples differed in education levels, unemployment and Spanish primary language. COVID-19 infection was associated with food insecurity in 2 of the 3 samples.	High <i>PREPRINT</i>
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.	Oct 14, 2020	Cross-sectional	n=74,413 Households, United States Apr 2020	43% Apr (Household Pulse Survey)	30% before Mar 13 2020	Household food insecurity was associated with: <ul style="list-style-type: none"> • Pre-existing food insecurity (p<0.0001) • Larger household size (p=0.047) • Low income (p=0.036) • Unemployed (p<0.0001) 	High

Reference	Date Released	Study Design	Sample size, Population, Jurisdiction, Date of Data Collection	Prevalence of Food Insecurity During Pandemic (Measure)	Comparison Prevalence of Food Insecurity (Date)	Food Insecurity among Population Sub-Groups	Quality Rating
Ahn, S., & Norwood, F.B. (2020). Measuring food insecurity during the COVID-19 pandemic of spring 2020 . <i>Applied Economic Perspectives and Policy</i> , 43(1), 162-168.	Sep 9, 2020	Cross-sectional	n=1047 Households, United States May 13 - 14, 2020	15.4% (18-item USDA Household Food Security Module)	16.1% in 2016 and 12.8% in 2017	Household food insecurity was more common among: <ul style="list-style-type: none"> Households with children (20.12% ± 2.49% vs. 13.58±1.94% households with no children) Those with job loss (25% vs. 7% whose employment had not changed) Households with COVID-19 symptoms (30%) 	Moderate
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.	Jul 15, 2020	Cross-Sectional	n=3219 Households, Vermont, United States Mar - Apr 2020	24.8% (6-item USDA Food Security Survey Module)	18.8% in the year prior to the pandemic (retrospective recall)	Household food insecurity was more common among: <ul style="list-style-type: none"> Females (OR=1.422, 95%CI=0.963, 2.100) Households with children (OR=2.459, 95%CI=1.818, 3.325) Job loss (OR=3.064, 95%CI=2.107, 4.457) 	Moderate
Statistics Canada. (2020, Jun 24). Food insecurity during the COVID-19 pandemic. May 2020 .	Jun 24, 2020	Prevalence	n=4600 Adults, Canada May 2020	14.6% (6-item USDA Food Security Survey Module)	10.5% 2017/18	Household food insecurity was more common among: <ul style="list-style-type: none"> Households with children (19.2% vs. 12.2% households without children) Those unable to work due to business closure, layoff or personal circumstances due to COVID-19 (28.4% vs. 10.7% employed during the same period) 	Low NOT PEER REVIEWED

Table 2: Single Studies with No Comparator to Pre-Pandemic

Reference	Date Released	Study Design	Sample size, Population, Jurisdiction, Date of Data Collection	Prevalence of Food Insecurity During Pandemic (Measure)	Food Insecurity among Population Sub-Groups	Quality Rating
New evidence reported June 2, 2021						
INSPO (2021). Pandémie et insécurité alimentaire - 4 mai 2021.	May 4, 2021	Cross-sectional	n=3,300 Adults, Québec, Canada Apr 16 - 28, 2021	17% (4 questions from 18-item Household Food Security Survey Module)	Household food insecurity was more common among: <ul style="list-style-type: none"> • Younger adults (aged 18-25, 21%; 26-44, 22%) • Job loss (39%) • Immigrant (25%) • Material deprivation index=5 (highest) (24%) Prevalence of 26% food insecure from Mar 26 - Apr 1, 2020, with values ranging from 16% to 26% at bi-weekly intervals throughout the pandemic.	Moderate NOT PEER REVIEWED
Raifman, J., Nsoesie, E., Dean, L. T., Gutierrez, K., Raderman, W., Skinner, A., & Shafer, P. (2021). State minimum wage, paid sick leave, and food insufficiency during the COVID-19 pandemic. Preprint.	Mar 4, 2021	Cohort	n=507,922 Low-income households, aged < 65, United States Aug 19 - Dec 21, 2020	Food insufficiency 11.8% - 14.3% depending on state minimum wage (Census Pulse survey data)	Household food insufficiency was more common among: <ul style="list-style-type: none"> • Black (18.2-24.3%, depending on state minimum wage) • Latinx (17.9- 19.3%, depending on state minimum wage) • Those without paid sick leave who missed work due to COVID-19 illness • Households in states with <\$12/hour minimum wage 	Moderate PREPRINT

