

# The Intersection of Food Availability, Access, & Affordability with Food Security and Health

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## Key Findings

- The terms “availability,” “affordability,” and “accessibility” are inconsistently defined and applied in food insecurity research. The resulting scholarship is complex, and above else, provides evidence that none of these elements are sufficient proxies for food insecurity.

### Availability

- Existing research finds food availability does not correlate strongly with food security: just because nutritious food is available nearby does not mean that people will purchase and consume it. Rather, food acquisition decisions are complex.
- There is limited evidence to support a causal relationship between living in a food desert and food insecurity or unhealthy eating.
- Consumers do not necessarily shop at the closest available store, even if they lack resources or transportation.
- Nearly nine-in-ten households do their primary food shopping at a grocery store, regardless of food security status, SNAP or WIC participation, or the presence of a grocery store in the same zip code as their home.

### Affordability

- High food prices and non-food demands on household resources shape whether food is “affordable” for consumers.
- Higher food prices are linked with increased risk of food insecurity, especially for low-income households. One study found that a \$10 increase in the price of a standard “basket” of key foods would increase food insecurity by about 2.5 percentage points among low-income households.
- There is clear and consistent evidence linking simple measures of total household income to food security. While food costs, food-specific budgets, and non-food household expenses aren’t irrelevant to food affordability, more generalized approaches that measure and bolster overall household resources may also be conducive to food security.

### Accessibility

- Private transportation is a meaningful indicator of food access, with a 2016 review concluding “of all the factors that seemingly limit access to food, the most important is no money but second in importance is no car.”
- Public transportation could support food access, especially for those with no transportation, although routes would need to be convenient and reach into neighborhoods with supermarkets.

### Health Implications of Food Insecurity

- Food insecurity is linked to lower dietary quality for adults, but not as clearly linked for children.

- Food insecurity is consistently linked to a wide variety of worse health outcomes, including hypertension, diabetes, depression and other mental health challenges, poorer sleep outcomes and poorer general health.

### Nutrition Assistance Programs & Food Insecurity

- The Supplemental Nutrition Assistance Program (SNAP) is clearly linked to reduced food insecurity and better health. Participation and higher benefits are also associated with reduced health care expenditures and reduced hospital utilization.
- SNAP-linked incentive programs, like Double Up Food Bucks, have been moderately successful, but require further study regarding scalability to additional places and populations.
- Non-SNAP federal nutrition programs reveal some positive outcomes, although not uniformly across populations or programs. The greatest successes have been among targeted, population-specific programs like school meals to children and Commodity Supplement Food Program (CSFP) deliveries to seniors. However, these programs face underutilization due to administrative barriers and stigma, and a limited reach, due to program funding and eligibility criteria.
- Given household preference for shopping at supermarkets, food assistance programs that allow participants to do so are likely to be most amenable to participants. This kind of support can improve uptake and protect participants’ dignity and ability to make individualized food choices.

### Summary Table of Key Relationships and Evidence

	Relationship with		Amount of Evidence	Clarity of Evidence
	Food Security	Health		
Availability	~	~	●●●	●●●
Accessibility	↑	↑	●●●	●●●
Affordability	↑	↑	●●●	●●●
Quality	↑	↑	●●●	●●●
SNAP	↑	↑	●●●	●●●

Legend:    ↑ Supports    ●●● Strong  
              ↓ Hinders    ●●● Moderate  
              ~ Mixed      ●●● Weak

Notes: This table summarizes the findings from the full Carsey School literature review. However, given varying definitions, methodological approaches, and study rigor, it is important to acknowledge that there is a subjective component to summarizing findings in such a compact format. Note that unlike the other elements of food security, dietary quality is most often understood as an outcome of food security, not a driver of it.

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## Introduction

Food insecurity is a complex and enduring challenge facing families in the United States and in New Hampshire, which has only become more pervasive following the COVID-19 pandemic. Historically, efforts to ameliorate food insecurity have focused on expanding food availability by siting new retailers in underserved communities or making food more affordable by subsidizing purchases for low-income people. Yet despite these efforts, food insecurity has remained stubbornly static. New Hampshire has the lowest food insecurity rate in the nation, but even here, rates have remained between 7 and 10 percent across the last decade.<sup>1</sup> Amid the 2020 pandemic, which has triggered greater food insufficiency and constricted family, public, and philanthropic resources, it is increasingly urgent to direct those resources in effective, evidence-informed ways.

Despite broad recognition that food security includes multiple elements, related research does not always consider the complex ways that people locate, select, purchase, and consume food amid the constraints and choices of their everyday lives. Further complicating the siloed scholarship is the pervasive mixing of terms; for instance, there is a persistent tendency for scholars and practitioners to use terms like “food access” as proxies for “food security.” It is this paper’s goal to untangle the relationships between different elements of food security and to identify the role that each component plays in producing food-secure populations, and in turn, healthy, well-nourished families and children.

## Approach

To begin untangling the elements around food security and health, we mine a vast body of published research literature, eventually drawing on more than 125 research papers for this summary.<sup>2</sup> Our focal areas included food (1) availability, (2) affordability, (3) accessibility, and (4) quality (defined in Table 1), seeking research evidence on the relationship of each element with measurable food security. We next review and summarize evidence linking food security to health outcomes, as well as the role of food support programs (like the Supplemental Nutrition Assistance Program) in addressing food insecurity and improving health. We explore how these dimensions operate alone and together and evaluate the strength and consistency of the evidence on each dimension. By tracing these relational pathways, we can conclude with some recommendations for propelling food insecurity policy, philanthropy, and research forward, against the backdrop of a deeper understanding of food insecurity’s multidimensional context.

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<sup>1</sup> (Coleman-Jensen et al. 2020) for most recent estimates; see earlier years’ estimates in Annual Economic Research Reports on “Household Food Security in the United States” at <http://ers.usda.gov>.

<sup>2</sup> Research evidence was considered for this review if published in a peer-reviewed outlet, by the federal government, or by a reputable think tank. We screened the results for methodological rigor and excluded any that did not meet our standards particularly around sampling and analytic quality.

Table I. Key Terms & Definitions

Term	Definition
Food availability	the degree to which food is consistently physically obtainable in desired quantities, shaped by the production, distribution, and exchange patterns of food goods.
Food accessibility	the ability to obtain food free from barriers posed by travel time, physical features of the area and store, neighborhood safety, and transportation costs.
Food affordability	the ability to purchase enough safe and nutritious food given demands on household income outside of food.
Dietary quality	the nutritional quality and freshness of an individual’s collective food intake.

Note: Definitions synthesized from (Cafer and Kaiser 2016; Taylor and Villas-Boas 2016b; Usher 2015; Gregory, Ingram, and Brklacich 2005; Swaminathan and Bhavani 2013)

## Food Availability

### Food Deserts as a Policy and Investment Lever

Perhaps the most prominently discussed dimension of food security is food availability.<sup>3</sup> A review of 38 studies on food environments finds that scholars most often describe food availability as “the adequacy of the supply of healthy food.”<sup>4</sup> Elements of food availability include the presence and prevalence of food retailers, and research regularly focuses on the type or quality of food available at such retailers; for instance, places to buy produce or types of nearby restaurants.<sup>5</sup>

The availability of food retailers is often at the center of research and policy efforts to promote food security and healthful eating in the United States, particularly within a body of work on “food deserts.” Definitions of food deserts vary, although the best-known version is from the U.S. Department of Agriculture, which states that a food desert is both (1) a low-income area with a poverty rate of at least 20 percent and (2) a low-access area with at least 33 percent of the population living more than one mile from a large grocery store or supermarket (10 miles for rural areas).<sup>6</sup> Other iterations of food desert research consider low vehicle ownership rates in their calculations.<sup>7</sup> And still other consider the quality

#### DEFINITION

**Food availability** refers to the degree to which food is consistently physically obtainable in desired quantities, shaped by the production, distribution, and exchange patterns of food goods.

<sup>3</sup> See Definition box above. Definition synthesized from (Gregory, Ingram, and Brklacich 2005; Swaminathan and Bhavani 2013; Usher 2015)

<sup>4</sup> (Caspi et al. 2012:1173)

<sup>5</sup> (Caspi et al. 2012)

<sup>6</sup> (Taylor and Villas-Boas 2016a)

<sup>7</sup> <https://www.ers.usda.gov/data-products/food-access-research-atlas/documentation/>

and cost of food stocks in their designations; that is, a food desert doesn't always imply a lack of food retailers, but may also refer to a place where healthful foods are less available or higher priced.<sup>8</sup> In most cases, food deserts are characterized by a lack of full-service grocery stores, and sometimes by a predominance of convenience stores or fast food retailers.<sup>9</sup>

Importantly, policy and practice recommendations emerging from this work have narrowly focused on increasing food availability through supply-side interventions, like siting new food retailers in communities.<sup>10</sup> One illustrative effort is the ongoing federal Healthy Food Financing Initiative (HFFI), begun in 2011. This effort focuses on attracting grocers and other food retailers to low-income communities through grants and loans to public and private entities.<sup>11</sup> The HFFI is a significant policy effort, awarding almost \$200 million to community development organizations around the country and leveraging \$1 billion in tax credits and private investments.<sup>12</sup> These and related efforts are guided by the assumption that there is a causal connection between food deserts—often treated interchangeably with low food availability—and unhealthy eating. Undergirding this work is the sentiment (even expressed by former First Lady Michelle Obama<sup>13</sup>) that people would make healthier food purchases if only grocery stores selling fresh fruits and vegetables were available in their neighborhoods.<sup>14</sup> However, the relationships between food availability, food insecurity, and food choices are considerably more complex than can be explained by a lack of supply.

