

Stakeholder perceptions of healthy food access and SNAP online grocery ordering during and after COVID-19

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Abstract

The COVID-19 pandemic prompted local and national changes to food programs, including expansion of the Online Purchasing Pilot to increase access to online grocery ordering with

Supplemental Nutrition Assistance Program (SNAP) benefits. Yet, health equity remains challenged by limited food access and barriers to online ordering. As part of a needs assessment to inform the development of future individual and policy,

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systems, and environmental (PSE) change interventions, we aimed to (1) explore community stakeholders' perceptions of food access and online grocery ordering with SNAP benefits during and after the end of the COVID-19 public health emergency and (2) synthesize equity-oriented recommendations to improve healthy food access. We conducted qualitative interviews with stakeholders from 15 organizations in a low-income, low food access Connecticut community during ($n = 12$) and after ($n = 9$) the public health emergency. Interview transcripts were thematically analyzed according to a health equity framework. Excerpts were compared across time points and developed into themes relating to food access and online ordering. Themes informed proposed solutions to improve equity in food and online ordering access. Though stakeholders described a community with many food resources, inadequate bus routes and cultural barriers limit food access. Stakeholders reported increasing food insecurity during and following the public health emergency. Inflation and the end to SNAP emergency allotments further increased need. Fees, internet and technology access, and digital literacy were perceived as barriers to online ordering adoption. Equity-oriented recommendations to improve healthy food access included (1) increasing availability of healthy options from various cultural dietary patterns, (2) recruiting Spanish- and K'iche'-speaking staff at food retailers and within the charitable food system, (3) strengthening local bus routes, and (4) forming commu-

nity collaborations to provide digital, food, and nutrition literacy resources. Thus, while expansion of the Online Purchasing Pilot may address transportation barriers to food access, additional solutions are needed to improve overall food access. Community programs that support SNAP online ordering may be combined with policy, systems, and environmental changes to improve health equity.

Keywords

food access, qualitative interviews, COVID-19, pandemic, online grocery shopping, health equity, food security, Supplemental Nutrition Assistance Program (SNAP); policy, systems, and environmental (PSE) change

Introduction

Inequities in diet-related chronic diseases persist across geographic, racial, ethnic, and income groups in the United States (Cheng et al., 2019; Mohebi et al., 2022; Slack et al., 2014; Stierman et al., 2021). Food access—made up of the affordability of foods, distance to food sources, relative density of healthy and unhealthy food outlets, and availability of culturally relevant foods—may contribute to unhealthy behavior and disease risk (Ogot, 2021). For example, greater obesity risk has been associated with food environments characterized by low access to grocery stores, high access to fast food outlets or convenience stores, and low relative access of healthy versus unhealthy food outlets (Cobb et al., 2015; Cooksey-Stowers et al., 2017; Larson et al., 2009). Communities with higher poverty rates and with larger populations of non-White residents tend to have less healthy food environments with lower access to grocery stores and greater access to convenience stores and fast-food outlets (Larson et al., 2009; Moore & Diez Roux, 2006), perhaps related to a history of structural racism (e.g., redlining) in the U.S. (Singleton et al., 2023). Furthermore, individuals living in low-income communities may experience unique barriers to accessing healthy foods, including poor availability and affordability of healthful food outlets (Pitt et al., 2017) and transportation barriers (Dumas et al., 2021; Madlala et al., 2023; Park & Yi, 2023). Thus, co-occurring efforts are needed to

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improve healthy food access and diet quality among those living in low-income and low food access communities with residents diverse in race and ethnicity.

The COVID-19 pandemic greatly influenced food and nutrition security—defined as consistent and equitable access to healthy, safe, affordable foods essential to optimal health and well-being (U.S. Department of Agriculture, 2022). According to data from the nationally representative Understanding America Study, monthly food insecurity prevalence peaked at 20% in April 2020, declined until mid-2020, and then remained relatively stable at about 9% until March 2021 (Kim-Mozeleski et al., 2023). Such data suggest high food insecurity following the pandemic onset, followed by a decline in food security as the pandemic continued. Despite month-to-month variability in food security prevalence, including the sharp upturn in food insecurity following the onset of the pandemic, the U.S. Department of Agriculture (USDA) estimated that average annual food insecurity rates remained stable from 2019 to 2021 (Coleman-Jensen et al., 2021, 2022), yet increased in 2022 (Rabbitt et al., 2023). However, across this time period, disparities in food insecurity persisted across racial, ethnic, and income groups (Coleman-Jensen et al., 2021, 2022; Daniels & Morton, 2023; Rabbitt et al., 2023). Healthy food access among low-income communities was further hindered during the COVID-19 pandemic by store closures, school closures and the resultant disruptions to lunch and breakfast programs, supply chain disruptions, food price inflation, and public transportation disruptions (Kar et al., 2022; Peterson et al., 2023; U.S. Department of Agriculture Economic Research Service, 2023a, 2023b), with differences across geographic areas (Peterson et al., 2023). Concurrent to these disruptions, the nutritional quality of the diets of many adults decreased during the COVID-19 pandemic, characterized by greater snacking and use of ultra processed foods as well as less consumption of fruits and vegetables (González-Monroy et al., 2021). These findings are underscored by qualitative interviews with community members during the COVID-19 pandemic, in which participants reported increased food insecurity and stress-related eating (Scott et al., 2024).

Local and federal food assistance programs aimed to buffer against pandemic-related increases in food and nutrition insecurity. At the local level, community nutrition organizations adapted their services in response to increased demand (Castro et al., 2021; Gilleran et al., 2023; Harper et al., 2022). Federal programs allowed states flexibility to provide emergency allotments to recipients of the Supplemental Nutrition Assistant Program (SNAP), increasing the benefit amount by \$95 or, if greater, to the maximum benefit amount for the household size. More than 60% of U.S. states (32/50) opted into this flexibility. (U.S. Department of Agriculture Food and Nutrition Service, 2023a). Yet, states lost the ability to provide this benefit after the February 2023 issuance of the Consolidated Appropriations Act and end of the federal Public Health Emergency. In analyses of the nationally representative Household Pulse Survey, discontinuation of the emergency SNAP allotments was associated with significant increases in food insufficiency (“sometimes” or “often” not having enough to eat) among SNAP participants (Richterman et al., 2023; Sanjeevi & Monsivais, 2023), an effect which persisted for 15 months after the discontinuation (Richterman et al., 2023). Alongside these benefit reductions, food prices have continued to increase, with overall food prices increasing by 5.8% in 2023 (U.S. Department of Agriculture Economic Research Service, 2023b). The experience of local community food providers during changes in federal policy, food prices, and food assistance needs remains unexplored.

