

Food Insecurity among US Households during the Covid-19 Pandemic: Prevalence and Inequality

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ABSTRACT: Using the Household Pulse Survey conducted by the U.S. Census Bureau from April 2020 to November 2021, this study investigates whether the Covid-19 pandemic escalated the prevalence and inequality of food insecurity in the United States. It finds that the pandemic statistically increased the prevalence of food insecurity -- 21.86% and 6.01% of US households were either low or very low food secure, double the 2019 level. The top reason was the lack of affordability resulting from income loss and inflated food prices. Inequality of food insecurity was pronounced -- people of color, low-income households, households with income loss, and households with children were impacted most during the pandemic. Given that these household types had a disproportionately higher prevalence of food insecurity before the pandemic, the pandemic elevated the inequality of food insecurity even more. Among food-insecure households, 18.66% of households received free meals, and 29.66% received SNAP benefits. Food pantries or food banks provided most of the free groceries and meals. The government can use the findings, non-profit organizations and community programs to identify and target households who need help to stay food secure -- minority households, households that lost their income, households with children, and low-income households.

KEYWORDS: Behavioral and Social Sciences, Food Insecurity; Covid-19 Pandemic; Prevalence; Inequality; US Households.

■ Introduction

Since December 2019, the world has been facing a big challenge, the Covid-19 pandemic. Unlike other outbreaks in living memory, such as SARS, MERS, or Ebola, COVID-19 was a global disease with high transmissivity, quickly affecting poor, rich, rural, and industrialized countries. The World Health Organization (WHO) declared the Covid-19 outbreak a Public Health Emergency of International Concern (PHEIC) on January 30, 2020, and a pandemic on March 11, 2020.^{1, 2} As of Dec. 3, 2021, the Coronavirus Resource Center at Johns Hopkins University reported 264,834,612 cases and a death toll of 5,242,078 globally; the United States had seen 4,898,223 infections and 787,678 deaths. The New York Times reported that the highest peak for the number of infections, hospitalization, and death was in January 2021, and the second most prominent peak was in September 2021 in the United States due to the Delta variant.³ The socioeconomic impacts of this pandemic were comparable only to the crash of the Great Depression.

The frightening fast rate of spread led to a harsh response -- a complete shutdown in major cities and expanded to many states in March-April 2020.³ Shelter at home orders were issued by local governments, enforcing curfews and social distancing. Nonessential businesses were shut down, while even essential ones, such as restaurants that provided food, were only allowed to ship takeout during the lockdown. Grade schools and colleges started online learning. By the end of 2020 and

early 2021, all the countries began a race to vaccinate. Cases and deaths began to fall. However, the variants were still a threat. For example, by July 2021, the Delta variant was found in 65 countries, including the United States, which resulted in the second highest peak for infection cases, hospitalization, and death in the United States.³ In December 2021, the world had another spike infection cases due to the new variant, Omicron.

The Covid-19 pandemic brought economic, social, health, and emotional shocks to people regardless of their backgrounds and socioeconomic status. Food insecurity has been one of the most critical problems.⁴ Figure 1 the trend of food insecurity in US households from 1995 to 2020, distinguishing low food security and very low food security according to the USDA definitions. Low food-secure households have enough food to avoid substantially disrupting their eating patterns or reducing food intake by using various coping strategies, such as eating less varied diets, participating in Federal food assistance programs, or getting food from community food pantries. Among very low food-secure households, the standard eating patterns of one or more household members are disrupted, and food intake is reduced at times during the year because they have insufficient money or other resources for food. Figure 1 shows that before the pandemic, the United States had the lowest food insecurity prevalence -- approximately 10.54% of households were low food secure, and 4.11% were very low food insecure in 2019.

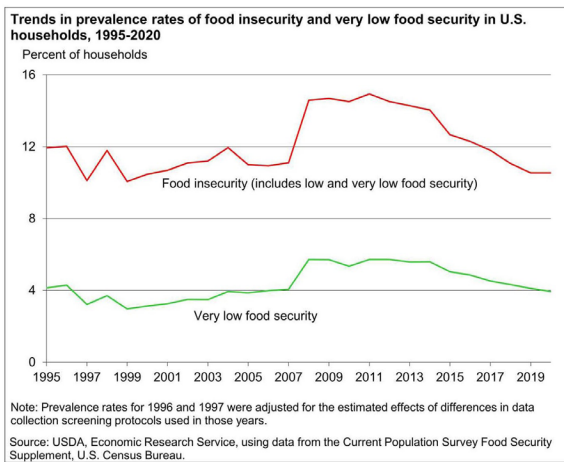


Figure 1: The trend of food insecurity among the US households (1995-2020).