Reference	Date Released	Study Design	Sample size, Population, Jurisdiction, Date of Data Collection	Prevalence of Food Insecurity During Pandemic (Measure)	Food Insecurity among Population Sub-Groups	Quality Rating
Ferrante, M. J., Goldsmith, J., Tauriello, S., Epstein, L. H., Leone, L. A., & Anzman-Frasca, S. (2021). Food acquisition and daily life for U.S. families with 4-to 8-year-old children during COVID-19: Findings from a nationally representative survey . <i>International Journal of Environmental Research and Public Health</i> , 18(4), 1734.	Feb 10, 2021	Cross-sectional	n=1000 Adults aged ≥18 who are parents of at least one child age 4-8, United States Oct 2020	69% (Hager 2-item brief screen)	No breakdown reported	Moderate
Niles, M. T., Wirkkala, K. B., Belarmino, E. H., & Bertman, F. (2021). Home food procurement impacts food security and diet quality during COVID-19 . <i>Preprint</i> .	Feb 3, 2021	Cross-sectional	N=900 Adults, matched sample based on income, race and ethnicity, Vermont, United States Aug - Sep 2020	29% (6-item USDA Food Security Survey Module)	Household food insecurity was more common among: <ul style="list-style-type: none"> • Age ≥55 (OR=2.52, p=0.001) • Job disruption (OR=0.47, p=0.001) • Income <\$50,000 (OR=0.134, p<0.001) 	High PREPRINT
Lauren, B. N., Silver, E. R., Faye, A. S., Rogers, A. M., Woo Baidal, J. A., Ozanne, E. M., & Hur, C. (2021). Predictors of households at risk for food insecurity in the United States during the COVID-19 pandemic . <i>Public Health Nutrition</i> . Epub ahead of print.	Jan 27, 2021	Cross-sectional	n=1250 Adults reporting food security prior to the COVID-19 pandemic, United States Mar - Apr 2020	41% 'at risk' for food insecurity (2-item measure from Hager)	Household food insecurity was more common among: <ul style="list-style-type: none"> • Black, Hispanic, Asian (adjusted OR=2.12-2.22, 95%CI=1.24, 3.66) • Income <20K (adjusted OR=4.01, 95%CI=1.97-8.34) • Households with children (adjusted OR=1.84, 95%CI=1.14-2.97) 	High

Reference	Date Released	Study Design	Sample size, Population, Jurisdiction, Date of Data Collection	Prevalence of Food Insecurity During Pandemic (Measure)	Food Insecurity among Population Sub-Groups	Quality Rating
Raifman, J., Bor, J., & Venkataramani, A. (2021). Association between receipt of unemployment insurance and food insecurity among people who lost employment during the COVID-19 pandemic in the United States. <i>JAMA Network Open</i> , 4(1). Epub ahead of print.	Jan 4, 2021	Cohort	n=1119 Households earning less than \$75,000 and who lost their jobs during COVID-19, United States Data were collected over 15 waves, between Apr 1 and Nov 11, 2020.	37.1% during at least 1 wave (Food Insecurity Experience Scale)	Household food insecurity was more common among: <ul style="list-style-type: none"> • Younger populations;18-29 (48.9%) • Females (38.4%) Racial/ethnic minorities: <ul style="list-style-type: none"> • American Indian or Alaska Native (69.2%) • Hispanic (52.2%) • Black (42.2%) • Mixed race (50%) • Income <\$20,000 (58.2%) • Households with children (46.1%) • Single parent families (59.6%) 	Moderate
Polsky, J. Y., & Gilmour, H. (2020). Food insecurity and mental health during the COVID-19 pandemic. <i>Health reports</i> , 31(12), 3–11.	Dec 16, 2020	Cross-sectional	n=4481 People aged ≥15, Canada May 4 - 10, 2020	14.6% (6-item USDA Food Security Survey Module)	Household food insecurity was more common among: <ul style="list-style-type: none"> • Younger populations aged 15-34 • Males • Large households • Households with children • Not employed • Households financially impacted by COVID-19 	High
Previously reported evidence						
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> , 24(3), 519-530.	Oct 23, 2020	Cross-sectional	n=218 Young adults aged 18-26, Minnesota, United States Apr - May 2020	12% (Food insufficiency, 6-item USDA Food Security Survey Module)	Household food insufficiency was more common among: <ul style="list-style-type: none"> • Low-middle to middle parent socio-economic status (18.9%, p=0.006) • Households with children (22.5%, p=0.02) 	High