Additionally, during the COVID-19 pandemic, the USDA expanded the Online Purchasing Pilot by enabling states to allow online grocery ordering with SNAP benefits at SNAP-authorized retailers (USDA Food and Nutrition Service, 2023b). Presently, 50 states and the District of Columbia are participating in the SNAP Online Purchasing Pilot (U.S. Department of Agriculture Food and Nutrition Service, 2023b). Retailers may then opt into accepting SNAP payments online. For example, the state of Connecticut currently includes 22 online retailers accepting SNAP payments online. This led to a reduction in food insufficiency among SNAP eligible residents during early months of the COVID-19 pandemic (Jones et al., 2023), and may

improve food access in low-income and low food access environments via eliminating barriers to grocery shopping. Given that grocery shopping frequency is associated with higher diet quality (Banks et al., 2020; Liese et al., 2014; Pechey & Monsivais, 2015), strategies to increase access to groceries also have the potential to promote healthy diets. In one study, cross-sectional survey participants from a low-income/low food access community who reported purchasing groceries online had significantly higher diet quality in regression models, controlling for demographics, food security, and perceived health (Avelino et al., 2023).

Yet, online grocery ordering has been criticized for its potential to increase health inequities by widening the “digital divide” (Vedovato et al., 2022). Previous quantitative and qualitative studies have highlighted barriers to online grocery ordering, including fees for pick-up (approximately \$2-3) or delivery orders (approximately \$5-15) that cannot be covered by SNAP benefits (Jilcott Pitts et al., 2020; Martinez et al., 2018; U.S. Department of Agriculture Food and Nutrition Service, 2023b), limited digital food and nutrition literacy (Consavage Stanley et al., 2022), and restricted delivery in rural areas (Brandt et al., 2019; McGuirt et al., 2022). Such barriers may lead low-income families to be less likely to order groceries online (Zatz et al., 2021), limiting the success of the Online Purchasing Pilot. As the SNAP Online Purchasing Pilot continues to expand to additional brick-and-mortar and online stores (U.S. Department of Agriculture Food and Nutrition Service, 2023b), greater exploration of barriers to online ordering with SNAP benefits, as well as strategies to reduce these barriers, are needed to inform online ordering interventions among SNAP recipients.

Programs which help SNAP recipients order healthy groceries online must be guided by established frameworks to prevent unintended increases in health inequities. Kumanyika’s Getting to Equity (GTE) framework (Kumanyika, 2019) is intended to assist decision-makers in developing individual and policy, systems, and environmental (PSE) change interventions, and is well-suited to improve diet quality and food access via online grocery ordering. Within the framework, efforts to increase

equity are structured across four quadrants. Proposed strategies aim to *increase availability of healthy options* by making health promoting, culturally acceptable foods available and accessible to all residents, and to ensure residents have the transportation necessary to reach these foods; *reduce deterrents* via solutions to identified barriers to healthy food access (e.g., discrimination); *improve social and economic resources* which assist at-risk individuals in accessing healthy foods (e.g., nutrition assistance programs); and *build on community capacity* by creating and strengthening strategic partnerships between organizations that promote health equity and healthy food access. This framework has previously been used to propose equity-promoting recommendations for online ordering following interviews with low-income parents (Ali et al., 2022), and may guide initial steps of developing individual and PSE change interventions to improve healthy food access via online ordering.

In conjunction with guidance from established frameworks, development of an individual and PSE change intervention should consider local context and needs. Assessing community capacity and needs among influential community stakeholders via qualitative research is often the first step of intervention planning (de Vries et al., 1992; Eldredge et al., 2016). Existing stakeholder interviews have identified that grocery store managers perceive both store and customer barriers to online ordering (Gillespie et al., 2022). Bodega owners have reported that the government should allow SNAP online orders at small retailers (Trude et al., 2023). Yet, no interviews assessing the food environment and barriers to online grocery ordering have been conducted among diverse community stakeholders (e.g., community food providers, government officials, etc.) to date. Furthermore, no stakeholder interviews have been conducted across two time points during the COVID-19 pandemic, despite related changes in food security, food access, and federal policy. Such work could inform development of community-specific individual and PSE change interventions.

Thus, we aimed to (1) explore multisectoral community stakeholders’ perceptions of food access and online grocery ordering during and after the end of the COVID-19 public health emergency

declaration, including comparisons across time points and (2) synthesize recommendations to improve healthy food and online grocery ordering access aligned with the explored stakeholder perceptions and a health equity framework. Findings from this work will inform individual and PSE change interventions to improve food access and healthful online ordering with SNAP benefits among low-income communities.

Methods

This study is part of broader efforts to develop community-based digital food and nutrition literacy and PSE interventions in Northeastern Connecticut. Qualitative interviews among 21 community stakeholders from 15 unique organizations contributed to the initial needs assessment via exploration of community assets and needs (de Vries et al., 1992; Eldredge et al., 2016). We conducted qualitative interviews during (May-September 2022, $n = 12$) and after (May-September 2023, $n = 9$) the federal public health emergency for COVID-19. The research team included researchers and students with training in qualitative methods and public health nutrition, as well as members from the University Supplemental Nutrition Assistance Program Education (SNAP-Ed) and Extension programs. Given the community-based nature of SNAP-Ed and Extension, the co-PIs of the parent project had pre-existing relationships with organizations from which study participants were recruited. Interviewers had no pre-existing relationships with participants, and interviewees were assured that their responses would not affect their relationship with the University, SNAP-Ed, or Extension programs. The Institutional Review Board at the University of Connecticut approved all study procedures (#L22-009, May 22, 2022).