Source: <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/key-statistics-graphics.aspx>.

Last Accessed on December 4th, 2021.

The World Bank Report states that “COVID-19 impacts led to severe and widespread increases in global food insecurity, affecting vulnerable households in almost every country, with impacts expected to continue into 2022 and possibly beyond.”⁵ Many US households faced a significant challenge to staying food secure for different reasons. Due to staying at home for long periods, some people developed “fear from infection or fear from the virus.”⁵ People feared contracting Covid-19 and did not want to go out or were affected by lockdowns. Another reason could be that some households had sick family members and/or school children who did not go to school because of the pandemic, which also made people unable to get out of the house shopping for groceries. The pandemic also disrupted the U.S. food supply chain, and people could not get enough food or sufficient varieties at grocery stores. Food prices increased significantly, making households unable to purchase groceries and meals, especially low-income households and those whose family members either lost jobs or employment income.⁶ One of the most important reasons was that people lost jobs, had pay cuts, or had their businesses either temporarily or permanently closed. The income shock not only caused households with low food security before the pandemic to be trapped in severe food insecurity but also dragged households who were food secure before the pandemic into either low or very low food insecure status.

The objectives of this study are to investigate: 1) whether the pandemic increased food insecurity among US households, 2) the inequality of food security by socioeconomic profiles, and 3) channels from which food insecure households get help.

■ Literature Review

Before the pandemic, about 10.5% of U.S. households were classified as low food secure, and 4.1% were very low food secure in 2019 (see Figure 1). Coleman-Jensen *et al.* (2020) show that food insecurity among US households in 2019 has the following patterns.⁷ First, the following households had a statistically higher rate of food insecurity than the national average: households with incomes below 185% of the poverty line (27.6%), households with children headed by a

single woman (28.7%), and households with children (13.6%). Second, among all food-insecure households in 2019, 37.6 percent were households with children, 19.7 percent were female-headed households with children, and 13.5 percent were married-couple households with children. Third, food insecurity exhibits significant racial inequality – non-Hispanic black and Hispanic households were more likely to be food insecure (19.1% and 15.6%) than non-Hispanic white households (7.9%). Fourth, the lower the household income, the higher the prevalence of food insecurity. Low-income households living under 185% of the federal poverty line had a much higher rate of food insecurity (28.7%), making up the majority of food-insecure households (53.8%).

The pandemic caused economic and social shocks to US households. The pandemic elevated the prevalence of food insecurity, from 18% in late spring to 35% in summer of 2020.⁶ During the pandemic, especially during lockdowns, households were recommended to stock up on food and limit trips to the grocery store. Some households may lack financial resources and physical space to store food.⁴ The pandemic brought price spikes for almost all food categories, which caused negative impacts on food security.⁸ Lack of affordability was the single most significant barrier to staying food secure.⁶

■ Methods

This study uses data from the Household Pulse Survey (HPS) conducted by the U.S. Census Bureau at the outset of the pandemic. HPS is a 20-minute online survey focusing on how the Covid-19 Pandemic affected households throughout the United States economically, socially, and mentally. The survey's first week lasted from April 23, 2020, to May 5, 2020. The first phase of the HPS consists of 12 weekly surveys until the week of July 16, 2020. Starting from the second phase, the U.S. Census Bureau changed the HPS to every two weeks. This study's most recent survey was conducted from September 29, 2021, to October 11, 2021, week 39. According to the US Census Bureau, the sample represents the U.S. population aged 18 years and above.

The US Household Pulse Survey participants were asked whether their household had experienced any food insufficiency in the last seven days. The choice options are 1) enough of the types of food wanted; 2) enough food, but not always the types wanted; 3) sometimes not enough to eat, and 4) often not enough to eat. Following the definition of food security by the USDA, I assume that the participants who chose the first two options were food secure. More specifically, I classify households being low food secure if they decided “sometimes not enough to eat”; and very low food secure if they chose “often not enough to eat.”

