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## SNAP Is Linked with Improved Nutritional Outcomes and Lower Health Care Costs

By Steven Carlson and Brynne Keith-Jennings

New and emerging research links the Supplemental Nutrition Assistance Program (SNAP, formerly food stamps), the nation's most important anti-hunger program, with improved health outcomes and lower health care costs. This research adds to previous work showing SNAP's powerful capacity to help families buy adequate food, reduce poverty, and help stabilize the economy during recessions.

SNAP is the primary source of nutrition assistance for many low-income people. In a typical month of 2017, SNAP helped about 42 million low-income Americans afford a nutritious diet. It provides important nutritional support for low-wage working families, low-income seniors, and people with disabilities living on fixed incomes: close to 70 percent of SNAP participants are in families with children, and more than one-quarter are in households with seniors or people with disabilities. While SNAP provides only a modest benefit — just \$1.40 on average per person per meal in 2017 — it forms a critical foundation for the health and well-being of low-income Americans, lifting millions out of poverty and improving food security.

Although evaluating SNAP's impact presents a daunting challenge in part because it is so widely available and because participants tend to be substantially different from non-participants, research emerging in the last ten years suggests that SNAP may affect household well-being in ways that extend beyond its intended aim to improve food security and nutrition. The available evidence suggests that SNAP is at least associated with and may promote better health and lower health care costs. And, to the extent this connection exists, it is plausible that policies that limit program eligibility and cut SNAP benefits would harm health and raise health care costs. Substantial research on SNAP and related areas has shown:

- **Food insecurity increases the risk of adverse health outcomes, complicates the ability to manage illness, and is linked to higher health care costs.** On average, after controlling for a range of socioeconomic and demographic characteristics expected to affect food security and health care costs, people in food-insecure households — those lacking consistent access to adequate food at some point during the year due to limited resources — spend roughly 45 percent more on medical care in a year (\$6,100) than people in food-secure households (\$4,200). And extensive research has shown a strong correlation between food insecurity and

chronic health conditions among various age groups: children, working-age adults, and seniors.

- **SNAP improves food security, offers benefits that enable families to purchase healthier diets, and frees up resources that can be used for health-promoting activities and needed medical care.** SNAP reduces the overall prevalence of food insecurity by as much as 30 percent, and is even more effective among the most vulnerable, such as children and those with “very low food security,” that is, when one or more household members have to skip meals or otherwise eat less during the year due to lack of money. The largest and most rigorous examination of the relationship between SNAP participation and food security found that food insecurity among children fell by roughly a third after their families received SNAP benefits for six months.
- **SNAP is associated with improved current and long-term health.** SNAP participants are more likely to report excellent or very good health than low-income non-participants. Early access to SNAP among pregnant mothers and in early childhood improved birth outcomes and long-term health as adults. Elderly SNAP participants are less likely than similar non-participants to forgo their full prescribed dosage of medicine due to cost. SNAP may also help low-income seniors live independently in their communities and avoid hospitalization.
- **SNAP is linked with reduced health care costs.** On average, again after controlling for factors expected to affect spending on medical care, low-income adults participating in SNAP incur about \$1,400, or nearly 25 percent, less in medical care costs in a year than low-income non-participants. The difference is even greater for those with hypertension (nearly \$2,700 less) and coronary heart disease (over \$4,100 less).

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## A Brief Introduction to the Supplemental Nutrition Assistance Program

SNAP is broadly available to almost all households with low incomes and few resources, unlike most means-tested benefit programs which are restricted to certain categories of low-income individuals.<sup>a</sup> SNAP eligibility rules and benefit levels are, for the most part, uniform across the nation. Under federal rules, a household must meet three criteria to qualify for SNAP benefits (although states have flexibility to adjust these limits):

- Its gross monthly income generally must be at or below 130 percent of the poverty line, or \$2,213 (about \$26,600 a year) for a three-person family in fiscal year 2018. Households with elderly or disabled members and households that are “categorically eligible” for SNAP because they receive public assistance — such as Temporary Assistance for Needy Families or Supplemental Security Income — are not subject to the gross income test. The limit on gross income is higher for bigger families and lower for smaller families.
- The household’s net monthly income, or income after deductions are applied for items such as high housing costs and child care, must be less than or equal to the poverty line (\$1,702 a month or about \$20,400 a year for a three-person family in fiscal year 2018).
- Its assets must fall below \$2,250 for households without an elderly or disabled member and \$3,250 for those with an elderly or disabled member in fiscal year 2018.