Although “food desert” has become a regular part of the food security lexicon, there are surprisingly few efforts to quantify the effects of food deserts on food security. Much of the scholarship purporting to link the two focuses on measuring disparities in the quality and amount of food available to people in and out of technically-defined food deserts. Often, this research does not explicitly measure differences in food security by residence in a food desert.<sup>15</sup> As noted in one review article, because food deserts regularly appear in low-income neighborhoods with high minority populations, other structural factors influencing food security and unhealthy eating are difficult to disentangle.<sup>16</sup>

Finally, in the limited research that has attempted to quantify a relationship between food availability or food deserts and healthy eating, there has been little evidence of a causal relationship.<sup>17</sup> The following section details this work and outlines reasons for the potential disconnect.

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<sup>8</sup> (Allcott et al. 2019)

<sup>9</sup> (Ver Ploeg et al. 2015)

<sup>10</sup> (Allcott et al. 2019; Bitler and Haider 2011)

<sup>11</sup> (The Food Trust 2019)

<sup>12</sup> (The Food Trust 2019)

<sup>13</sup> (Curtis 2011)

<sup>14</sup> (Curtis 2011)

<sup>15</sup> (Bukonya 2017; Kaplan 2006)

<sup>16</sup> (Wright et al. 2016)

<sup>17</sup> (Allcott et al. 2019; An and Sturm 2012; Bitler and Haider 2011; Coveney and O'Dwyer 2009; Wright et al. 2016)

## Food Environments Matter, but Don't Explain Nutrition Gaps

Food availability is not unimportant, as purchasing decisions are inherently constrained by the food retailers that are present locally. However, it appears that supply-side factors (i.e., number of grocery stores nearby) have been credited with more importance than is merited. How consumers choose a place to shop has been studied extensively: findings suggest that price, location, convenience, service, variety, speed of checkout, product quality, household demographics, past purchase history, and comparisons of alternate stores are all associated with retailer selection.<sup>18</sup>

Three especially well-designed studies provide compelling evidence of the weak relationship between food availability and healthful eating by leveraging “natural experiments” wherein grocery stores opened in underserved neighborhoods. In the first study, researchers matched two neighboring food desert Census tracts, and collected data on fruit and vegetable intake and body mass index in each, both before and after a large supermarket opened in one tract.<sup>19</sup> The authors found that only one-quarter of the participants had ever shopped in the new store six months after it opened, and documented no impact on daily fruit or vegetable intake, nor BMI, as compared with the control group at six months after opening.

In the second study, researchers collected data in two underserved New York City neighborhoods, asking parents about their children's diets (children age 3-10).<sup>20</sup> Data were collected in both communities and continued two months after a new supermarket, funded by the Healthy Food Financing Initiative (described above), opened in one neighborhood. To account for changes that were slower to implement, the researchers also collected dietary data in both places one year later; if the supermarket improved dietary quality, data in the two, otherwise-similar, communities would have diverged. Instead, the authors found no differences in the availability of healthful food at home, unhealthy food at home, or children's dietary intake between the two communities after the supermarket's opening.

**There is limited evidence to support a causal relationship between living in a food desert and unhealthy eating.**

The third study, published in 2019 in one of the nation's oldest and highest-ranked economics journals, used data on household purchasing and on grocery store openings over the course of 12 years. The authors found that when a new supermarket opened, the effect on healthy eating was small; different access to supermarkets accounted for 1.5% of the relationship between nutrition and income. Using food purchasing data, the authors identified why: people did shop at new stores, but they did so instead of shopping at other supermarkets, not instead of drug stores and convenience stores that offer fewer healthy choices. The authors noted, “indeed, even households living in ZIP codes with no supermarkets still buy 85% of their groceries from

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<sup>18</sup> (Arnold, Oum, and Tigert 1983; Feather 2003; Hausman and Leibtag 2007; Kyureghian and Nayga 2013; Vaughan et al. 2017)

<sup>19</sup> Note that the researchers took care to avoid contamination of the sample by documenting the participants in the “control” group who might have shopped in the new, nearby store, even though it wasn't in their neighborhood. None did. (Cummins, Flint, and Matthews 2014)

<sup>20</sup> (Elbel et al. 2015)

supermarkets”<sup>21</sup> (p. 1796). This finding seeds evidence of mobile shoppers documented later in this review and supports the conclusion that mere availability doesn’t drive patronage.

Further evidence that expanded food availability isn’t a panacea comes from a study of small metropolitan counties in Colorado that included surveys and focus groups with residents. Using cluster analysis, the study authors identified five groups or “clusters” of residents based on their survey responses on demographics, level of food security, food purchasing habits, and preferences. The authors found that the local food retail environment was linked to food security for the most food insecure group (called “single and food insecure”), but that for other food insecure residents (called the “compromised consumer” group since they often compromise on healthful food choices due to budget constraints), proximity to a store with healthful food would not enhance their food security. For this second group, the barrier was not food accessibility or availability but rather food affordability at such retailers.<sup>22</sup>

Finally, a survey in Pennsylvania found that nearly 80 percent of food insecure households reported that it was easy or very easy to find fruits and vegetables in their neighborhood.<sup>23</sup> Additionally, 60 percent of food insecure households reported that their neighborhood had excellent or good quality grocery stores.<sup>24</sup> Given the high availability and accessibility of healthy food in the neighborhood, authors suggest that affordability is a barrier to enhancing food security and improving diet.<sup>25</sup>

That people are willing to travel for groceries may shed light on the disconnect between food desert status and healthful eating (more on this in the “Food Accessibility” section, below). A review of food desert literature succinctly notes that fewer than one in five people shop inside their Census tract, the level at which a food desert is most often designated.<sup>26</sup> Although living in a food desert doesn’t necessarily mean that people are constrained to shopping within that desert, county-level research on food deserts does show that they tend to be contiguous (that is, are next to other food deserts).<sup>27</sup> This has particular relevance for rural residents, including parts of New Hampshire in and north of the White Mountains, where food deserts exist.<sup>28</sup> There, Census tracts can be geographically large, and shopping outside the tract may require additional effort.

## Narrowing the Focus of Expanding Food Availability

Although food availability does not appear to be the main driver of nutritional inequity, and has an uncertain relationship with measurable food security, there are some populations for whom food availability is a critical consideration. In particular, availability warrants special consideration around culturally significant foods or the cultural appropriateness of food more

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<sup>21</sup> (Allcott et al. 2019)

<sup>22</sup> (Jablonski, McFadden, and Colpaart 2016)

<sup>23</sup> (Mayer et al. 2014)

<sup>24</sup> (Mayer et al. 2014)

<sup>25</sup> (Mayer et al. 2014)

<sup>26</sup> (Wright et al. 2016)

<sup>27</sup> (Blanchard and Matthews 2008)

<sup>28</sup> See <https://www.ers.usda.gov/data-products/food-access-research-atlas/go-to-the-atlas/> for details on food desert tracts in New Hampshire.

generally.<sup>29</sup> One study interviewed indigenous urban residents in Canada, who reported it was very challenging to find culturally appropriate foods, inhibiting their ability to engage in Indigenous Food Sovereignty (IFS).<sup>30</sup> For indigenous people, IFS can be a key element of food security. For other populations, including those born outside the United States or living in refugee or resettlement communities, these issues may be especially critical, particularly in places like New Hampshire, where racial and ethnic diversity tends to be low statewide and concentrated in the southern cities of Manchester and Nashua. For those with specific cultural food needs outside this metropolitan tier of the state, the availability of appropriate food may be limited. However, even in these specific instances, efforts to simply increase the number of grocery stores locally would not necessarily enhance food security or healthful eating among these groups.

## Food Accessibility

Food accessibility complements and builds on food availability by ensuring food is not only present, but that people are able to obtain that food.<sup>31</sup> In this framing however, accessibility intersects heavily with both availability and affordability, acting as a bridge between the two dimensions.

## Shoppers Are Willing to Travel

Physical distance to food sources has long been a traditional measure of food accessibility, and a review of 137 articles on the “food environment” identified geographic analysis as the most often-used measure across articles.<sup>32</sup> The most frequent specification of distance, perhaps, is number of miles to a full-service grocery store, and it is the sole measure in the USDA Economic Research Service’s most recent report on access to healthy food.<sup>33</sup> Much of this research treats physical distance as a proxy for access, assuming those who live further from food sources will be more often food insecure. However, research on spatial elements of food access suggests that distance to stores does not substantially account for food insecurity gaps. Rather, people’s purchasing preferences and ability to navigate distance, for instance, through access to transportation, shift the distance-between-home-and-grocery-store relationship in nuanced ways.<sup>34</sup>

### DEFINITION

**Food accessibility** refers to the ability to obtain food free from barriers posed by travel time, physical features of the area and store, neighborhood safety, and transportation costs.