The participants were asked to identify their race and ethnic background among non-Hispanic white, Hispanic, non-Hispanic black, Asian, and others. They were also asked to report whether they have children under age 18 and whether any household members lost their employment income. The participants were also asked to choose their household income level among the following intervals: less than \$25,000, \$25,000–\$34,999, \$35,000–\$49,999, \$50,000–\$74,999, \$75,000–\$99,999, \$100,000–\$149,999, \$150,000–\$199,999,

and \$200,000 and above. According to the 2020 Census, the federal poverty line for an average household with four members was \$26,200, and the median household income was \$67,521. I created four income categories: less than \$25,000 for those living in poverty; \$25,000–\$75,000 for those living out of poverty but below the median household income; \$75,000–\$100,000; and \$100,000 and above.

I used graphical and statistical analyses to examine the proposed research questions on food insecurity among US households during the pandemic. Statistical student t-tests were conducted to assess the inequality of food insecurity between different types of households.

■ Results and Discussion

The empirical analyses investigate the prevalence, reasons, and inequality of food security and channels through which food-insecure US households get their free meals and groceries to improve their food security during the pandemic.

Overall Food Insecurity and its Reasons among US Households:

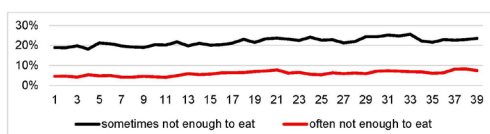
Table 1 shows that the prevalence was 21.86% for low food security and 6.01% for very low food security during the pandemic, higher than the 2019 level (10.54% and 4.11%). Approximately 27.86% of US households faced either low or very low food security, more than double the level in 2019 (14.65%).

Table 1: Food insecurity and reasons for US households during the pandemic (%).

	Minimum	Maximum	Mean	Standard Deviation
Food Insecurity Measures				
Low food security (Sometimes not enough to eat)	18.28% (Week 4)	25.65% (Week 33)	21.86%	1.93%
Very low food security (Often not enough to eat)	4.05% (Week 11)	8.27% (Week 38)	6.01%	1.17%
Overall food insecurity (Low and very low Food security)	23.45% (Week 8)	32.70% (Week 31)	27.46%	2.89%
Reported Reasons for Food Insecurity				
Cannot afford	54.03%	72.67%	60.41%	5.49%
Cannot get out	9.42%	13.81%	11.44%	1.10%
Afraid to go out	8.58%	16.70%	13.59%	2.02%
Cannot get delivery ¹	4.56%	7.33%	5.81%	0.69%
Store did not provide ¹	7.40%	16.95%	11.16%	2.04%
Other reasons	7.23%	22.25%	14.56%	4.13%

¹ The Household Pulse Survey included "cannot get delivery" and "store did not provide" in Weeks 1-27, but they were combined with "other reasons" in Weeks 28-39.

Table 1 summarizes the self-reported reasons for food insecurity: some could not afford to stay food secure (60.41%); others were afraid to go out to get groceries and meals (13.59%); 11.44% could not get out of their houses to get groceries and/or meals. From Week 1 to Week 27, the participants were provided a choice that stores did not offer the type of food they would like to buy – 11.16% cited this as the main reason. Figure 2(a) shows a significantly high prevalence of low food security and very low food security during the pandemic. Table 1 shows that the peak time for low food security and very low food security were in Week 33 (June 23, 2021 – July 5, 2021) and Week 38 (September 15, 2021 – September 27, 2021), respectively. The widespread of the Delta variant likely attributed to the peak. Figure 2(b) shows that an increasing proportion of the participants attribute the lack of affordability to their food insecurity situation.



(a) Low and very low food security during the pandemic

(b) Reasons for food insecurity during the pandemic

Figure 2: Food insecurity and its reasons among US Households during the pandemic.

The ERS Food Price Outlook tracks changes in the Consumer Price Index for food at home and food away from home. Retail food prices were higher in September 2021 than in September 2020 for all food categories. The highest price increases were for beef and veal (17.6%) and pork (12.7%). The disruptions caused by the pandemic to the food supply chain are attributed to the rising food prices. A concerted effort between the public and private sectors including food industries and major food companies, should be promoted to mitigate the impacts of the pandemic disruptions and improve efficiency.

Household Food Insecurity between Difference Households:

Inequality of food insecurity was pronounced in the US before the pandemic and further exacerbated it.^{7,8} I examined the inequality of food security by race and income level between households with and without children and between households with and without income loss.