SNAP targets its benefits according to need: households with less income receive larger benefits than households with more income since they need more help to afford an adequate diet. The benefit formula assumes that families will spend 30 percent of their net income for food; SNAP makes up the difference between that 30 percent contribution and the cost of a low-cost but nutritionally adequate diet.<sup>b</sup>

<sup>a</sup> Some categories of people are not eligible for SNAP regardless of their income or assets, such as individuals who are on strike, all unauthorized immigrants, and certain lawfully present immigrants. For more information, see “A Quick Guide to SNAP Eligibility and Benefits,” Center on Budget and Policy Priorities, updated September 14, 2017, <https://www.cbpp.org/research/a-quick-guide-to-snap-eligibility-and-benefits>.

<sup>b</sup> For more information on the structure and effectiveness of SNAP, see “Policy Basics: Introduction to the Supplemental Nutrition Assistance Program (SNAP),” Center on Budget and Policy Priorities, updated October 3, 2017, <http://www.cbpp.org/research/policy-basics-introduction-to-the-supplemental-nutrition-assistance-program-snap>.

## The Importance of Social Determinants of Health

Research accumulated over the last 25 years has firmly established the powerful effects of the circumstances in which people grow, live, work, and age on health, development, and longevity.<sup>1</sup> People disadvantaged by poor social and economic circumstances — including low income, poor education, insecure employment, poor housing, and inadequate retirement pensions — have worse health from the moment of birth throughout life. An average 40-year-old in the poorest 1 percent of American men, for example, will die 15 years sooner than a man in the richest 1 percent; the gap for American women is ten years.<sup>2</sup>

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<sup>1</sup> Paula Braveman, Susan Egerter, and David R. Williams, “The Social Determinants of Health: Coming of Age,” *Annual Review of Public Health*, 32:381-98, 2011, <http://www.annualreviews.org/doi/pdf/10.1146/annurev-publhealth-031210-101218>; Nancy E. Adler *et al.*, “Addressing Social Determinants of Health and Health Disparities,” Vital Directions for Health and Health Care Series, National Academy of Medicine, September 19, 2016, <https://nam.edu/wp-content/uploads/2016/09/Addressing-Social-Determinants-of-Health-and-Health-Disparities.pdf>.

<sup>2</sup> Raj Chetty *et al.*, “The Association Between Income and Life Expectancy in the United States, 2001-2014,” *Journal of the American Medical Association*, 315(16):1750-1766, 2016, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4866586/>.

While the ways that social and economic circumstances affect health are complicated and not fully understood, some research implicates chronic stress — including that stemming from economic hardships — in the more rapid onset or progression of chronic illnesses. Coping with the challenges of daily life can be particularly stressful when money is tight. The accumulated strain from trying to meet basic needs for food, shelter, and clothing with too few resources may lead to more damage than a single dramatically stressful event.<sup>3</sup>

Food insecurity may influence health and development through its effects on nutrition and as a component of overall family stress. Families that struggle with limited resources to put enough food on the table may buy more affordable but less nutritious foods. And the anxiety associated with unpredictable or intermittent meals may be a source of chronic stress that, if left unchecked, can contribute to an increased risk of chronic conditions, including high blood pressure, heart disease, obesity, and diabetes.