Recent research analyzing the USDA’s National Household Food Acquisition and Purchase Survey (FoodAPS) has found that households do not necessarily shop at the closest available store, and that consumers—even lower income and SNAP-participating shoppers—are willing to pay more to shop at their preferred store.<sup>35</sup> This is true even for low-income households and those who walk, bike, use transit other than a personal vehicle to get to the store, and for

<sup>29</sup> (Cafer and Kaiser 2016; Cidro et al. 2015)

<sup>30</sup> (Cidro et al. 2015)

<sup>31</sup> Definition synthesized from (Cafer and Kaiser 2016; Taylor and Villas-Boas 2016b; Usher 2015)

<sup>32</sup> (McKinnon et al. 2009)

<sup>33</sup> (Rhone et al. 2019)

<sup>34</sup> (Coveney and O’Dwyer 2009)

<sup>35</sup> (Taylor and Villas-Boas 2016a; Ver Ploeg et al. 2015)

SNAP households, which are on average, less than two miles from a store that accepts SNAP, but travel more than three miles on average to get to their primary grocery store.<sup>36</sup> Worth reiterating is that even for lower-income households or those with transportation constraints, sheer proximity to a grocery store does not guarantee its utilization.

Finally, other research uses those same USDA data to explore food shopping preferences by store type, and finds that SNAP households are willing to pay \$27 more per week to shop at superstores, and would need to be compensated with \$9 per week to shop at a farmers market.<sup>37</sup> As described above, a broad body of work consistently finds that between 65 and 90 percent of people shop at supermarkets, regardless of food security status,<sup>38</sup> suggesting that factors other than pure distance from food sources play a role in shaping food acquisition behaviors. Additionally, given that so many households prefer shopping at supermarkets, food assistance programs that allow participants to shop at traditional food retail outlets are not only effective at getting food to families, but also ensure their dignity and ability to make individualized food choices.<sup>39</sup>

**Consumers do not necessarily shop at the closest available store, even if they are low income or do not have personal vehicle.**

In short, consumers have complicated relationships with how they select from available food retailers, which extend far beyond proximity and short travel distances. These findings link back to the food availability discussion above, supporting the hypothesis that supply-side interventions (like adding a new supermarket) do not necessarily lead to more healthful food purchasing or enhanced food security.

## Transportation Improves Access, but Type Matters

Having available transportation is more consistently linked to food access than is a minimal distance between home and store. Research consistently identifies transportation as a meaningful element of food accessibility, linking both lack and cost of transportation to food insecurity.<sup>40</sup> Evidence of this relationship is strong enough that one review paper concludes “Of all the factors that seemingly limit access to food, the most important is no money but second in importance is no car.”<sup>41</sup> Inadequate transportation has been identified as an especially prevalent barrier for certain populations, including seniors, people with disabilities, and low-income families who might not have a personal vehicle.<sup>42</sup> For many at risk for food insecurity, reaching food has high costs, whether in terms of multi-line bus fare in urban areas, cabs and ride-share arrangements in suburban areas, or private vehicles in rural areas.<sup>43</sup>

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<sup>36</sup> (Ver Ploeg et al. 2015)

<sup>37</sup> (Taylor and Villas-Boas 2016a)

<sup>38</sup> For a summary, see (Ma et al. 2017)

<sup>39</sup> (Gundersen 2020)

<sup>40</sup> (Harrison et al. 2019)

<sup>41</sup> (Wright et al. 2016:180)

<sup>42</sup> (Chang and Hickman 2018; Oemichen and Smith 2016; Schwartz, Buliung, and Wilson 2019)

<sup>43</sup> (Harrison et al. 2019)

Findings are mixed on the link between public transportation and food access: one study found that in urban areas, adding the equivalent of one extra bus per 10,000 people would reduce household food insecurity by 1.6 percentage points.<sup>44</sup> However, other research finds that particularly for those who live in lower-income urban areas with few full-service retail options nearby, public transit doesn't necessarily enhance access to wide selections of food, as service may be limited to one's own neighborhood.<sup>45</sup> And even for those who could reach full-service stores via public transit, inadequate routes can mean long waits, while abbreviated schedules limit offerings for those working non-standard shifts, and crowded conditions limit capacity for shopping in cost-effective bulk.<sup>46</sup>

For those without public transit options, private vehicles are essentially a necessity. As a result, food may be more technically accessible for rural residents, who more often have private vehicles than urban residents, but become less affordable after considering the additional costs of transit.<sup>47</sup> One study of Missouri counties quantifies a rural-urban dimension of access and transportation, finding that households in urban counties had more food retailers per 1,000 people (that is, higher food availability) than their rural counterparts, but urban households struggled more with transportation (that is, lower food accessibility) than households in rural counties.<sup>48</sup> In both rural and urban spaces, shuttle services and mobile markets might help fill gaps in access.<sup>49</sup>

## Measuring Access Beyond Distance

Aside from physical distance to a store, another important element of accessibility is physical accessibility, especially for those with functional impairments and/or disabilities. A national study of low-income older Americans found that functional limitations were associated with a higher risk of both food insecurity and poor-quality diet.<sup>50</sup> These associations were stronger for older adults living alone, highlighting the role that spouses and relatives often play in assuring access to healthful food for seniors with functional impairments.<sup>51</sup> For older adults in communities with few family members nearby or with few public transportation options—characteristics that may be especially important in New Hampshire—meal delivery programs can be critical for filling these gaps.<sup>52</sup> These types of nutrition supports are discussed in more detail below.

A scoping review of literature on disability, food access, and food insecurity found that disability was consistently associated with a higher risk of household food insecurity across different places and populations.<sup>53</sup> So tightly linked are disability and food access that one type of disability commonly measured in national surveys directly relates to food accessibility. A person is considered to have an independent living disability if they are unable to perform what are

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<sup>44</sup> (Baek 2016)

<sup>45</sup> (Gottlieb, Fisher, and Jakowitsch 2002)

<sup>46</sup> (Harrison et al. 2019)

<sup>47</sup> (Harrison et al. 2019)

<sup>48</sup> (Cafer and Kaiser 2016)

<sup>49</sup> (Arena and Salerno 2020)

<sup>50</sup> (Chang and Hickman 2018)

<sup>51</sup> (Chang and Hickman 2018)

<sup>52</sup> e.g., Wright et al. (2015)

<sup>53</sup> (Schwartz et al. 2019)

called “instrumental activities of daily living,” which includes errands like going grocery shopping.<sup>54</sup> Research recommends that future scholarship and policy efforts on food accessibility consider how disability or other factors might shape travel times and consider household-level accessibility issues alongside broader environmental ones.<sup>55</sup>

## Food Affordability

Alongside availability and accessibility, affordability is perhaps one of the best-known dimensions of food security. Like the former two, food affordability is not a static characteristic of food or food sources, but is best understood alongside characteristics of people, households, and communities.

Specifically, food affordability does not refer to the cost of food alone, but should also consider non-food demands on household income, and the availability of nutrition supports to help defray those costs.

### DEFINITION

**Food affordability** refers to the ability to purchase enough safe and nutritious food given demands on household income outside of food.

## Higher Food Prices Suggest Increased Risk of Food Insecurity

First, there is some research linking food prices and food insecurity, although more often in a global context than in the United States.<sup>56</sup> In general, food prices have been steadily increasing worldwide, and have particularly surged in recent decades.<sup>57</sup> And in developing nations, rising food prices and price volatility have happened in conjunction with increases in food insecurity.<sup>58</sup> However, there is limited research on the relationship between food prices, affordability of those prices, and food insecurity in the United States, largely owing to a lack of household finance data.<sup>59</sup> Broad studies find food insecurity is highest in the South, where food prices are among the lowest,<sup>60</sup> although because incomes are lower there too, food may be *relatively* less affordable. However, variation in food costs within the region may also play a role: research in Kentucky found that food costs are higher in poorer, rural counties and lower in urban counties.<sup>61</sup> Other research has identified temporal correlations between food prices, food spending, and food insecurity. For instance, research shows that when U.S. food prices rose at the start of the millennium, food spending among low- and middle-income households declined, as those households spent more on housing and experienced overall income declines.<sup>62</sup> Another study found that falling unemployment after the Great Recession (December 2007 to June 2009) might have triggered an improvement in food insecurity if inflation and food prices hadn't increased at the same time.<sup>63</sup> Although these studies demonstrated correlations between higher food prices and higher food insecurity, very few have attempted to assess a causal link.