Setting

Qualitative interviews were conducted with stakeholders with a direct role in the local food environment, food policy, and adult digital literacy in an urban Census Designated Place within a Northeastern Connecticut county. The local food environment includes a regional supermarket chain, a national discount supermarket chain, an independent family grocery store, and a community-owned

grocery store. Residents may also access food at the local farmers market (May-October), small markets or bodegas, and convenience stores. There is a diverse charitable food network distributing food items from the largest food bank in the state, as well as small, independent charitable food resources (e.g., local church pantries). The county also has a regional transit district that hosts several bus routes and a dial-a-ride program.

The county is home to racially and ethnically diverse residents, about a quarter of whom speak a language other than English at home (U.S. Census Bureau, n.d.). About three quarters of residents over age 25 report educational attainment as less than a Bachelor's degree (U.S. Census Bureau, 2023). Residents in this county have the lowest median income (U.S. Census Bureau, n.d.) and lowest level of access to healthy foods (The Reinvestment Fund, 2012) in CT. The median household income is approximately \$45,000 (in 2022 dollars) and over a quarter of residents (27%) live in poverty (U.S. Census Bureau, n.d.). The Census Designated Place is home to a large population (36%) of Hispanic/Latino residents (U.S. Census Bureau, n.d.).

Our previous work identified that low-income adults seeking emergency food resources in this county have high rates of food insecurity (Feeding America, n.d.) and chronic diseases (Marmash et al., 2021; Marmash et al., 2022). Adults in this county have the lowest level of access to healthy foods in the state (The Reinvestment Fund, 2012).

Recruitment

To participate in key informant interviews, individuals were required to be 18 years or older and professionally contribute to efforts to improve community food access or digital literacy in the county. An initial list of potential key informants was developed according to existing community partnerships between the University SNAP-Ed and Extension programs, as well as an internet search of organizations in the community. This list intentionally included stakeholders from a variety of professional sectors to reflect varying experiences and perceptions. We recruited stakeholders from government, transportation, farming, food retail, faith-based, and other sectors. A research team

member contacted potential informants at their publicly disclosed phone number or email address. During the initial contact, the research team member explained the purpose, format, and duration of the interview. Additional participants outside of our existing network were identified via snowball sampling, in which interviewees identified additional potential participants. Recruitment continued until data saturation, or the point in which no new topics arose during interviews, was reached.

Data Collection

The study team collaboratively developed a semi-structured interview guide which assessed participant perceptions of local food access, online ordering with SNAP benefits, and internet access and digital literacy. The full interview guide is available in the Appendix. All interviews took 60-90 minutes to complete and were conducted virtually via Cisco Webex video conferencing software (San Jose, California). Participants provided demographic information at the start of the interview. A study team member with training and experience in qualitative methods conducted the interviews. Participants provided verbal informed consent at the start of the interview and received a \$40 electronic gift card upon completing the interview.

Data Analysis

All interviews were audio recorded. Transcripts were automatically generated via Webex, reviewed and edited for accuracy, and uploaded into Dedoose (version 4.12). Data were analyzed using thematic analysis, a method which does not align with a pre-existing theoretical framework (Braun & Clarke, 2006), and may thus be adapted to theoretical frameworks that align with the study in question. Two study team members reviewed all transcripts and developed a codebook. Parent codes were deductively developed according to components of a health equity framework (Kumanyika, 2019), similar to a previous study of online ordering recommendations (Ali et al., 2022). Child codes were developed inductively and placed within the appropriate equity framework parent code. The same team members coded initial transcripts in an iterative process, meeting regularly with the study team to refine the codebook as needed and to qual-

itatively ensure inter-rater reliability. The study team found few discrepancies between coders in review of transcripts of interviews conducted in 2022 (12 transcripts) and thus proceeded with only one coder for transcripts of interviews conducted in 2023 (9 transcripts). Excerpts were organized into tables according to parent and child code and year of the interview, allowing for direct comparison of excerpts from 2022 and 2023 interviews. Coded excerpts were developed into themes, labeled according to the applicable health equity framework quadrant(s), and described. Any differences across years are presented in the description of each theme. Example quotes for each theme were selected. Participant demographics were summarized as averages and/or frequencies (%), calculated using Microsoft Excel (version 2401).

Next, we proposed individual and PSE change strategies to improve healthy food and online grocery ordering access. To develop strategies, we reviewed coded excerpts under each quadrant of the health equity framework. We noted specific recommendations made by community members as potential suggestions (e.g., waive online ordering fees). We proposed additional strategies to reduce stakeholder-identified barriers.

Results

We contacted 48 potential informants. Eight declined to participate due to lack of capacity or perceived lack of expertise in the content area, one stakeholder did not attend a scheduled interview, and 18 did not respond to our contact attempts. The 21 participating stakeholders represent 15 unique organizations, including a Special Supplemental Nutrition Program for Women, Infants and Children (WIC) clinic, grocery store, nutrition education program, homeless services organization, health center, human services department, and faith-based charitable organization, among others. Twelve stakeholders completed interviews in 2022 and nine stakeholders completed interviews in 2023. Participants held a variety of positions ranging from executive director to community farmer and had been in their current positions from 4 months to 39 years. Among the 20 participants who provided demographic information, 19 (95%) were female, 17 (85%) were non-Hispanic white,

and 3 (15%) were Hispanic/Latino. Participant age ranged from 24 to 65 years (average: 45 years).

Food Access Themes

We identified six themes pertaining to food access. Each theme is described below, with example quotes and health equity framework components presented in Table 1. Differences across time points in the COVID-19 pandemic are noted when applicable.

The county is home to a rich network of social service agencies

Participants described the community as having a wide variety of centrally located resources for families with low incomes, and an ability to

respond to residents' needs. One participant stated that the community "has every resource you're gonna need immediately." Food-related resources were described as plentiful, and included static food pantries, mobile food pantries, soup kitchens, Meals on Wheels, and nutrition education classes. Overall, participants reported that most food retailers, apart from some small corner stores, accepted SNAP and WIC benefits. Participants also described the availability of other social resources, such as energy assistance and household product donations. When speaking about the social services landscape, participants described strong cooperation between organizations.