Food assistance programs like SNAP can help prevent or moderate the effects of food insecurity. Though its benefits are modest, SNAP helps low-income individuals and families who struggle to afford basic needs have enough to eat, enables them to afford healthier diets, and frees up resources that can be used on health-promoting activities and preventive health care. The benefits it provides may also offset some of the stress associated with food insecurity, and make it somewhat easier to manage chronic illness. Thus, SNAP may offer a pathway to improved health and lower public expenditures on health care.

### **Food Insecurity Is Associated with Poor Health Outcomes**

An extensive body of research reveals a consistent and strong correlation between food insecurity and poor health outcomes across the life cycle. Food insecurity among children is linked to increased risks of poor diets, the development of chronic health conditions including asthma and anemia, cognitive and behavioral problems, anxiety and depression, and poorer general health. Food insecurity among working-age adults is associated with poorer diet quality; multiple chronic conditions, including hypertension, coronary heart disease, diabetes, and kidney disease; and poorer general and mental health. And among seniors, food insecurity is linked to poorer diets, chronic conditions such as diabetes and anemia, worse general health, depression, more limitations in daily activities, and decreased quality of life.<sup>4</sup> Though to a lesser degree than with food insecurity, research suggests that marginal food security, defined by at least one reported indication of stress related to having insufficient food (but not as many indications as those considered food insecure), is also linked with adverse health outcomes among young children and caregivers.<sup>5</sup>

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<sup>3</sup> Richard Wilkinson and Michael Marmot, “Social Determinants of Health: The Solid Facts,” World Health Organization, 2003 (2<sup>nd</sup> edition), [http://www.euro.who.int/\\_data/assets/pdf\\_file/0005/98438/e81384.pdf](http://www.euro.who.int/_data/assets/pdf_file/0005/98438/e81384.pdf).

<sup>4</sup> For summaries of the extensive research on the health consequences of food insecurity, see Barbara A. Laraia, “Food Insecurity and Chronic Disease,” *Advances in Nutrition: An International Review Journal*, 4(2):203-212, 2013, <http://advances.nutrition.org/content/4/2/203.full>; Alisha Coleman-Jensen, William McFall, and Mark Nord, “Food Insecurity in Households with Children,” EIB-113. U.S. Department of Agriculture, Economic Research Service, May 2013, [https://www.ers.usda.gov/webdocs/publications/43763/37672\\_eib-113.pdf?v=41424](https://www.ers.usda.gov/webdocs/publications/43763/37672_eib-113.pdf?v=41424); and Craig Gundersen and James P. Ziliak, “Food Insecurity and Health Outcomes,” *Health Affairs*, 34(11):1830-1839, 2015, [http://gatttonweb.uky.edu/Faculty/Ziliak/GZ\\_HealthAffairs\\_34\(11\)\\_2015.pdf](http://gatttonweb.uky.edu/Faculty/Ziliak/GZ_HealthAffairs_34(11)_2015.pdf).

<sup>5</sup> John T. Cook *et al.*, “Are Food Insecurity’s Health Impacts Underestimated in the U.S. Population? Marginal Food Security Also Predicts Adverse Health Outcomes in Young U.S. Children and Mothers,” *Advances in Nutrition: An International Review Journal*, 4(1):51-61, 2013, <http://advances.nutrition.org/content/4/1/51.long>.

Recent work by researchers at the U.S. Department of Agriculture’s (USDA) Economic Research Service documents the strong correlation between food insecurity and chronic health conditions among low-income working-age adults. Their work shows that the risk of each of ten chronic conditions — hypertension, coronary heart disease, hepatitis, stroke, cancer, asthma, diabetes, arthritis, chronic obstructive pulmonary disease, and kidney disease — increases substantially as the severity of food insecurity increases (see Figure 1). Adults in households with very low food security are at least 40 percent more likely to be diagnosed with at least one of the ten chronic diseases than adults in food-secure households.<sup>6</sup>

Research has established a strong association between food insecurity and physical and mental health. Some of the research is based on study designs that make it difficult to determine whether food insecurity causes poor health, poor health contributes to food insecurity, or both are caused by other unobserved factors. Poor physical or mental health may make it harder to work, for example, leading to lower income and increasing the risk of food insecurity. Conversely, limited budgets may force families to purchase cheaper but less healthy food, or make a choice between buying food or medications, with adverse consequences for their health. But regardless of the precise mechanism that links the two, food insecurity is a strong predictor of poorer physical and mental health.