Race-specific Inequality of Food Insecurity

Figure 3 shows a clear pattern of food insecurity by race – non-Hispanic black households experienced the most food insecurity, followed by Hispanic and Latino households, non-Hispanic white households, and Asian households had the least exposure to food insecurity during the pandemic. Table 2 shows that the proportion of low food-secure households was 29.50% for non-Hispanic black, 26.24% for Hispanics and Latinos, 18.42% for non-Hispanic white, and 14.22% for Asians.

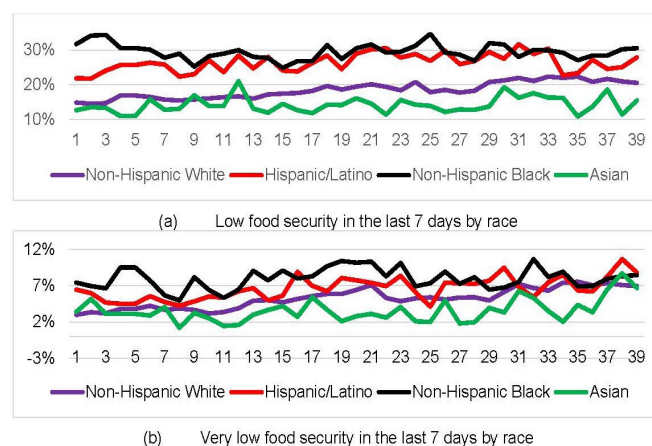


Figure 3: Food insecurity of US households by race during the pandemic by races.

Table 2: Food insecurity during the pandemic among different households (%).

	Low Food Security: Sometimes not enough to eat		Very Low Food Security: Often not enough to eat		Low or Very Low Food Insecurity	
	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation
White	18.42	2.46	5.25	1.41	23.67	3.78
Hispanic/Latino	26.24	2.84	6.75	1.58	32.99	3.32

Black	29.50	2.27	7.97	1.42	37.47	2.57
Asian	14.22	2.33	3.57	1.61	17.79	2.82
Household having at least one child or not						
Yes	24.72	2.25	6.34	1.29	31.06	3.07
No	19.48	2.14	5.74	1.25	25.22	3.11
Household lost employment income or not						
Yes	26.62	3.58	8.01	2.33	34.62	5.60
No	16.36	2.47	3.93	0.96	20.29	3.28
Household Income						
<\$250k	32.35	1.97	11.45	2.05	43.80	2.62
\$250k-\$75k	21.44	2.31	4.65	0.93	26.10	3.03
\$75k-\$100k	12.25	2.24	2.45	1.02	14.69	2.51
\$100k+	8.25	2.52	2.51	1.52	10.76	3.75

I formulated the null and alternative hypotheses below:

Null Hypothesis: $X_{\text{non-Hispanic black}} = X_{\text{Hispanic/Latino}} = X_{\text{non-Hispanic white}} = X_{\text{Asian}}$
 Alternative Hypothesis: $X_{\text{non-Hispanic black}} > X_{\text{Hispanic/Latino}} > X_{\text{non-Hispanic white}} > X_{\text{Asian}}$

Based on the corresponding p-value for Student t-tests in Table 3, we reject all null hypotheses at the 1% statistical significance level and accept the alternative hypotheses. I, therefore, conclude that race-specific inequality of food insecurity was pronounced: non-Hispanic black households most likely experienced both low security and very low security, followed by Hispanic and Latino households, non-Hispanic white households, and Asian households the least likely to experience food insecurity. The race-specific inequality of food insecurity found in this study is consistent with the literature.^{6, 9}

Table 3: Comparison of food insecurity between different households (%).

	Low Food Security: Sometimes not enough to eat	Very low food security: Often not enough to eat	Low and very low food security
	Difference (p-value)	Difference (p-value)	Difference (p-value)
Non-Hispanic Black vs. Hispanic/Latino	3.27%*** (0.00)	1.22%*** (0.00)	4.48%*** (0.00)
Hispanic/Latino vs. Non-Hispanic White	7.82%*** (0.00)	1.50%*** (0.00)	9.32%*** (0.00)
Non-Hispanic White vs. Asian	4.20%*** (0.00)	1.68%*** (0.00)	5.88%*** (0.00)
Households with at least one child vs. Household without children	5.24%*** (0.00)	0.61%*** (0.00)	5.84%*** (0.00)
Households lost employment income vs. Households without any income loss	10.26%*** (0.00)	4.08%*** (0.00)	14.33%*** (0.00)
<\$25,000 vs. \$25,000-75,000	10.91%*** (0.00)	6.79%*** (0.00)	17.70%*** (0.00)
\$25,000-75,000 vs. \$75,000	9.20%*** (0.00)	2.21%*** (0.00)	11.40%*** (0.00)
\$75,000 vs. \$100,000	4.00%*** (0.00)	-0.06% (0.00)	3.93%*** (0.00)