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<sup>54</sup> (U.S. Census Bureau 2017)

<sup>55</sup> (Schwartz et al. 2019)

<sup>56</sup> (Gregory and Coleman-Jensen 2013)

<sup>57</sup> (Lo et al. 2009)

<sup>58</sup> (Shapouri et al. 2009)

<sup>59</sup> (Gregory and Coleman-Jensen 2013)

<sup>60</sup> (Nord et al. 2010)

<sup>61</sup> (Hardin-Fanning and Rayens 2015)

<sup>62</sup> (Nord 2009)

<sup>63</sup> (Nord, Coleman-Jensen, and Gregory 2014)

Some of the strongest evidence linking food prices and food insecurity comes from USDA researchers, who used multiple years of data to estimate a causal relationship between the two.<sup>64</sup> The authors found that a \$10 increase in the price of a standard “basket” of key foods would increase food insecurity by about 2.5 percentage points among low-income households. Unsurprisingly, the same study also found that that SNAP-participating households in regions with higher food prices have food insecurity rates 8 to 10 percentage points higher than their SNAP-participating counterparts in lower-cost areas.<sup>65</sup>

**A \$10 increase in a standard food basket would increase food insecurity in low-income households by about 2.5 percentage points.**

## Food is Less Affordable in Rural Places

There is some evidence that food affordability varies between rural and urban counties in the United States.<sup>66</sup> One national study found that households in rural counties spend 19 percent of income on food compared to 17 percent in urban counties.<sup>67</sup> The same study found that compared to urban counties, rural places have lower household incomes, lower access to food retailers, higher shares of poverty, and lower average SNAP benefits per participant—all of which were found to contribute to lower food affordability. An analysis of Missouri counties also found that rural households spent a larger percentage of household income on food than their counterparts in urban counties, at least in part due to the lower incomes among the rural households.<sup>68</sup> This same study also found that across all study counties, as the poverty rate increased, food became less affordable, as measured by an increasing share of household income spent on food.<sup>69</sup>

Although the notion that food is less affordable in rural places may be counterintuitive for those who equate “rural” with farm land, this relationship is driven by two factors, both of which cohere with patterns found in New Hampshire. First, incomes are lower in rural places, reducing the amount of money that a household has for food spending. In New Hampshire, these disparities are exemplified by comparing median income in the state’s most remote county (Coös County) to income in some of its more urban spaces (like Rockingham County): in 2018, median household income was about \$45,000 in Coös compared with nearly \$90,000 in Rockingham.<sup>70</sup> Second, although overall costs of living may be lower in rural places, the expenses associated with transporting food products into rural spaces can add to base prices. Estimates from the Map the Meal Gap project suggest that this pattern also holds in New Hampshire: estimated costs per meal are higher than the state average in the more northern parts of the state as compared with the more south central parts of the state nearer to large transport routes.<sup>71</sup>

<sup>64</sup> (Gregory and Coleman-Jensen 2013)

<sup>65</sup> (Gregory and Coleman-Jensen 2013)

<sup>66</sup> (Cafer et al. 2018; Cafer and Kaiser 2016; Hardin-Fanning and Rayens 2015)

<sup>67</sup> (Cafer et al. 2018)

<sup>68</sup> (Cafer and Kaiser 2016)

<sup>69</sup> (Cafer and Kaiser 2016)

<sup>70</sup> Authors’ analysis of American Community Survey, 2018 5-year estimates.

<sup>71</sup> See <https://map.feedingamerica.org/county/2018/overall/new-hampshire>

## Choosing Between Food, Medicine, and Rent

Food affordability relates to family and child health in two ways: of course, if food is affordable, families can purchase the quantities of quality food they need to stay healthy. At the same time, unaffordable food can also jeopardize resources remaining for meeting other health-relevant (medical) expenses. For example, adults unable to meet both food and medication needs may be forced to make difficult trade-offs.<sup>72</sup> An analysis of a nationally representative sample of U.S. adults with chronic diseases found that food insecurity among this population was strongly associated with cost-related medication underuse.<sup>73</sup>

Although most available data sources do not capture such detail about household finances, existing research sometimes draws on more widely-available housing cost data as a proxy for households' non-food demands on income.<sup>74</sup> One such study identified a state's median rent as one of the strongest predictors of food insecurity, finding that a "\$100 increase in median rent is associated with a 17.5 percent increase in the odds of food insecurity."<sup>75</sup> Another found that food insecurity is associated with both total income and income less housing costs, and that low-income families living in subsidized housing had lower odds of food insecurity than low-income families on a waiting list for subsidized housing.<sup>76</sup> It is not clear, however, whether higher overall housing costs, instability in housing costs, or other factors unique to the waitlist group were the primary drivers of this discrepancy.

## Clear Links Between Food Security and Income

The considerable body of work linking food security and income should also be situated in the food affordability literature. There is little question that low-income households are more likely to be food insecure, and in 2018, more than one-in-three households with incomes below the official poverty line were food insecure.<sup>77</sup> Research using measures like the Supplemental Poverty Measure, which accounts for different pressures on household income, is particularly good at elucidating the relationship between income and food insecurity.<sup>78</sup> Generally, factors that strain household budgets, like adding people to the household or losing a job, are associated with increasing food insecurity, while factors that enhance household spending power, like having a working teenager or receiving child support, reduce food insecurity.<sup>79</sup> These influences converge simply because food security comes with a price tag: food secure households spend about 20 percent more on food than food insecure households with similar composition.<sup>80</sup> Importantly, most research on food insecurity and income does not attempt to explicitly measure "food affordability" (more on this below).

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<sup>72</sup> (Berkowitz, Seligman, and Choudhry 2014)

<sup>73</sup> (Berkowitz et al. 2014)

<sup>74</sup> (Cafer and Kaiser 2016)

<sup>75</sup> Page 932 in (Bartfeld and Dunifon 2006)

<sup>76</sup> (Kirkpatrick and Tarasuk 2011)

<sup>77</sup> (Coleman-Jensen et al. 2019; Gundersen and Ziliak 2018; Nord and Brent 2002)

<sup>78</sup> (Wight et al. 2014)

<sup>79</sup> (Gundersen and Ziliak 2018; Swann 2017)

<sup>80</sup> (Coleman-Jensen et al. 2019)

Certainly not all low-income households are food insecure, however, and limited research has attempted to identify the characteristics of low-income households at greatest risk for the deepest food insecurity (termed “very low food security”). One such study among low-income households with children found that parents’ physical and mental health may differentiate these households, with some tentative evidence pointing to drug use as a meaningful distinguisher.<sup>81</sup> Another study emphasized the complexity of characteristics associated with very low food security, including unmet medical needs, poor health, disability, depressive symptoms, and of course, low incomes.<sup>82</sup> While lower incomes put households at risk for food insecurity, a host of social, economic, and health characteristics within households can exacerbate risk for the most severe food insecurity levels.

**If food security is broadly linked to overall household income, then any policies and programs that expand or preserve household resources (e.g., refundable tax credits) can be supportive of food security.**

In short, there is evidence that high food prices, low incomes, and non-food demands on income shape households’ thresholds for what food costs are considered “affordable.” A host of known factors that correlate with income—including rural residence—are relevant for predicting food affordability, although there is some preliminary evidence that characteristics that tax families’ other, non-financial resources may further exacerbate risk. However, there is no standard measure or threshold for delineating food costs as “affordable” or not, and as a result, research seeking to quantify the role of affordability is not cohesive. In contrast, the consumer-resource-related

measure most clearly and explicitly linked to food insecurity is not a complex measure of affordability that accounts for food prices, spending patterns, and resources, but rather, is simply household income. “Affordability” and income are, of course, related, but retaining the distinction becomes especially important when considering policy interventions to support food security. If food security is not solely responsive to food-related pricing or food-specific assistance, but instead, more broadly linked to overall household income, then any policies and programs that expand or preserve household resources (e.g., refundable tax credits) can be supportive of food security too.

## Quality

Unlike the food security dimensions discussed above, dietary quality is most often understood as an outcome of food insecurity, not a driver of it. While quality can refer to the nutritional content of a specific food, an aggregate examination of individuals’ collective food intake—their dietary quality—is a more generally useful measure than analyzing consumption of any specific food. Surveys often measure dietary quality by asking respondents to list the foods they have consumed in some specific time period (e.g., in the previous 24 hours). This section is brief, mostly because the

### DEFINITION

**Dietary quality** refers to the nutritional quality and freshness of an individual’s collective food intake.

<sup>81</sup> (Anderson et al. 2016)

<sup>82</sup> (Choi, Fram, and Frongillo 2017)

link between food security and food quality is well-established and largely uncontested, at least for adults.

## Food Insecurity Linked with Adults' Dietary Quality; Less Clear for Children

There is a significant body of research connecting food insecurity and lower dietary quality.<sup>83</sup> A systematic review of existing literature found substantial evidence that food-insecure U.S. adults have lower dietary quality—especially in terms of lower vegetable, fruit, and dairy consumption—than food-secure adults.<sup>84</sup> Other research using point-of-purchase data found that among low-income shoppers, food-secure households purchased more fruit and protein, including seafood and plant protein, than their food-insecure counterparts, who, in turn, purchased more refined grains.<sup>85</sup>

A recent national study of U.S. adults again linked food insecurity with overall lower dietary quality.<sup>86</sup> This association did not vary by biological sex but was found to be more pronounced for certain racial-ethnic groups, including those identifying as Asian, non-Hispanic white, or “other race/ethnicity.”<sup>87</sup> An older study considered low-income U.S. adults specifically, drawing a nationally-representative sample from the 1999-2008 National Health and Nutrition Examination Survey (NHANES).<sup>88</sup> This study found that low-income U.S. adults experiencing food insecurity reported higher intakes of salty snacks, sugar-sweetened beverages, red/processed meat, high-fat dairy products, and fewer vegetables—characteristics of poor dietary quality that are linked to higher risk of chronic disease.<sup>89</sup> Separately, a survey of low-income Central Texas women participating in SNAP found that food insecurity was associated with both lower diet quality and higher body mass index (BMI).<sup>90</sup> Of course these findings are not distinct from research on the other dimensions of food insecurity, as lower-quality foods may be more affordable (or available or accessible) to low-income and SNAP shoppers than higher-quality foods.