Reference	Date Released	Study Design	Sample size, Population, Jurisdiction, Date of Data Collection	Prevalence of Food Insecurity During Pandemic (Measure)	Food Insecurity among Population Sub-Groups	Quality Rating
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.	Aug 7, 2020	Cross-sectional	n=254 families Middle to high income families (mothers, fathers and children), Guelph, Ontario, Canada Apr - May 2020	8.5% of mothers and 4.8% of fathers (Two-item food security measure adapted from Gundersen)	No breakdown reported.	Moderate
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.	Aug 6, 2020	Cross-Sectional	n=584 Parents of children ages 5-18, United States Apr - May 2020	55% (6-item USDA Food Security Survey Module)	No breakdown reported.	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	n=200 Low-income families attending routine pediatric visits at a primary care clinic, Texas, United States Apr - May 2020	47% (American Academy of Pediatrics 2-question food insecurity screen)	Household food insecurity was more common among: <ul style="list-style-type: none"> • Hispanic (54%) • Spanish-speaking (64%) 	Moderate
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.	May 15, 2020	Cross-sectional	n=1478 Low-income adults, United States Mar 19 - 24, 2020	44% (18-item USDA Household Food Security Module)	Household food insecurity was more common among: <ul style="list-style-type: none"> • Households with children (54%, p<0.001) 	Moderate

Table 3: In-progress Synthesis

Title	Anticipated Release Date	Population	Description of Document
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.

References

- 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](#). *The Journal of Pediatrics*, 4, 100044.
- 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](#). *Obesity*, 28(11): 2056-2063.
- Ahn, S., & Norwood, F.B. (2020). [Measuring food insecurity during the COVID-19 pandemic of spring 2020](#). *Applied Economic Perspectives and Policy*, 43(1), 162-168.
- 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](#). *Nutrients*, 12(8), 2352.
- Dou, Z., Stefanovski, D., Galligan, D., Lindem, M., Rozin, P., Chen, T., & Chao, A. M. (2021). [Household food dynamics and food system resilience amid the COVID-19 pandemic: A cross-national comparison of China and the United States](#). *Frontiers in Sustainable Food Systems*, 4, 577153.
- Doustmohammadian, A. (2020). [The impact of COVID-19 on food security: A systematic review and meta-analysis protocol](#). PROSPERO, CRD42020185843.
- Enriquez, D. & Goldstein, A. (2020). [COVID-19's socioeconomic impact on low-income benefit recipients: Early evidence from tracking surveys](#). *Socius*. Epub ahead of print.
- Escobar, M., DeCastro Mendez, A., Romero Encinas, M., & Wojcicki, J.M. (2020). [High food insecurity in Latinx families and associated COVID-19 infection in the Greater Bay Area, California](#). *Preprint*.
- Fang, D., Thomsen, M. R., & Nayga, R. M., Jr (2021). [The association between food insecurity and mental health during the COVID-19 pandemic](#). *BMC Public Health*, 21(1), 607.
- Ferrante, M. J., Goldsmith, J., Tauriello, S., Epstein, L. H., Leone, L. A., & Anzman-Frasca, S. (2021). [Food acquisition and daily life for U.S. families with 4-to 8-year-old children during COVID-19: Findings from a nationally representative survey](#). *International Journal of Environmental Research and Public Health*, 18(4), 1734.
- Food and Agriculture Organization of the United Nations. (2001). [The state of food insecurity in the world 2001](#).
- Gaitán-Rossi, P., Vilar-Compte, M., Teruel, G., & Pérez-Escamilla, R. (2020). [Measurement lessons of a repeated cross-sectional household food insecurity survey during the COVID-19 pandemic in Mexico](#). *Preprint*.
- Government of Canada. (2020, February 18). [Household food insecurity in Canada: Overview](#).

INSPQ (2021). [*Pandémie et insécurité alimentaire - 4 mai 2021.*](#)

Jones, S., Boland, J. H., Harris, S. C., Grzejdzia, M., Heberlein, E., & Crockett, A. (2021). [615 Food and housing insecurity: The effects of the COVID-19 pandemic on the obstetric population.](#) *American Journal of Obstetrics and Gynecology*, 224(2), S386.