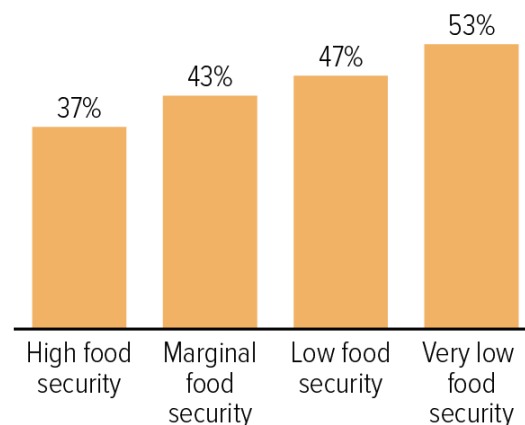
### Food Insecurity Is Associated with Cost-Related Medication Underuse

People facing food insecurity may put off attending to their health when faced with other pressing needs, choosing food over medication, postponing needed medical care, or forgoing special medical diets, for example. Taking less medication than prescribed, or not taking it at all, due to cost is a significant public health problem that affects the health and well-being of as many as 1 in 4 working-age adults.<sup>7</sup>

FIGURE 1

### Adults in Households with Less Food Security Are Likelier to Have a Chronic Illness

Probability of any chronic illness



Note: “High food security” = household has access to nutritious food at all times during the year. “Marginal food security” = household is concerned about adequacy, but does not compromise quality or quantity, of their diet. “Low food security” = household reduces quality or quantity of their diet at some point during the year because of limited resources. “Very low food security” = one or more household members skip meals or otherwise eat less at some point during the year because they lack money.

Source: Christian A. Gregory and Alisha Coleman-Jensen, “Food Insecurity, Chronic Disease, and Health Among Working-Age Adults,” U.S. Department of Agriculture, July 2017. Adjusted for differences in demographic, socioeconomic and other characteristics. Sample includes working-age adults in households at or below 200% of the federal poverty level.

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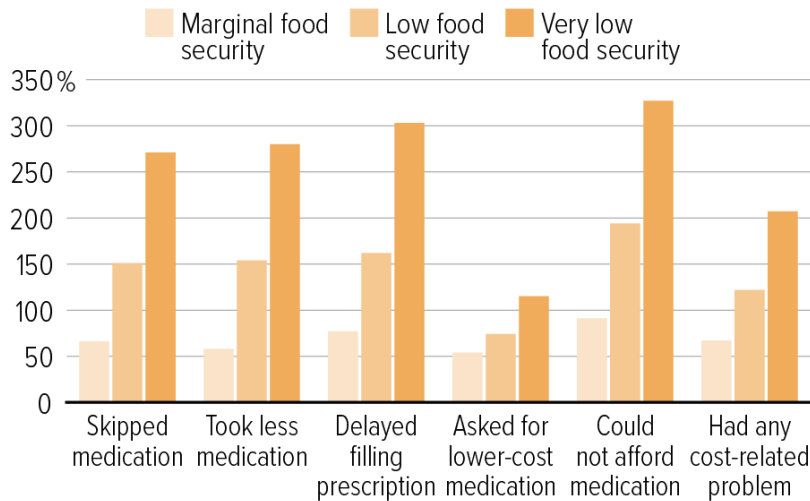
<sup>6</sup> Christian A. Gregory and Alisha Coleman-Jensen, “Food Insecurity, Chronic Disease, and Health Among Working-Age Adults,” ERR-235, U.S. Department of Agriculture, Economic Research Service, July 2017, <https://www.ers.usda.gov/webdocs/publications/84467/err-235.pdf?v=42942>.