Regarding children, a systematic literature review found inconsistent associations between food insecurity and lower dietary quality for children, perhaps due to adults shielding them from household food deficits when possible.<sup>91</sup> (This strategy is supported by research finding that although 14 percent of households with children are food insecure, in half of those households, only the adults experienced food insecurity).<sup>92</sup> However, some research does link food insecurity with child diet quality. One study surveying parent-child dyads in Minneapolis, Minnesota found that during summer months—when school-year nutrition assistance programs like school meals are less available—children in food-insecure households had lower diet quality

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<sup>83</sup> (Hanson and Connor 2014; Lee, Kubik, and Fulkerson 2019; Leung et al. 2014; Leung and Tester 2019)

<sup>84</sup> (Hanson and Connor 2014)

<sup>85</sup> (Gregory, Mancino, and Coleman-Jensen 2019)

<sup>86</sup> (Leung and Tester 2019)

<sup>87</sup> (Leung and Tester 2019)

<sup>88</sup> (Leung et al. 2014)

<sup>89</sup> (Leung et al. 2014)

<sup>90</sup> (Sanjeevi, Freeland-Graves, and Hersh 2018)

<sup>91</sup> (Hanson and Connor 2014)

<sup>92</sup> (USDA 2019)

than those from food-secure households.<sup>93</sup> A study of Texas students in grades 3, 4, and 5 conducted during the school year also found an association between child food insecurity and lower diet quality.<sup>94</sup>

## Food Insecurity and Health Outcomes

The most central reason for assessing and addressing food insecurity is because it is linked with health. That is, being food insecure is not an isolated quality, and its effects may be sweeping, particularly for children in key developmental periods. This section describes relationships between food insecurity and specific health outcomes, for both children and adults, and reviews the limited evidence on the specific pathways by which food insecurity affects health outcomes.

### Worse Health among the Food Insecure

A considerable body of literature examines relationships between food insecurity and various adult and child health outcomes. Summarizing this work, two comprehensive reviews each conclude that food insecurity is associated with negative health outcomes.<sup>95</sup> The majority of studies included in each review focused on children, finding that children who are food insecure have greater risks of hospitalization, anemia, lower nutrient intakes, birth defects, cognitive problems, asthma, aggression, anxiety, depression, behavioral problems, worse oral health, and poorer general health.<sup>96</sup> Among the youngest children, new research finds that living in a food-insecure household is associated with early childhood development delays, a relationship that is intensified for babies whose mothers experience anxiety and depression,<sup>97</sup> and is associated with worse-quality sleep for pre-school children.<sup>98</sup>

**Food insecurity is consistently linked to a wide variety of worse health outcomes.**

There has been less research on the health outcomes of food insecure adults, but existing studies have linked food insecurity with decreased nutrient intakes, poor sleep outcomes, hypertension, hyperlipidemia, diabetes, increased rates of mental health problems, depression, and being in poor or fair health.<sup>99</sup> A longitudinal study focusing on parents of young children found that food insecurity was associated with poorer maternal physical health and increased depression as well as more arguing between parents during a critical early child development period.<sup>100</sup> And although also limited in number, existing studies found food-insecure seniors more likely to experience depression, lower nutrient intakes, limitations in activities of daily living, and poor or fair health.<sup>101</sup>

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<sup>93</sup> (Lee et al. 2019)

<sup>94</sup> (Landry et al. 2019)

<sup>95</sup> (Gundersen and Ziliak 2015; Pai and Bahadur 2020)

<sup>96</sup> (Gundersen and Ziliak 2015; Pai and Bahadur 2020)

<sup>97</sup> (Pedroso et al. 2020)

<sup>98</sup> (Na et al. 2020)

<sup>99</sup> (Gundersen and Ziliak 2015; Seligman, Laraia, and Kushel 2010)

<sup>100</sup> (Johnson and Markowitz 2018)

<sup>101</sup> (Gundersen and Ziliak 2015)

## How Does Food Insecurity Affect Health?

There is a significant body of research linking food insecurity to worse health outcomes. However, the specific mechanisms by which food insecurity produces worse health have not always been identified. Some of the most frequently studied pathways are through lack of key nutrients or by way of increased prevalence of obesity and obesity-related ailments.<sup>102</sup> Research published in the official journal of the American Academy of Pediatrics identifies the roles of specific nutrients that are most essential for brain growth, including protein, zinc, and iron, and notes that lacking those nutrients in early days can result in permanent deficits in brain function, even if nutrients are later made up.<sup>103</sup>

A recent review from the Academy of Nutrition and Dietetics found little evidence that food insecurity is associated with underweight in children, and moderate evidence of an association between food insecurity and overweight in children.<sup>104</sup> One study found that food insecure households scored worse on weight-related health outcomes than their food secure counterparts, but that this relationship didn't differ by the availability of healthy food in the household. That is, those who were food insecure had worse health, regardless of whether their available food was healthful.<sup>105</sup>

To date, the exact mechanisms by which food insecurity impacts health are not entirely clear. In some cases, a lack of nutrients suggests an obvious causal pathway. But for health outcomes like depression, it is possible that being food insecure leads to depression, that being depressed complicates a person's ability to obtain sufficient food, or that some third, unobserved factor (say, an unstable job, a struggle with substance misuse, or an abusive domestic partner) affects both. Efforts to specifically address causal mechanisms through sophisticated modeling and high-quality longitudinal data are especially warranted.<sup>106</sup>

## The Role of Nutrition Assistance Programs

### SNAP Reduces Food Insecurity

The federal Supplemental Nutrition Assistance Program (SNAP), formerly known as food stamps, is a U.S. Department of Agriculture (USDA) program and the largest food support program in the United States. Many studies have reviewed the effectiveness of SNAP in reducing food insecurity and promoting child and family health. In 2013, Mathematica Policy Research published a report summarizing their original survey research on SNAP participation and food security conducted for the USDA's Food and Nutrition Service. The authors tracked food-insecure households that had newly enrolled in SNAP, and after six months of participating, found a 10.6 percentage point drop in food insecurity, from 65.1 percent of households at enrollment to 54.5 percent of those same households after.<sup>107</sup> Another study

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<sup>102</sup> (Adams, Grummer-Strawn, and Chavez 2003; Franklin et al. 2012; Schwarzenberg, Georgieff, and Nutrition 2018)

<sup>103</sup> (Schwarzenberg et al. 2018)

<sup>104</sup> (Spoede et al. in press)

<sup>105</sup> (Poulsen et al. 2019)

<sup>106</sup> (Gundersen and Ziliak 2018)

<sup>107</sup> (Mabli et al. 2013)

using U.S. Census Bureau household data found SNAP participation was associated with a 31 percent decrease in the likelihood of being food insecure.<sup>108</sup> Part of the reason that SNAP is so effective is its simple boost to household food purchasing power: SNAP benefits account for more than 60 percent of food-at-home expenditures of SNAP households, and are especially important in boosting food budgets for households with children, poor households, and households in rural counties.<sup>109</sup>

## Successes in SNAP-Linked Incentive Programs

Evaluations exist for several pilot programs aimed at incentivizing healthful food purchases among SNAP participants. A SNAP-dollar matching program called Double Up Food Bucks (DUFB) has been tested and implemented in various ways across the country. The most common format is to provide a dollar-for-dollar match of SNAP dollars spent at farmers' markets as an incentive to shop at these locations. Research on DUFB programs at farmers' markets in Utah found that low-income adult participation was associated with a higher intake of fruits and vegetables as well as improved food security.<sup>110</sup>

In Michigan, a DUFB program provided a subsidy on purchases of fresh produce at participating supermarkets, hoping to replicate the success seen at farmers markets.<sup>111</sup> During the two years evaluated (2015 and 2016), SNAP participants spent significantly more on fresh produce at stores participating in the DUFB program than did SNAP recipients at non-participating control stores.<sup>112</sup> Although this research did not measure consumption, it is encouraging the SNAP participants at participating DUFB stores purchased more fresh produce than SNAP participants at non-participating stores. Another study, also in Michigan, used scanner data from an independent supermarket participating in DUFB in Detroit to examine fruit and vegetable purchase behaviors in a low-income, predominantly Hispanic/Latinx community.<sup>113</sup> That study concluded first, that program participation was low—just 1.9% of SNAP customers opted to participate, and just a fraction of those participated more than once. Second, the authors found that the effects of DUFB were modest: across the four-month implementation period, participating customers spent a total of \$1.60 more on fruit and vegetable expenditures (40 cents per month) than they would have spent if the program were not implemented. Further, when the program concluded, fruit and vegetable expenditures and the probability of purchasing fruits or vegetables declined to baseline levels again. Authors suggest that the low participation in DUFB may be due to the \$10 fruit and vegetable purchase hurdle, which must be reached before any benefits are received. Lowering this \$10 minimum fruit and vegetable purchase requirement might be one way to enhance DUFB participation.