Lamarche, B., Brassard, D., Lapointe, A., Laramée, C., Kearney, M., Côté, M., ... & Plante, C. (2021). [Changes in diet quality and food security among adults during the COVID-19-related early lockdown: Results from NutriQuébec.](#) *The American Journal of Clinical Nutrition*, 113(4), 984–992.

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.](#) *Public Health Nutrition*, 24(3), 519-530.

Lauren, B. N., Silver, E. R., Faye, A. S., Rogers, A. M., Woo Baidal, J. A., Ozanne, E. M., & Hur, C. (2021). [Predictors of households at risk for food insecurity in the United States during the COVID-19 pandemic.](#) *Public Health Nutrition*. Epub ahead of print.

Litton, M. M., & Beavers, A. W. (2021). [The relationship between food security status and fruit and vegetable intake during the COVID-19 pandemic.](#) *Nutrients*, 13(3), 712.

Men, F. & Tarasuk, V. (2021). [Food insecurity amid the COVID-19 pandemic: food charity, government assistance and employment.](#) *Canadian Public Policy/Analyse de politiques*. Epub ahead of print.

Molitor, F., & Doerr, C. (2021). [Very low food security among low-income households with children in California before and shortly after the economic downturn from COVID-19.](#) *Preventing Chronic Disease*, 18, E01.

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.](#) *Journal of Racial and Ethnic Health Disparities*. Epub ahead of print.

Morales, D. X., Morales, S. A., & Beltran, T. F. (2021). [Food insecurity in households with children amid the COVID-19 pandemic: Evidence from the Household Pulse Survey.](#) *Social Currents*. Epub ahead of print.

Nagata, J. M., Ganson, K. T., Whittle, H. J., Chu, J., Harris, O. O., Tsai, A. C., & Weiser, S. D. (2021). [Food insufficiency and mental health in the U.S. during the COVID-19 pandemic.](#) *American Journal of Preventive Medicine*, 60(4), 453–461.

Niles, M. T., Wirkkala, K. B., Belarmino, E. H., & Bertman, F. (2021). [Home food procurement impacts food security and diet quality during COVID-19.](#) *Preprint*.

- Niles, M., Bertmann, F., Belarmino, E., Wentworth, T., Biehl, E., & Neff, R. (2020). [The early food insecurity impacts of COVID-19](#). *Nutrients*, 12(7), 2096.
- Perry, B. L., Aronson, B., & Pescosolido, B. A. (2021). [Pandemic precarity: COVID-19 is exposing and exacerbating inequalities in the American heartland](#). *Proceedings of the National Academy of Sciences of the United States of America*, 118(8), e2020685118.
- Polsky, J. Y., & Gilmour, H. (2020). [Food insecurity and mental health during the COVID-19 pandemic](#). *Health reports*, 31(12), 3–11.
- Raifman, J., Bor, J., & Venkataramani, A. (2021). [Association between receipt of unemployment insurance and food insecurity among people who lost employment during the COVID-19 pandemic in the United States](#). *JAMA Network Open*, 4(1). Epub ahead of print.
- Raifman, J., Nsoesie, E., Dean, L. T., Gutierrez, K., Raderman, W., Skinner, A., & Shafer, P. (2021). [State minimum wage, paid sick leave, and food insufficiency during the COVID-19 pandemic](#). *Preprint*.
- Schünemann, H., Brożek, J., Guyatt, G., & Oxman, A. (2013). [Handbook for grading the quality of evidence and the strength of recommendations using the GRADE approach](#).
- Siddiqi, S. M., Cantor, J., Dastidar, M. G., Beckman, R., Richardson, A. S., Baird, M. D., & Dubowitz, T. (2021). [SNAP participants and high levels of food insecurity in the early stages of the COVID-19 pandemic](#). *Public Health Reports*.
- Statistics Canada. (2020, June 24). [Food insecurity during the COVID-19 pandemic, May 2020](#).
- Vasudevan, V., Karpur, A., Shih, A., & Frazier, T. (2021). [Food insecurity in households of people with autism spectrum disorder during the COVID-19 pandemic](#). *Preprint*.
- Wolfson, J. A., Garcia, T., & Leung, C. W. (2021). [Food insecurity is associated with depression, anxiety, and stress: Evidence from the early days of the COVID-19 pandemic in the United States](#). *Health Equity*, 5(1), 64–71.
- Wolfson, J.A. & Leung, C.W. (2020). [Food insecurity and COVID-19: Disparities in early effects for US adults](#). *Nutrients* 12(6): 1648.