Asterisks, ***, **, and *, indicate statistical significance levels at 1%, 5%, and 10% levels, respectively.

Inequality of Food Insecurity between Households with and without Children:

Figure 4 shows that households with children were likelier to have low or very low food insecurity than those without children. Table 2 shows that the proportion of households that reported low food security was 24.72% for households with children and 19.48% for those without children. The patterns were the same for very low food security but in a much smaller magnitude: 6.34% for households with children and 5.74% for households without children. Overall, the pandemic increased the prevalence of food insecurity from 25.22% in 2019 to 31.06% during the pandemic.¹⁰ I formulated the null hypotheses and the alternative hypotheses below:

Null Hypothesis: $X_{\text{Households with children}} = X_{\text{Households without children}}$
 Alternative Hypothesis: $X_{\text{Households with children}} > X_{\text{Households without children}}$

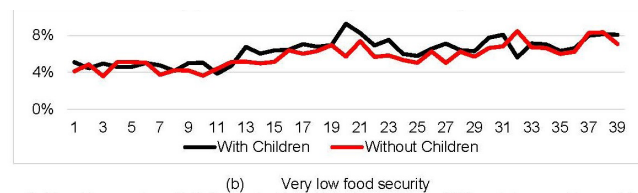
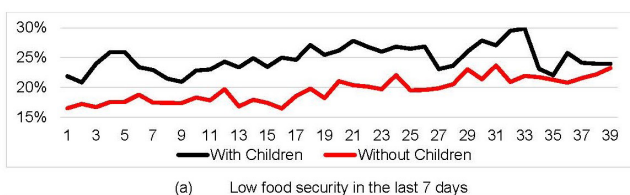


Figure 4: Food insecurity of US households with at least one child and those without children.

Based on the corresponding p-values of several Student t-tests shown in Table 3, I reject all the null hypotheses at the 1% statistical significance level likely to experience low food security than households without children during the pandemic.

Inequality of Food Insecurity between Households had Employment Income Loss or not:

A high prevalence of food insecurity was found among households that experienced job disruptions or lost jobs during the pandemic.^{9, 11} I examine the same issue based on whether households lost employment income result from job loss, reduced job hours, and furlough. Figure 5 shows that households who experienced a loss of employment income were more likely to be food insecure than those without income loss.

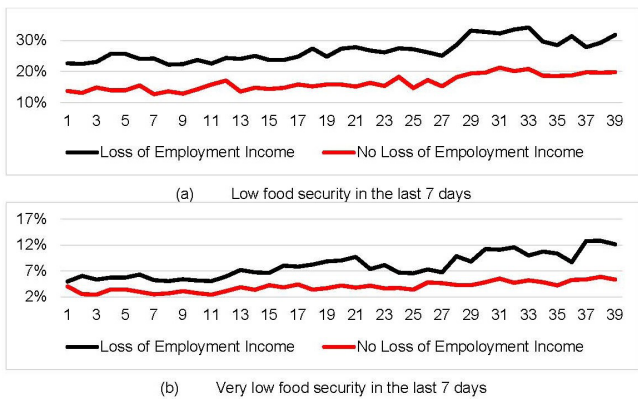


Figure 5: Food insecurity of US households with a loss of employment income or not.

Table 2 shows that the prevalence of low food security was 26.62% for households with employment income loss and 16.36% for households without employment income loss. The pattern of the majority of very low food security was the same. Still, in a much smaller magnitude: 8.01% for households lost employment income and 3.93% for households without any employment income loss.