Another SNAP pilot program called the Healthy Incentives Pilot (HIP) in Hampden County, Massachusetts was evaluated by Abt Associates for the USDA's Food and Nutrition Service.<sup>114</sup> HIP gave SNAP participants an incentive of 30 cents per dollar of SNAP benefits they spent on

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<sup>108</sup> (Ratcliffe, McKernan, and Zhang 2011)

<sup>109</sup> (Cafer and Kaiser 2016; Tiehen, Newman, and Kirilin 2017)

<sup>110</sup> (Durward et al. 2019; Savoie-Roskos et al. 2016)

<sup>111</sup> (Rummo et al. 2019)

<sup>112</sup> (Rummo et al. 2019)

<sup>113</sup> (Steele-Adjognon and Weatherspoon 2017)

<sup>114</sup> (Bartlett et al. 2014)

‘targeted fruits and vegetables’, which included fresh as well as some canned, frozen, and dried fruits and vegetables. Findings showed that, compared to non-participants, HIP participants consumed 26 percent more target fruits and vegetables daily.<sup>115</sup> Notably, HIP did not result in changes to household shopping patterns such as where they purchased their groceries or how frequently they went shopping.<sup>116</sup>

Despite the moderate successes of these programs, questions remain about the scalability of these small programs into broader food insecure populations, and their sustainability over the long term. Many of the incentive programs are small-scale, and assessments are locally focused. Whether promising findings would translate to food insecure populations in different demographic and geographic groups is not yet well studied. Further, questions of practicality loom for some nutrition incentive programs, particularly those that are based at limited-availability farmers markets, which may be difficult to access for working adults, those with young children, those with disabilities, or those without transportation.

**The scalability of successful SNAP-linked incentive programs requires further study.**

As evaluations of these programs continue, close examination of study design will also remain important. Specifically, studies that find positive effects when comparing program participants’ food security levels and eating patterns to their own, earlier data may not necessarily be generalizable to broader populations. Challenges may arise in that those who are willing to participate in a nutrition incentive program (and related research) may be more generally advantaged and resourced, and more amenable to positive influences, than those who do not. Generalizability is also relevant when considering incentives linked explicitly to SNAP participation, as under-enrollment in SNAP is not random, and can cluster among some of the highest-need groups (for instance, Latinx immigrant populations facing logistical barriers or fears of repercussions).<sup>117</sup> In this case, findings would, at best, be generalizable to SNAP participants, not populations that are low income or at risk for food insecurity more generally.

## SNAP Associated with Better Health

In terms of overall health, there is consistent evidence that SNAP participation has positive effects. SNAP participants report better self-rated health than their low-income non-SNAP counterparts.<sup>118</sup> SNAP participation is associated with lower health care expenditures (by around \$1,400 annually)<sup>119</sup> and with between 1 and 2 fewer doctors’ office visits per year, despite reporting more well visits,<sup>120</sup> compared with non-SNAP low income adults. One study analyzed monthly Medicaid discharge data in Massachusetts from both before and

**SNAP participation is associated with reduced health care expenditures and reduced hospital utilization.**

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<sup>115</sup> (Bartlett et al. 2014)

<sup>116</sup> (Bartlett et al. 2014)

<sup>117</sup> (Pelto et al. 2020)

<sup>118</sup> (Gregory and Deb 2015)

<sup>119</sup> (Berkowitz et al. 2017)

<sup>120</sup> (Gregory and Deb 2015)

after the state increased SNAP benefits in 2009, finding that after the benefits increase, Medicaid cost-growth fell by 73 percent. A reduction in hospital admissions following the SNAP increase was largely responsible for the declining Medicaid costs.<sup>121</sup> Similarly, a study of low-income older adults enrolled in both Medicare and Medicaid in Maryland found that SNAP participation and higher benefit amounts were associated with lower hospital utilization, although not with lower emergency department use.<sup>122</sup>

## Making SNAP More Effective

Although increasing household purchasing power through SNAP participation tends to yield positive outcomes, the program could be made even more effective through policy. First, not everyone who could benefit from SNAP participates. In fiscal year 2016, the most recent data available, 85 percent of eligible people participated; among eligible working poor people, the rate was 75 percent.<sup>123</sup> Participation rates in New Hampshire for both eligible and working poor eligible are slightly lower than national averages in the most recent period (80 and 70 percent, respectively), although the state's relationship to national trends has fluctuated over time.<sup>124</sup> As to why people do not participate in SNAP when eligible, issues that affect safety net program participation more broadly are in play here, including stigma. However, new attention to the administrative burdens of SNAP enrollment, including learning and compliance costs may provide an especially fruitful lens on non-participation.<sup>125</sup> For specific populations, additional demographic and policy factors are relevant: for instance, new research focused particularly on under-enrollment among Latinx immigrant families finds that logistical barriers and fears of repercussions, stoked by misinformation, prevents uptake among eligible people.<sup>126</sup>

Driving formal and informal underutilization, some of the identified shortcomings of SNAP include administrative barriers, poor retention, limited eligibility requirements, inadequate benefits, and lack of adjustment for regional variation in food prices.<sup>127</sup> A study of SNAP administrative data from seven states found that program retention is very low—about half of new SNAP cases are no longer receiving benefits just a year later despite that an estimated 50 percent are still eligible.<sup>128</sup> Regarding poor retention in particular, one study points to administrative barriers, specifically paperwork burdens related to re-verifying eligibility, as playing a meaningful role.<sup>129</sup> Simplified processes and new tools, like Michigan's online case management system, are possible ways to reduce administrative burden.<sup>130</sup> Additional simplifications in response to the COVID-19 pandemic will also provide policy and program points for evaluation.

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<sup>121</sup> (Sonik 2016)

<sup>122</sup> (Samuel et al. 2018)

<sup>123</sup> (Cunyngham 2019)

<sup>124</sup> (Cunyngham 2019)

<sup>125</sup> (Herd and Moynihan 2018)

<sup>126</sup> (Pelto et al. 2020)

<sup>127</sup> (Carlson 2019; Gray 2019; Gregory and Coleman-Jensen 2013; Hardin-Fanning and Rayens 2015; Keith-Jennings, Llobrera, and Dean 2019)

<sup>128</sup> (Gray 2019)

<sup>129</sup> (Gray 2019)

<sup>130</sup> (Gray 2019)

Another challenge is that while SNAP does adjust benefit levels over time to reflect inflation, benefits are not adjusted across geography. Researchers have argued that region-specific disparities in food prices can be substantial and should be considered in SNAP allocations.<sup>131</sup> Some have proposed more simply that the current SNAP benefit levels are insufficient and should be increased.<sup>132</sup> Despite the successes of SNAP, about half of participating households still experience food insecurity.<sup>133</sup> SNAP household spending on food and household food consumption both tend to decline throughout the month, as SNAP benefits allocated at the beginning of the month are exhausted.<sup>134</sup> Some evidence suggests that although SNAP benefits are depleted early, families strategically cope with this instability by borrowing money at the end of the month to smooth their food spending, thereby stabilizing household food insecurity throughout the month.<sup>135</sup>

Expanding SNAP eligibility would be another way to assist food insecure adults and families, as many vulnerable U.S. households are ineligible to participate in SNAP.<sup>136</sup> For example, some adults in households without dependent children are limited to 3 months of SNAP benefits in a 36-month period, many classes of immigrants are ineligible, and often low-income college students are also ineligible.<sup>137</sup> Furthermore, millions of food-insecure households are not eligible for food assistance programs like SNAP because their income level is slightly too high.<sup>138</sup>

## Other Food Support Programs

There are myriad other federal and local food support programs in the United States aimed at enhancing food security and improving health outcomes for children and families. After SNAP, the next largest federal program is the USDA's National School Lunch Program (NSLP) which provides free or reduced-price school meals to low-income children.<sup>139</sup> Although there is far less research evaluating the NSLP than SNAP, research also finds the NSLP effective in reducing food insecurity and supporting child health.<sup>140</sup> A study analyzing a nationally representative health dataset found that participation in the NSLP reduced food insecurity by at least 6 percent, obesity by 21 percent, and overall child poor health by at least 33 percent.<sup>141</sup> A similar USDA program called the School Breakfast Program provides low-cost or free breakfast to low-income children either before or during the school day. An evaluation of this program using national data on third-grade students also found that program participation was associated with a lower likelihood of household food insecurity.<sup>142</sup>

One of the limitations of both the NSLP and the School Breakfast Program is that meal delivery occurs at school, so low-income students do not have this support during the summer months

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<sup>131</sup> (Carlson 2019; Gregory and Coleman-Jensen 2013; Hardin-Fanning and Rayens 2015)

<sup>132</sup> (Carlson 2019; Keith-Jennings et al. 2019)

<sup>133</sup> (Carlson 2019)

<sup>134</sup> (Carlson 2019; Farrell et al. 2018)