Table 1. Food Access Themes and Associated Health Equity Framework Component(s) and Exemplar Quotes from Interviews with 21 Community Stakeholders in a Connecticut Community

Theme	Equity Framework Component(s)	Exemplar Quotes
The county is home to a rich network of social service agencies	Social and Economic Resources Community Capacity	"I've heard a lot of times throughout the community you can't starve in [city] you can't starve in the [county], and I think because there's so many agencies that help distribute food in different ways." —Soup Kitchen Director, 2023
Latino residents have limited access to culturally relevant foods	Availability of Healthy Options	"[Culturally appropriate items] are nonexistent unless you go to one of two bodegas that are more culturally appropriate. One is Dominican and the other is Mexican. They both bring more of the cultural aspects. If you want to have <i>nopales</i> , that's where you get it. You're not going to find <i>nopales</i> in Walmart or Stop and Shop." —Nutrition Educator, 2022
Language barriers and stigma prevent equitable food access	Deterrents	"A lot of folks here who do use these resources are Spanish speaking primarily and Guatemalan, which is another dialect. They speak K'iche' and other indigenous languages. Those folks are some of the folks who need these resources the most, but because there is no access language wise are the ones that don't get it." —Community Farmer, 2022
Limited public transportation is a significant barrier to healthy food access for many	Availability of Healthy Options	"[Transportation] is the biggest barrier that a lot of families have. We have single parents that have one to four kids, right? And how are you going to tell me you're going to get all of them on the bus? And then come on over to the food pantry and get the food?" —Case Manager, 2022
The COVID-19 pandemic increased residents' need for social services, prompting action by community organizations	Community Capacity	"So, it looks like absolute panic and bedlam and all of a sudden our number shot up to, like, 5 times normal, which was terrifying because we were also—we all thought we were going to die." —Soup Kitchen Director, 2023
SNAP alone does not meet the needs of county residents	Social and Economic Resources	"Just had quite a few people that come up to the truck and they say, man, I just lost my food stamps. Over and over again. Just saying, you know, I have nothing, you know, I'm so glad you came, that type of thing. On a daily basis." —Food Bank Program Specialist, 2023

Latino residents have limited access to culturally relevant foods

Participants reported mixed reviews of cultural food access. While some felt that large grocery stores offered food options for the Hispanic/Latino residents, others felt that the stores offered insufficient variety. One participant stated that there were “about half a dozen culturally specific grocery stores,” while another felt that access to culturally appropriate items was “nonexistent.” This concern was even greater for groups with races, ethnicities, and nationalities less represented in the community, including the growing population of K’iche’-speaking immigrants from Guatemala. Participants described that many residents purchase food at local corner stores or bodegas, which have a strong sense of community, but may not accept SNAP or WIC benefits and may have fewer health-promoting foods available. Participants acknowledged that, while there is opportunity for improvement, food assistance organizations are working to offer more foods aligned with diverse cultural dietary patterns. For example, one participant described surveying community members to “fill out a survey of their food preferences” to “help [community program] guide what [they are] growing.”

Language barriers and stigma prevent equitable food access

Participants described that, even when food is physically available, other deterrents prevent low-income and non-English speaking residents from accessing healthy food. Some key informants described that shame or stigma prevents residents from accessing food pantries, SNAP benefits, and other food resources. Spanish- and K’iche’-speaking residents faced additional barriers to food access. Certain locations, including a local co-op and farmers market, are viewed as “white spaces” in which non-English-speaking residents were less welcome. For example, one participant described that “folks don’t perceive [the co-op] as a place for everyone or for them.” Grocery stores and food assistance programs rarely have Spanish- or K’iche’-speaking staff, with some participants describing their own challenges to hire non-English speakers. K’iche’-speaking residents may have the

greatest difficulty accessing healthy foods at grocery stores, pantries, or other locations, where resources may only be available in English and Spanish.

Limited public transportation is a significant barrier to healthy food access for many

Several key informants described public transportation as the biggest barrier to healthy food access in the area. Participants described that many community members lack cars, and that the community is only walkable to able-bodied individuals with centrally located homes. Residents are thus left to rely on a limited bus system that does not stop at all grocery stores or residential areas. One participant reported, “getting from their house to the bus route that’s the issue,” as bus routes may not stop in residential areas. Additionally, participants described that, as buses do not run regularly, a single grocery trip could take several hours. Several participants also described difficulties in bringing groceries on the bus, particularly when traveling with young children. Several participants acknowledged that the transit department has made efforts to improve the bus system, but that it is “not enough to satisfy all of the need that’s there.”

The COVID-19 pandemic increased residents’ need for social services, prompting action by community organizations

Participants described changing needs for food and other social resources throughout the pandemic, as well as the community’s response to these needs. Most participants, regardless of the year in which they completed an interview, felt that community needs were still higher than pre-pandemic levels. Only one participant interviewed in 2022 discussed inflation, whereas five participants completing interviews in 2023 discussed how the rising costs of food, energy, and housing were impacting community members, stating that “everything has gone up.” Participants also described how their organization adapted and responded to the community’s increased needs, such as starting a new food pantry and delivering food to those in quarantine. One participant described that the community’s pandemic response was successful due to the pre-existing network of community organizations. Several

stakeholders described that funding opportunities fluctuated throughout the pandemic, with an influx of opportunities at the pandemic onset, and a decrease in opportunities toward the end of the federal public health emergency.

SNAP alone does not meet the needs of county residents

Participants expressed their perceptions of the federal SNAP program. Several participants felt that SNAP was difficult to sign up for and provided an insufficient amount of benefits. One participant expressed concerns that SNAP did not cover hot or prepared foods, stating that “it’s so frustrating that you can go into companies with a SNAP card and you can buy a nice cold soda... but you can’t get a hot coffee or a slice of pizza.” Another suggested that policymakers “up the [monthly benefit] amount to a realistic amount” for households.