I formulated the null and alternative hypotheses below:

Null Hypothesis: $X_{HH \text{ with employment income loss}} = X_{HH \text{ without employment income loss}}$
 Alternative Hypothesis: $X_{HH \text{ without employment income loss}} > X_{HH \text{ with employment income loss}}$

Based on the corresponding p-values of several Student t-tests in Table 3, I reject all the null hypotheses at the 1% statistical significance level and accept the alternative hypotheses. I conclude that households who lost employment income are more likely to experience both low and very low food security than households without any income loss. The finding is consistent with other studies.^{9, 11}

Food Insecurity by Household Income Levels:

Figure 6 demonstrates that the lower the household income, the more likely they experience food insecurity. Table 2 shows

that the prevalence of low food security was 32.35% for low-income households (less than \$25,000), 21.44% for households with incomes between \$25,000 and \$75,000, 12.25% for households with incomes between \$75,000 and \$100,000, and 9.25% for households with incomes of \$100,000 or greater. The patterns were the same for the prevalence of very low food security: 11.45% for households with incomes less than \$25,000, 4.65% for households with incomes between \$25,000 and \$75,000, 2.45% for households with incomes between \$75,000 and \$100,000, and 2.51% for households with incomes of \$100,000 or greater. Almost half of the households living in poverty experienced either low or very low food security (43.80%), followed by those with income between \$250,000 and \$750,000 (26.10%). Fewer households with income above \$750,000 experienced food insecurity (14.69% for those between \$75,000 and \$100,000 and 10.76% for the highest income households -- \$100,000 or greater).

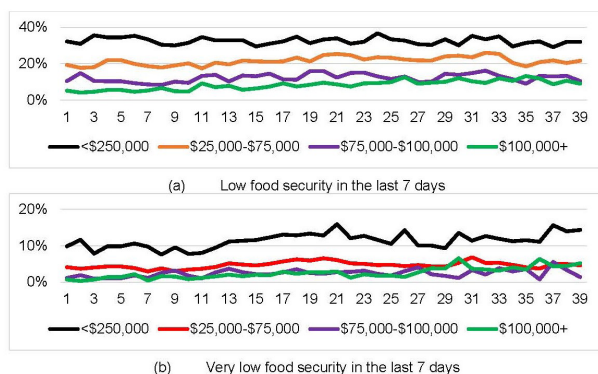


Figure 6: Food insecurity of US households during the pandemic by household income levels.

I formulated the null and alternative hypotheses below:

$$\begin{aligned} \text{Null Hypothesis: } & X_{\text{Less than } \$25,000} = X_{\$25,000-\$75,000} = X_{\$75,000-\$100,000} = X_{\$100,000+} \\ \text{Alternative Hypothesis: } & X_{\text{Less than } \$25,000} > X_{\$25,000-\$75,000} > X_{\$75,000-\$100,000} = X_{\$100,000+} \end{aligned}$$

I conducted several Student t-tests for the above hypotheses. Based on the corresponding p-values shown in Table 3, I reject all the null hypotheses at the 1% statistical significance level and accept the alternative hypotheses. I, therefore, conclude that low-income households were more likely to experience low and very low food security than relatively higher-income households during the pandemic.

Channels Helping Households to Improve Food Security during the Pandemic:

Table 4 shows that approximately 18.66% of households received free meals or groceries during the pandemic. The Supplemental Nutrition Assistance Program (SNAP) is the most extensive food assistance program in the US, aiming to improve food security and nutrition for low-income people and households. Table 4 also reports that almost 30% of the food-insecure households received SNAP benefits during the pandemic. SNAP benefits appeared to have a protective effect against food insecurity.⁶ Policy efforts should focus on minimizing the barriers to receiving and using SNAP benefits. First, local SNAP offices should encourage and help newly eligible individuals and families to enroll. Second, due to the rising inflation and food prices, the government should low-

er-income and resource eligibility and increase SNAP benefits. Third, SNAP requires that adults aged 18 to 50 are limited to three months of SNAP benefits every three years. Given the long-lasting pandemic, the government should eliminate this requirement. Fourth, policy efforts should focus on minimizing the barriers to receiving and using SNAP benefits. For example, participants should be allowed to use SNAP benefits for online grocery shopping.

Table 4: Free meals, SNAP, and provider or sources of free groceries and meals (%).