<sup>135</sup> (Schenck-Fontaine, Gassman-Pines, and Hill 2017)

<sup>136</sup> (Carlson 2019; Keith-Jennings et al. 2019)

<sup>137</sup> (Keith-Jennings et al. 2019)

<sup>138</sup> (Gundersen, Kreider, and Pepper 2011)

<sup>139</sup> (Gundersen et al. 2011)

<sup>140</sup> (Gundersen, Kreider, and Pepper 2012)

<sup>141</sup> (Gundersen et al. 2012)

<sup>142</sup> (Bartfeld and Ahn 2011)

when school is not in session. To address this gap, the USDA has summer-specific initiatives including the Summer Food Service Program and the related Seamless Summer Option. Since meal dissemination cannot occur as naturally during the school day, households must travel to summer meals program sites to pick up meals.<sup>143</sup> Although research is limited on these programs, a study of California households investigated the relationship between Seamless Summer Option participation (measured as geographic accessibility, or proximity of households to summer meal program sites) and household food insecurity.<sup>144</sup> They found that program geographic accessibility was significantly associated with a lower likelihood of very low food security, but not associated with food insecurity.<sup>145</sup>

The Expanded Food and Nutrition Program (EFNEP) is a federal USDA program designed to educate low-income, SNAP-eligible families about nutrition and resource management.<sup>146</sup> A study of EFNEP participants in Massachusetts conducted focus groups, interviews, and a survey to better understand the impact of the EFNEP on food security as well as the relationship between food security and food affordability.<sup>147</sup> They found that more participants were food secure after EFNEP than before the program (71 percent compared to an initial 39 percent).<sup>148</sup> Regarding food affordability, authors found cyclic purchasing patterns where households could afford more healthy foods at the beginning of the month (shortly after SNAP benefit receipt) but not throughout the month as those resources diminish.<sup>149</sup> While New Hampshire and Massachusetts are not entirely analogous, the success of this program with a New England audience is encouraging.

Another federal food support program is the Commodity Supplement Food Program (CSFP) is a food-box program that targets assistance for low-income pregnant women, young children under age 6, and older adults ages 60 and older. Each month, participants receive a box of healthful foods that can be picked up at food pantries or, in the case of older adults, distributed directly at senior housing centers.<sup>150</sup> The limited research on the effectiveness of the CSFP has focused on the impact on low-income older adult participants.<sup>151</sup> A survey of both CSFP participating and non-CSFP senior housing centers in New York state found no significant differences in food security levels between seniors at CSFP sites compared to those at non-CSFP sites, who often participated in other food assistance programs such as SNAP instead.<sup>152</sup> Their analysis of participation in a variety of government food programs suggests that CSFP is just as effective as SNAP at supporting food security for seniors.<sup>153</sup> This is important as seniors may choose to participate in CSFP over SNAP due to stigma around food stamps or because the food-box model of CSFP does not require them to travel to a grocery store.<sup>154</sup> A survey of

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<sup>143</sup> (Miller 2016)

<sup>144</sup> (Miller 2016)

<sup>145</sup> (Miller 2016)

<sup>146</sup> (Farrell et al. 2018)

<sup>147</sup> (Farrell et al. 2018)

<sup>148</sup> (Farrell et al. 2018)

<sup>149</sup> (Farrell et al. 2018)

<sup>150</sup> (Khan, Schiff, and Mello 2019)

<sup>151</sup> (AbuSabha et al. 2011; Khan et al. 2019)

<sup>152</sup> (AbuSabha et al. 2011)

<sup>153</sup> (AbuSabha et al. 2011)

<sup>154</sup> (AbuSabha et al. 2011)

low-income seniors in Rhode Island before and after CSFP enrollment found CSFP participation to be associated with a 20.7 percent decrease in food insecurity.<sup>155</sup> Interestingly, they also found that those who received their boxes in senior housing settings had larger improvements to their food security than those who received their CSFP food boxes at food pantries.<sup>156</sup> Although more research is needed, it is possible that the more convenient food delivery model, involving less transportation pressure for seniors, is more effective at bolstering food security in this group.

A more locally-focused but still USDA-funded program called the Chicksaw Nation Packed Promise project has also been evaluated for its impact on food insecurity among low-income children and families in the Chicksaw Nation territory in Oklahoma.<sup>157</sup> The program consisted of a monthly home-delivery of a food box with nonperishable food staples as well as \$15 for purchasing fresh and frozen fruits and vegetables. The project was organized through school districts and low-income households had to order their food boxes for each eligible child.<sup>158</sup> Although the program was not found to reduce food insecurity among children, improvements in food security were seen for adults and households more broadly.<sup>159</sup>

In short, studies of non-SNAP food support programs do provide some evidence of positive outcomes, although not always uniformly. Targeting programs to specific populations—like School Meals to children and CSFP deliveries to seniors—may be especially useful. However, as with SNAP, these programs face underutilization due to administrative barriers and stigma, and a limited reach, due to program funding and eligibility criteria. A comprehensive review more focused on comparing programs within designated populations might be able to elevate specific programmatic directions, or to highlight gaps in existing knowledge needed to make those recommendations. Finally, not described here is the array of locally funded and sited private and philanthropic food relief efforts that likely play a role in community food. Food pantries in particular seem especially well suited to respond to immediate community needs, and some research (conducted in rural New England) suggests that some low-income residents feel less stigmatized when served by people in their own communities.<sup>160</sup> These local efforts and effects are best examined with a place-based lens.

## Food Insecurity During the COVID-19 Pandemic

### Food Acquisition Decisions are Further Complicated

During the COVID-19 pandemic usual food acquisition patterns have been disrupted and household budgets have been strained or depleted by job or wage losses and medical expenses. Food prices increased sharply, further constraining families' budgets.<sup>161</sup> Households are also navigating where and when to acquire food, given new social distancing requirements and recommendations (like limiting trips to retailers) and changes to the charitable food landscape

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<sup>155</sup> (Khan et al. 2019)

<sup>156</sup> (Khan et al. 2019)

<sup>157</sup> (Briefel et al. 2019)

<sup>158</sup> (Briefel et al. 2019)

<sup>159</sup> (Briefel et al. 2019)

<sup>160</sup> (Carson and Mattingly 2018)

<sup>161</sup> (Bauer et al. 2020)

that include new options and new strains. Access to food sites has been further complicated by closures, either temporary or permanent, and changes to hours of operation. Other pandemic-induced changes such as more limited public transportation and health concerns for older adults and other vulnerable populations may also contribute to reduced access to available food sites.

Although official annual food insecurity rates are not yet available, evidence from the U.S. Census Bureau's Household Pulse Survey (CHHPS) suggests that food hardship has increased among households with children in 2020.<sup>162</sup> The CHHPS is designed to give rapid updates on households during the pandemic and measures food insufficiency—sometimes or often not getting enough to eat—over the past week. By comparison, official food insecurity rates are measured with a more detailed scale of 10-18 questions, referring to the past year. Using the CHHPS, Brookings Institution researchers estimated that 16 percent of households with children—around 14 million children—were not getting enough to eat in June 2020.<sup>163</sup> Researchers at Northwestern's Institute for Policy Research translated food insufficiency rates from the CHHPS to approximate food insecurity rates for the U.S. and all 50 states using data from another national survey (the Current Population Survey's Food Security Supplement) that collects data on both food insufficiency and food insecurity.<sup>164</sup> Although these researchers were unable to adjust for the different reference periods (food insufficiency over the past week versus food insecurity over the past year) they created rates that are more comparable to official food insecurity rates. Findings suggested that nationwide household food insecurity increased from 10.8 percent in February 2020 to 23.0 percent in April-May 2020. In New Hampshire food insecurity more than doubled from 7.0 percent in February 2020 to 16.9 percent in April-May 2020.<sup>165</sup> That is, 1 in 6 Granite State households were experiencing food insecurity in April-May 2020. Regardless of the exact rates of food insecurity, it is clear that the pandemic has presented additional challenges to food security for many U.S. households.

## Emergency Food System Responses

The nonprofit emergency food safety net tends to be responsive to community needs in usual times and this has also been the case during the COVID-19 pandemic. Not only have food pantries and food banks reported massive spikes in demand, they are also devising new models of food dissemination that are in line with social distancing needs.<sup>166</sup> One such model is drive-through or curbside food pantry pickup, where prepackaged food boxes are placed in cars (clients may or may not be able to select desired items for their food boxes from a list).<sup>167</sup>

Mobile markets and mobile food pantries have become more relevant in the COVID-19 pandemic context, given the health and transportation constraints facing some of the most at-risk populations, although evidence that these programs are effective in usual times is thin.