Additionally, perceptions of the end of COVID-19 emergency allotments were discussed among participants interviewed in 2023. Several participants interviewed in 2023 described that the need for emergency food resources rapidly increased when SNAP dollar amounts decreased. For example, one stated that, in their statewide mobile food pantry program, “an extra 6,000 people showed up in our numbers in March [following the end of emergency allotments] and stayed relatively high from there... and 6,000 people is a lot of people when you’re only serving 20,000.” These participants expressed that SNAP benefits need to be increased to meet the needs of community members in the post-COVID-19 world.

Online Ordering and Digital Literacy

We identified five themes pertaining to online grocery ordering, described below. Table 2 provides

Table 2. Online Ordering and Digital Literacy Themes and Associated Health Equity Framework Component(S) and Exemplar Quotes from Interviews with 21 Stakeholders in a Connecticut Community

Theme	Equity Framework Component(s)	Exemplar Quotes
Online ordering can alleviate some—but not all—barriers to healthy food access	Deterrents	“Having had a caseload at the beginning of the pandemic of folks who had no transportation and no support system, and I was literally going and picking up their EBT cards and then grocery shopping for them, I think that that is an amazing first step.” —Assistant Director of Government Agency, 2023
Fees may prevent SNAP recipients from ordering groceries online	Deterrents Social and Economic Resources	“I think that the delivery fee or the pickup fee is just going to be the biggest kind of challenge I’d say in terms of getting people to actually participate.” —Farmers Market Staff, 2023
Limited digital literacy skills may limit some residents, particularly older residents, from ordering groceries online	Deterrents	“So, I think for our young families who have grown up with the digital system, it’s a piece of cake for them. It’s just very natural and easy. I think the part of the SNAP population that struggles are the seniors. They don’t know.” —WIC Nutritionist, 2022
The majority of residents have smartphones, but use of online ordering may be limited by lack of broadband internet access, bank accounts, or email addresses	Deterrents	“Most times that I try to kind of ease seniors into ‘yes, we can do this here or we can do this online together,’ the number one thing that comes up is they don’t have an email address, or they don’t use email regularly. They don’t know the password to that email because a family friend or child set it up for them, so they can’t access it to get the codes in front of me so I can assist them.” —Assistant Director of Government Agency, 2023
Internet access and technology resources are available in the community, but are not sufficient to meet residents’ needs	Community Capacity	“When the school went online, it obligated most people to have that Internet access because the schools were worried about low-income families. ... I know the Internet is [at reduced price] or free for families that have kids in school.” —Nutrition Educator, 2022

example quotes and the Health Equity Framework component(s) for each theme. There were no thematic differences noted in interviews conducted in 2022 versus 2023 according to side-by-side comparisons of coded excerpts from 2022 and 2023 interviews.

Online ordering can alleviate some—but not all—barriers to healthy food access

Interview participants had mixed perceptions of online ordering with SNAP benefits. Several participants expressed concerns that SNAP recipients would not want to or be able to order groceries online. One participant felt that there are more important issues to address in the food system over improving online ordering. However, many of the same participants acknowledged the potential benefits of online ordering with SNAP benefits, stating that online grocery ordering is a “good option” with “potential.” Most commonly, key informants discussed that online ordering could assist those with transportation or other mobility challenges. For example, one stated “I think if I was disabled and in my apartment and couldn't easily get to the store, I would probably welcome somebody delivering groceries to me.” Another stated that “anything that reduces barriers is a good idea.” Some informants also cited that online ordering could save people time.

Fees may prevent SNAP recipients from ordering groceries online

Key informants overwhelmingly felt that fees, including small fees incurred for pickup orders, could prevent SNAP participants from ordering groceries online. They felt that residents are “on SNAP for a reason,” and may not have the flexible income to spend on such fees. One participant suggested that fees were unacceptable as “families that are using SNAP benefits are pretty frugal and are trying to make really conscious decisions when they go to the grocery store.” The online ordering fees were perceived as a luxury item that SNAP participants would not want to include in their budgets. Several participants expressed that fees should be waived for SNAP participants, either by the state or the stores themselves.

Limited digital literacy skills may limit some residents, particularly older residents, from ordering groceries online

Most key informants expressed concern about the community's digital literacy. Many informants described that certain populations, especially seniors, may have a harder time using the technology necessary to complete online ordering. For example, when discussing online ordering using a smartphone, one participant stated that “as you get older, your capacity to navigate a screen diminishes. Your eyesight diminishes, your dexterity diminishes. Everything is just harder.” Some cited examples of community members being unable to access personal accounts (e.g., social security, email accounts). Most felt that the younger generations have greater digital literacy and could assist their older relatives with online grocery ordering. However, a few informants felt that most people with a smartphone would have enough digital skills to complete an online order.

The majority of residents have smartphones, but use of online ordering may be limited by lack of broadband internet access, bank accounts, or email addresses

Participants described low internet and technology access among residents. Most participants felt that residents do not own a computer or tablet and would thus need to complete online orders from their smartphone. Some participants felt that most community members possessed a smartphone, though some lacked a cellular data plan, leaving the phone to operate only when connected to Wi-Fi. Participants also expressed that many residents do not have internet access in their homes. Lastly, key informants described that community members, especially seniors or immigrants, may not have or know how to access email addresses or bank accounts needed to set up an account for online ordering. Several informants described instances of trying to help community members use online platforms, where community members would refuse with statements such as “I don't want an account” or “I don't want an email.”