	Min	Max	Mean	Standard deviation
Received free meals	12.64%	26.81%	18.66%	2.27%
Received SNAP benefits	27.74%	33.26%	29.56%	1.50%
Source of free groceries and/or meals				
Food pantry or food bank	20.73%	28.41%	25.07%	2.07%
School/programs aimed at children	18.20%	32.64%	24.37%	3.79%
Family, friends, or neighbors	14.84%	24.74%	19.28%	2.47%
religious organization (e.g., Church)	11.36%	18.47%	14.43%	2.58%
Shelter or soup kitchen	1.14%	6.55%	2.89%	1.30%
Home-delivered meal services (e.g., Meals on Wheels)	0.70%	6.67%	3.36%	1.51%
Other community program	7.96%	13.42%	10.60%	1.43%

Food banks and pantries played an essential role among different channels in providing emergency food. More than a quarter (25.07%) of households received free meals or groceries from food banks and pantries. Food banks and pantries were forced to develop and implement emergency plans to accommodate social-distancing guidelines, lack of staff, and the sudden increase in demand.⁴ Many food banks and pantries furloughed volunteers and implemented sanitation measures to protect workers and ensure food safety. They prepacked emergency food boxes rather than allowing clients to select their food and asked their clients to remain outside rather than enter the building. With a reduced labor force and volunteers, food banks and pantries had to accommodate an increased demand than before the pandemic, including those newly food-insecure individuals unfamiliar with navigating assistance.⁴

As schools closed most of the time during the pandemic, school districts developed different strategies to support emergency feeding programs for their students and families without clear federal mandates to continue feeding students and guidelines for effectively executing feeding programs.¹² About a quarter (24.37%) of the respondents received free meals or groceries from school and other programs aimed at children, who served meals and snacks to students outside the cafeteria and used strategies such as grab-n-go's, drive-thru's, and food deliveries to meet the needs of children.⁴ School districts should work closely with all the parties, including the local government, industries, parents, and volunteer groups, to continue such support to help students and families in need.

Table 4 also shows that about 20% of the respondents received free meals or groceries from family, friends, and neighbors; followed by religious organizations such as churches (14.43%), shelters or soup kitchens (2.89%), and home-delivered meal services (3.36%). Home-delivered meal services such as Meals on Wheels are essential to people bound at home, including the elderly living in their own homes or care facilities. My research finds that only 3.36% of free meals and groceries came from home-delivery meal services. One solution to mobilize home-delivery meal services is to provide free or reduced-price meals or groceries. An alternative solution is to create more innovative supporting environments. For example, we can create

community fridges or food baskets, where people could put in groceries they do not need, and others could come to grab what they need.

■ Conclusions and Policy Implications

US households experienced significant challenges in staying food secure during the pandemic due to lockdowns and isolations, disruptions to the food supply chain, and increased food prices in the United States and worldwide. The Household Pulse Survey conducted by the U.S. Census Bureau, a 20-minute online survey, has collected information on how the pandemic affected US households economically and socially. I used the 39 weeks of data from the Household Pulse surveys from April 23, 2020, to September 29, 2021, to examine the food insecurity of US households during the pandemic. I draw the following important conclusions based on graphical and statistical analyses of this nationally representative dataset.

First, the pandemic significantly increased the prevalence of food insecurity among US households: 21.86% and 6.01% of households were either low food secure or very low food secure, double the pre-pandemic level in 2019. The primary underlying reason was the lack of affordability resulting from income loss and inflated food prices.

Second, the inequality of food insecurity was pronounced and increased. People of color, low-income households, households with income loss, and households with children were impacted most by food insecurity. Given that these household types had a disproportionately higher prevalence of food insecurity before the pandemic, the impact of the pandemic elevated the inequality of food insecurity even more.

Third, about 18.66% of households received free meals, and 29.66% received SNAP benefits. Among all the channels, the food pantry or food bank provided most free groceries and meals, followed by school programs aiming to help children stay food secure. Almost all the organizations providing emergency food to needed families and communities were affected by the pandemic as they faced challenges in having sufficient staff and volunteers, food supplies, and the logistics of providing free meals and/or food. The efficacy of these organizations in improving the food security of households and communities is challenging.

The study provides the following policy implications. First, this study helps identify households that need help most to stay food secure – minority households, households that lost their income, households with children, and low-income households. The government, non-profit organizations, and community programs may want to target these types of households to reduce food insecurity and its inequality. Second, SNAP benefits were one of the critical resources for low-income households to fight against hunger and improve food security. The pandemic also calls for changes in the SNAP on the amount, duration, and allowed shopping methods of SNAP benefits.

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