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<sup>162</sup> (Bauer et al. 2020)

<sup>163</sup> (Bauer 2020)

<sup>164</sup> (Schazenbach and Pitts 2020)

<sup>165</sup> (Schazenbach and Pitts 2020)

<sup>166</sup> <https://www.nhbr.com/food-bank-number-of-families-seeking-food-in-new-hampshire-is-increasing>

<sup>167</sup> (Kulish 2020)

Similarly, Meals-on-Wheels has modified their deliveries to include multiple meals to reduce the contact between the deliverer and recipient.<sup>168</sup> For seniors who are not connected to a home delivery meal program, grab-and-go prepackaged meals have replaced congregate meals.<sup>169</sup> More informal options for socially distanced food pickup include outdoor cupboards where users are encouraged to “give what you can and take what you need.”<sup>170</sup>

Local, regional, and federal governments have also developed programs to turn excess food resulting from disrupted distribution chains into meals or food boxes for people in need. A notable example is the U.S. Department of Agriculture (USDA) Farmers to Families Food Box program, which delivered over 100 million food boxes from May 15 – September 18 and has been extended to run until the end of December.<sup>171</sup> Unfortunately the Farmers to Families Food Box program has not exactly been the win-win-win that was promised. After successful participation in the first and second rounds of contracts, some farmers report that they have not been renewed for the third extension of the program, leaving them with acres of food they already grew for the food box program that now has nowhere to go.<sup>172</sup> Additional public criticisms of the program include that the program has not been cost-effective, food box contractors have often not assisted food banks with distribution as promised, and the quality and quantity of food distribution has been uneven across the country.<sup>173</sup> Specific examples of the latter for New Hampshire have been documented by local media.<sup>174</sup>

### Federal Response: SNAP Flexibilities, Pandemic EBT and School Meal Distribution

Effective April 1, 2020, the Families First Coronavirus Act (FFCRA) permitted temporary changes to school meal delivery and to the Supplemental Nutrition Assistance Program (SNAP). The millions of school-age children who rely on free and reduced-price school meals were in danger of being disconnected from these school-based nutrition assistance programs when schools closed in spring 2020. The FFCRA allowed schools new flexibilities around meal delivery and serving meals in non-congregate settings.<sup>175</sup> Schools were able to continue providing meals through methods such as bus stop or home delivery and grab-and-go meal pickups.

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<sup>168</sup> [https://www.victoriaadvocate.com/covid-19/demand-for-meals-on-wheels-reaches-unprecedented-levels-amid-covid-19/article\\_ec38759c-8e35-11ea-a91a-3be96bccf864.html](https://www.victoriaadvocate.com/covid-19/demand-for-meals-on-wheels-reaches-unprecedented-levels-amid-covid-19/article_ec38759c-8e35-11ea-a91a-3be96bccf864.html)

<sup>169</sup> For example, Strafford Nutrition & Meals on Wheels (<https://straffordmealsonwheels.org/covid-19-response>)

<sup>170</sup> Such as “Blessing Boxes” or Little Free Pantries (<https://www.littlefreepantry.org/>). Note that in Washington state, the health department of Asotin County has ordered an informal free pantry to close:

<https://reason.com/2020/05/01/a-washington-woman-set-up-a-little-free-pantry-without-a-permit-asotin-county-threatened-criminal-charges/>

<sup>171</sup> <https://www.ams.usda.gov/selling-food-to-usda/farmers-to-families-food-box>

<sup>172</sup> <https://thecounter.org/usda-food-box-program-farmers-unharvested-crops-covid-19/>

<sup>173</sup> <https://www.npr.org/sections/health-shots/2020/09/03/907128481/how-the-usdas-food-box-initiative-overpaid-and-under-delivered>

<sup>174</sup> See <https://www.wmur.com/article/new-hampshire-food-bank-forces-change-in-distributor-after-families-return-poor-quality-food-from-usda-program/34591578#>

<sup>175</sup> <https://www.fns.usda.gov/sfsp/covid-19/covid-19-meal-delivery>

To help shore up household funds, SNAP emergency allotments provide benefits to SNAP households up to the maximum monthly amount.<sup>176</sup> States could also request waivers from USDA to ease SNAP administrative processes, like reducing reporting and recertification requirements, allowing telephone signatures to limit in-person interviews, and suspending time limits on SNAP eligibility for those who are unemployed or underemployed. Given increased need and new flexibilities, most states have realized higher SNAP caseloads since March.<sup>177</sup> However, New Hampshire's caseloads rose in April and May, but dipped below January 2020 levels by June, where they remained at least through the end of August.<sup>178</sup>

Leveraging SNAP infrastructure, the FFCRA also enabled states to issue Pandemic Electronic Benefit Transfer (Pandemic EBT) benefits, through which families with students can recoup the value of missed school meals.<sup>179</sup> The lump-sum of the missed school meals is received on an EBT card, which can be used to buy food at most grocery stores. As any new program, little research has yet evaluated the effectiveness of Pandemic EBT. However, an economic analysis by The Hamilton Project found that over the summer (June 4 – July 7) Pandemic EBT lifted an estimated 2.7-3.9 million children out of very low food security.<sup>180</sup>

## Recommendations for Action

### Recommendations for Researchers & Evaluators

- Food access, availability, and affordability are differentially predictive of food security and health outcomes. We recommend that researchers studying food insecurity-related issues select, define, and measure terminology carefully to continue to strengthen and clarify the field's conclusions.
- There is considerable complexity in population-wide food acquisition decisions. However, there is little information on food acquisition patterns specific to low-income families and none pertaining to New Hampshire. An in-depth qualitative study could illuminate how low-income families prioritize certain food sites (including retail and charitable) and particular food products in New Hampshire.
- Further research is required to better understand how administrative barriers—including learning and compliance costs—and stigma impact SNAP enrollment and retention, particularly in New Hampshire.
- The COVID-19 waivers and flexibilities to SNAP administration implemented during the pandemic offer an opportunity to examine how these changes (e.g., telephone signatures, recertification waivers) have impacted both SNAP administrators and customer satisfaction, SNAP participation, and retention. A case study on these changes could provide insights on how to reduce administrative barriers to SNAP and enhance program participation in the long-term.

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<sup>176</sup> <https://frac.org/news/food-research-action-center-commends-the-house-for-passing-the-families-first-coronavirus-response-act>

<sup>177</sup> (Rosenbaum 2020)

<sup>178</sup> (Polizzotti 2020); Personal communication with the New Hampshire Department of Health and Human Services (NH DHHS) Program Administrator

<sup>179</sup> <https://www.fns.usda.gov/snap/state-guidance-coronavirus-pandemic-ebt-pebt>

<sup>180</sup> (Bauer et al. 2020)

- The geographic scalability of successful SNAP-linked incentive programs requires further investigation. For example, studies of DUFB supermarket programs at specific retailers in Michigan have shown promise, but it is not certain that these programs will be equally successful in other places and communities.
- Most SNAP-linked incentive program research tracks the types of foods that consumers purchase (e.g., fruits and vegetables) but does not track actual consumption. Future research measuring both purchases and consumption could fill this gap with the goal of assessing how incentivized purchases may produce measurable nutritional impacts.

## Recommendations for Policymakers

- Though popular, policy interventions that focus solely on supply-side factors—such as attracting a grocery store to a community without one—are not likely to improve food security alone and should not be a policy focus. Policies that pivot from subsidizing retailer relocation to supporting vulnerable consumers with household spending power and transportation—that is, moving from availability to affordability and access—appear better positioned for effectiveness.
- Design and implementation of government food assistance programs should consider the strong evidence that most households prefer to shop at supermarkets, even amid income and transportation barriers. Policies and programs that allow participants to shop at traditional food retail outlets are not only effective at getting food to consumers in need, but also ensure their dignity and ability to make individualized food choices.
- SNAP successfully reduces food insecurity and is associated with better health. Identifying ways to increase uptake among eligible households is a clear and immediate strategy for enhancing public health.
  - Policy efforts should consider barriers particular to specific populations, such as under-enrollment among Latinx immigrant families who face not only logistical constraints but also fears of repercussions stoked by misinformation.
  - Retention of existing SNAP participants might be strengthened by broader or more flexible eligibility cutoffs and reduced administrative burdens.
  - Simplified processes, as implemented in the pandemic, and new tools, like Michigan’s online case management system, could contribute to this burden reduction.
- The Double Up Food Bucks (DUFB) programs have been moderately successful in encouraging SNAP customers to purchase more fruits and vegetables. Making incentive programs more widely available in traditional food retailer settings could increase program reach, while lowering programs’ minimum fruit and vegetable purchase requirement could enhance participation.

## Recommendations for Philanthropists/Practitioners

- Support research that continues to unbraided the functionally related but conceptually distinct components of food availability, access, and affordability. Commitment to this specificity can produce a higher-quality evidence base with clearer links to specific policy actions.

- Consider the role of other dimensions of food insecurity that are not described in depth here, including nutrition knowledge and “utilization,” which refers to consumers’ capacity to prepare, cook, and serve foods that may be higher quality but more difficult or time-consuming to prepare (e.g., certain vegetables).
- Deploy resources within and across community networks with the goal of bolstering household resources, that, by design or extension, enhance resources for food spending. This includes:
  - Supporting expansion of pilot projects like DUFEB and including funding for rigorous program evaluation (including filling gaps around purchase versus consumption).
  - Funding trusted community organizations and advocates who can connect with populations at risk of under-enrollment in federal nutrition programs. Information on eligibility and privacy, language translation services, or support navigating applications could strengthen uptake among these populations.
  - Strengthening active-referral networks to keep food insecure populations connected with the widest array of resources possible, including for subsidizing non-food household costs.

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