Internet access and technology resources are available in the community, but are not sufficient to meet residents' needs

Several participants described community internet and digital literacy resources. One key informant stated that “the community is doing its best to get people up to speed with the new era,” referencing internet and digital literacy resources. Several felt that free Wi-Fi was limited in the community, with exceptions in the library. Various assistance programs, including the connectivity program, hotspot rentals from the library, and assistance from schools, have helped increase community internet access. Additionally, participants described two organizations providing adult digital literacy classes. However, as one key informant stated, the classes are “geared toward people who have been under or unemployed for a period of time,” and thus focus on digital literacy for employment, rather than

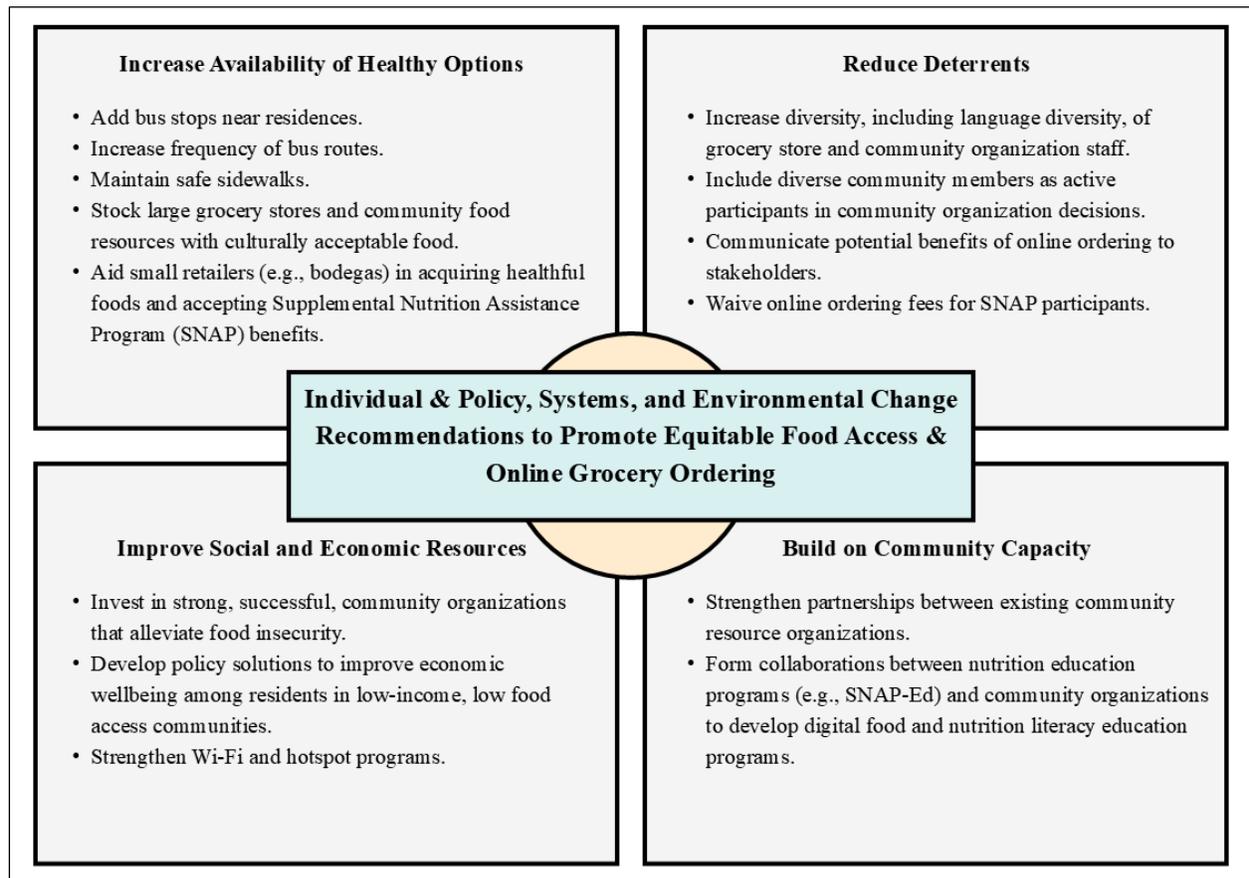
broader applications of digital literacy. Stakeholders reported that other residents may learn digital literacy skills through individual case managers.

Individual and Policy, Systems, and Environmental Change Recommendations to Promote Equitable Food Access and Online Grocery Ordering

Suggestions to improve healthy food access and online grocery ordering among SNAP recipients living in low food access environments are presented in Figure 1 and summarized below.

To increase availability of healthy options, small retailers may require financial and logistical assistance in stocking healthy foods and accepting SNAP benefits. Funders may prioritize programs that promote SNAP authorization and healthy food provision for small retailers. Large grocery stores and community food programs (e.g., pan-

Figure 1. Health Equity-Aligned Recommendations for Low Food Access Communities to Increase Healthy Food and Online Grocery Ordering Access



tries) may prioritize the provision of food that reflects the demographic makeup of their community. The community may improve food access by strengthening the public transportation system and safe sidewalk programs.

To *reduce deterrents* to healthy food access, community programs and retailers may recruit a diverse staff that matches the resident demographics, thus including community members as active decision-makers. State and federal programs may communicate the potential benefits of online ordering to stakeholders, who may then prioritize digital food and nutrition literacy education and resources to increase healthy and equitable online grocery ordering. Additionally, online ordering fees could be waived for SNAP participants, either as part of State or federal policy, or within individual grocery stores.

To *improve social and economic resources*, funders must invest in strong, successful, collaborative community organizations. In addition, policy solutions to improve economic wellbeing and food security are needed. Lastly, additional funding may be needed to develop and grow existing public Wi-Fi and hotspot programs.

To *build on community capacity*, multisectoral community organizations may collaborate to provide food resources and digital food and nutrition literacy education. Such collaboration may include the strengthening of existing community internet and digital literacy resources. Nutrition education programs, including SNAP-Ed and Extension, may partner with trusted community organizations to develop digital food and nutrition literacy education programs.

Discussion

We identified community stakeholder perceptions of local food access and online grocery ordering with SNAP benefits during and after the COVID-19 pandemic in a low-income and low food access community. Stakeholders described a community with a rich, collaborative network of social service agencies seeking to improve local food access. However, resident food access is challenged by public transportation and cultural barriers. Stakeholders completing interviews in 2023 discussed the negative effects of inflation and the termination

of SNAP emergency allotments. Stakeholders also described mixed opinions about online ordering with SNAP benefits, noting online ordering fees, technology access, and digital literacy as barriers to adoption. Healthy food access and online ordering barriers may be addressed by equity-aligned individual and PSE change interventions. Online grocery ordering with SNAP benefits has been cited as a facilitator to equitable healthy food access among low-income families, as it may circumvent transportation barriers (Trude et al., 2022; Vedovato et al., 2022). Lack of convenient transit options may impair healthy food access (Vedovato et al., 2022) and is associated with food security status (Baek, 2016). Public transportation use was complicated by the COVID-19 pandemic, which resulted in altered bus schedules and community member fear of acquiring an infection on public transportation (Helfers et al., 2022; Vedovato et al., 2022). These findings were echoed by stakeholders in our analysis who identified public transportation as the largest barrier to healthy food access among residents. Though not reported by interviewed stakeholders, our Extension and SNAP-Ed teams have been told by community members that several mobile food pantry sites were closed during the COVID-19 pandemic. Such environmental changes make transportation access even more critical. In conjunction with efforts to improve public transportation access, nutrition education programs may encourage online ordering as a means to access food.

Yet, SNAP-eligible residents and our community stakeholders have reported in qualitative interviews that, while online ordering is a convenient option that circumvents transportation barriers, it may be inaccessible due to packing and delivery costs not covered by SNAP benefits (Jilcott Pitts et al., 2020; Martinez et al., 2018; U.S. Department of Agriculture Food and Nutrition Service, 2023b; Vedovato et al., 2022). While fees for pick-up orders (e.g., \$2-\$3) tend to be less than delivery orders (e.g., \$5-15), and net cost of online ordering is smaller when factoring in saved time and bus fares, all online orders may remain inaccessible for SNAP recipients. It is possible that waiving such costs would increase accessibility of online ordering, though it is unclear who should bear the burden of the cost. One stakeholder suggested that the

SNAP program waive such costs, though such a change would require substantial policy changes at the federal or state level. Additionally, online grocery ordering alone fails to improve access to healthy, culturally appropriate foods. Our findings corroborate previous reports that immigrants and non-English speaking residents in the U.S. face a variety of barriers to healthy food access, including lack of affordable culturally appropriate options and language barriers (Berggreen-Clausen et al., 2022). Large grocery stores' online ordering platforms may also have limited availability of food aligned with cultural dietary patterns and may not be translated into multiple languages.

Furthermore, our stakeholders noted that poverty, cost of food, and the perceived inadequate value of SNAP benefits may collectively make healthy food inaccessible to community members, particularly during periods of continued food price inflation (U. S. Department of Agriculture Economic Research Service, 2023b). These previously established systemic issues highlighted by our stakeholders are unique and have not been identified as a central theme among qualitative interviews with low-income shoppers who use food assistance benefits to shop for groceries online (Jilcott Pitts et al., 2020; Martinez et al., 2018; Ventura et al., 2022). Such findings highlight the need for widespread policy changes to improve financial wellbeing across vulnerable communities. Within the Census Designated Place explored in this qualitative analysis, social service agencies, including the charitable food system, were key to alleviating financial insecurity during the COVID-19 pandemic. Yet, funding for these systems varied throughout the COVID-19 pandemic, with stakeholders reporting an increase in funding at the pandemic onset, and a reduction in funding opportunities following the end to the federal public health emergency. This reduced ability to provide services occurred alongside an increase in need due to the discontinuation of SNAP emergency allotments. The negative effects of the discontinuation of emergency allotments, described both by our stakeholders and previous reports (Lavallee et al., 2023; Richterman et al., 2023; Sanjeevi & Monsivais, 2023), highlight that continued financial support is needed to increase food access and decrease food

insecurity among low-income families. Recent changes to SNAP are intended to help families with low incomes meet their food needs. SNAP benefits were permanently increased by about \$16 per person following the 2021 Thrifty Food Plan re-evaluation (U.S. Department of Agriculture Food and Nutrition Service, 2023). Additionally, following the 2023 Consolidated Appropriations Act, families now permanently have access to Summer EBT, or \$40 per eligible child per month when school is not in session (U.S. Department of Agriculture Food and Nutrition Service, n.d.). Thus, the felt loss may be greatest among households without children, and households with children while school is in session. Despite these positive changes, the state of SNAP benefits is at risk during each Farm Bill reauthorization. As such, continued advocacy for equitable food policy is needed.

While online ordering with SNAP benefits may alleviate transportation barriers to food access, it could contribute to the growing "digital divide" between those with and without digital literacy skills (Trude et al., 2022; Vedovato et al., 2022). Novel opportunities to assist shoppers in healthy grocery shopping are needed, such as the recently tested Retail Online Shopping Assistant (ROSA) (McGuirt et al., 2024). Educational programs may also be developed in accordance with established digital food and nutrition literacy models (Consavage Stanley et al., 2022). Such programs may be targeted toward those with lower digital literacy skills, including seniors. Other populations who may benefit from online ordering, such as families with young children, may require less digital literacy education. Access to smartphones is a less significant barrier to online ordering. According to Pew Research Center (2024b), 90% of Americans own a smartphone. However, those age 65+ (76%) and with income less than \$30,000 (79%) are less likely to own a smartphone than the overall population (Pew Research Center, 2024b). In addition, as noted by stakeholders, some individuals' smartphones may not be connected to cellular data. These individuals would therefore require Wi-Fi access to complete an online order. While 95% of Americans use the internet, and 80% subscribe to a broadband internet service at home,

only 57% of those with incomes less than \$30,000 have broadband internet access (Pew Research Center, 2024a).

Given the remaining challenges to food access and equitable online ordering, multisectoral health equity-aligned individual and PSE change solutions are needed. Potential policy changes from the local to federal level may aim to (1) include frequent transit routes from low-income residential areas to large grocery stores, (2) incentivize large grocery stores to stock culturally appropriate food at affordable prices, (3) assist small, local, and culturally appropriate grocers in accepting SNAP benefits and online orders, and (4) improve economic security among individuals and families with low incomes. In conjunction with PSE change solutions, community education programs may further improve food access. Trusted local organizations may partner with nutrition education providers, including SNAP-Ed and Extension, to develop programs that provide nutrition and digital literacy education with the aim of improving health outcomes. For example, our team is actively developing a program in partnership with community organizations that provides personalized nutrition and digital food and nutrition literacy education. When combined with PSE change work, this multi-component intervention will address each quadrant of the health equity framework to improve food access and equitable online ordering. This and other programs may be further personalized for those who face unique barriers to food access and online ordering, including households with young children (Ali et al., 2022; Bennett et al., 2023; Chapman et al., 2024; Varela et al., 2023; Varela et al., 2022).

Limitations and Strengths

We acknowledge several limitations with our work. First, our sample includes primarily non-Hispanic white (85%) female (95%) stakeholders, which may limit the depth and generalizability of our findings, particularly regarding cultural food access. However, stakeholders noted that the social service workforce consists of primarily non-Hispanic white females, and thus our participant demographics represent a broader concern in the diversity of community staff rather than sampling error. Addi-

tionally, stakeholders who decided to participate in an interview may differ from those who opted not to participate. Thus, our findings may not represent the views of all community stakeholders in the County. Next, this manuscript presents the perceptions of community stakeholders alone and thus may not represent the views of SNAP recipients living in the community. It is possible that stakeholders misperceive residents' food access, or over- or underestimate barriers to online ordering. To address this limitation, our team selected stakeholders who work closely with SNAP recipients. Our team has also conducted interviews among SNAP recipients, and analyses are underway. Lastly, we acknowledge that low income and low food access communities are unique. While our recommendations are based on the perceptions of community stakeholders in a given county, not all recommendations will apply to other communities, such as rural communities. Qualitative interviews with key informants are warranted in rural regions with decreased access to online grocery ordering.

Several strengths should also be noted. First, we successfully recruited participants from 15 unique community organizations representing multiple sectors, including emergency food resources, homelessness services, transportation, and social services. Such diversity in our participant pool increases the generalizability of our findings. Additionally, our study is unique in that it explored stakeholder perceptions at two time points during the rapidly changing COVID-19 pandemic. Thus, our findings are more likely to reflect perceptions sustained by community stakeholders, rather than perceptions reflecting a single time period. Lastly, our analysis was grounded in a health equity framework and concluded with actionable recommendations for low food access communities. This work thus has the potential to inform real-world programs in Connecticut and beyond.

Conclusion

Multisectoral stakeholders from a Connecticut community described a community with strong capacity to improve local food access. Yet, resident food access remains challenged by public transportation, cultural barriers, inflation, and lower SNAP benefits. Online grocery ordering may address

transportation barriers to food access, but programs are needed to assist SNAP recipients in ordering healthy groceries online. When combined with PSE change interventions, nutrition education programs may help SNAP recipients develop the

food and nutrition literacy skills needed to complete an online order. Collectively, such efforts may serve to improve food access, diet quality, and resultant health outcomes among low-income communities.

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Appendix. Interview Guide

I. Perceived Food Environment

1. First, can you tell me about food availability and access for residents in [Census Designated Place]?
2. Now, can you tell me about access to *culturally acceptable* foods and beverages in [Census Designated Place]?
3. Can you tell me about transportation access in [Census Designated Place], including public transportation?
4. To your knowledge, what resources or programs exist in [Census Designated Place] to improve community food security to ensure a nutritionally adequate diet?
 - a. **For interviews after the end of the Public Health Emergency:** How has need for and use of these resources changed since the end of SNAP emergency allotments in February 2023, if at all? What else has changed as COVID-19-related policies were rolled back?
5. If you could change anything to improve food access in [Census Designated Place], what would you do?

II. Introduction to SNAP Online Ordering

After the onset of the COVID-19 pandemic, national and state government agencies changed the SNAP benefits program to allow eligible participants to buy groceries online using their SNAP benefits/Electronic Benefits Transfer (EBT) card. People can use their benefits to buy food items, but not non-food items and the benefits do not cover delivery and other online ordering fees. Residents can use their EBT card to buy groceries directly from Amazon, Walmart, Shoprite, and Stop and Shop. Residents can buy groceries from Price Chopper and ALDI through a third party, Instacart. We want to develop a program to help [Census Designated Place] residents order healthy foods and beverages online. Your input will help make sure this program works in the community.

6. Prior to this conversation, did you know that eligible participants can use their SNAP EBT card to order groceries online?
7. What do you think about the option to order groceries online with SNAP benefits?
8. Tell me about how awareness of online ordering with SNAP benefits in the community.
 - a. What needs to change to increase awareness of online ordering with SNAP benefits?
9. Have any of your clients/customers talked to you about ordering groceries online with an EBT card? **If yes:** What did they tell you about it?

III. Barriers to Online Ordering

Now, we will talk about different factors that might impact whether people in [Census Designated Place] would order groceries online with their SNAP benefits.

How do you think your community would *feel* about ordering groceries online? I want to know whether people would be *comfortable* ordering groceries online, and if not, why.

10. What other factors might make it hard for people from [Census Designated Place] to order groceries online?
11. When you order groceries online, you are often charged an extra fee. You cannot use SNAP benefits to pay for this fee. Fees are approximately \$2-10, but vary depending on the store, whether the resident is picking up the groceries or having them delivered, and the resident's distance from the store. How do you think residents would feel about this?

IV. Internet Access and Digital Literacy

Now, I will ask you about internet access and digital literacy.

12. Tell me about internet access in [Census Designated Place]. What is it like for residents trying to access and use the internet?
13. Ordering groceries online requires many digital skills. For example, users must be able to access the internet, navigate to a website, create an account (often with a phone number and email address), and input the correct payment information. How would you describe your community members' ability to use these digital skills?
14. What resources already exist to improve internet access and digital literacy in [Census Designated Place], if any?

V. Closing Remarks

Thank you for speaking with me (*or us*) to share your views about these issues.

15. Is there anything that you believe is important that we have not yet discussed about food access or online ordering for residents in [Census Designated Place]?
16. Can you recommend any colleagues who are working in [Census Designated Place] who would be interested in speaking with us about this project?