<sup>7</sup> Dena Herman *et al.*, “Food Insecurity and Cost-Related Medication Underuse Among Nonelderly Adults in a Nationally Representative Sample,” *American Journal of Public Health*, 105(10):e48-e59, October 2015, <http://ajph.aphapublications.org/doi/full/10.2105/AJPH.2015.302712>

FIGURE 2

## Adults in Households with Less Food Security Are Likelier to Skip Needed Medications

Percent more likely relative to food-secure households



Note: "Food secure" = household has access to nutritious food at all times during the year. "Marginal food security" = household is concerned about adequacy, but does not compromise quality or quantity, of their diet. "Low food security" = household reduces quality or quantity of their diet at some point during the year because of limited resources. "Very low food security" = one or more household members skip meals or otherwise eat less at some point during the year because they lack money.

Source: Dena Herman et al., "Food Insecurity and Cost-Related Medication Underuse Among Nonelderly Adults in a Nationally Representative Sample," *American Journal of Public Health*, October 2015. Adjusted for differences in demographic, socioeconomic and other characteristics. Sample includes adults age 18 to 64.

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Several recent studies based on large national surveys find that food insecurity is associated with the underuse of medication due to cost among working-age adults, including those with chronic disease and diabetes, and among the elderly. Among working-age adults, for example, those in food-insecure households are about four times more likely to have a problem with medication underuse because of cost than those in food-secure households, even after adjusting for differences in the characteristics of food-secure and food-insecure households. There is also evidence that cost-related medication underuse increases with the severity of food insecurity: compared to people in food-secure households, for example, people in households with marginal food security are about 50 percent more likely to have at least one cost-related medication problem, people in households with low food security are more than twice as likely, and those in households with very low food security, the most severe form, are more than three times as likely (see Figure 2).<sup>8</sup>

<sup>8</sup> Seth A. Berkowitz, Hilary K. Seligman, and Niteesh K. Choudhry, "Treat or Eat: Food Insecurity, Cost-Related Medication Underuse, and Unmet Needs," *The American Journal of Medicine*, 127(4):303-310, 2014, [http://www.amjmed.com/article/S0002-9343\(14\)00030-8/fulltext](http://www.amjmed.com/article/S0002-9343(14)00030-8/fulltext); Herman et al. (2015); Chadwick K. Knight et al., "Household food insecurity and medication 'scrimping' among US adults with diabetes," *Preventive Medicine*, 83:41-45, February 2016, <http://www.sciencedirect.com/science/article/pii/S0091743515003679>; Minal R. Patel et al., "Social determinants of health, cost-related nonadherence, and cost-reducing behaviors among adults with diabetes: findings from the National Health Interview Survey," *Medical Care*, 54(8):796-803, August 2016, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4945373/>; and

## Food Insecurity Is Associated with Higher Health Care Use and Costs

Food insecurity imposes a substantial burden on society, including lost productivity and avoidable health care costs. While it may not be possible to create a precise estimate of food insecurity's economic burden, there is reason to think it could be substantial.<sup>9</sup>

Canadian researchers, for example, using linked survey and administrative data on 67,000 working-age adults in Ontario province, show that public health care expenditures are substantially higher for food-insecure people, even after adjusting for other socioeconomic and demographic characteristics that might affect either food security or costs. The findings are particularly compelling because the study occurred in the context of Canada's universal health care system, alleviating concerns that the observed differences are due to differences in access to health insurance. The researchers found that individuals in households with moderate food insecurity are a third more likely to use health care services — and expenses among these health care users are a third higher — than those in food-secure households. And as food insecurity increases, so do health care costs. Individuals in households with the most severe food insecurity are 71 percent more likely to use health care services, and the expenses of these health care users are 76 percent higher, than those in food-secure households (see Figure 3).<sup>10</sup>

Researchers in the United States, using national survey data to capture out-of-pocket expenses and insurance payments for two years after a household experiences food insecurity, found similar results. On average, again after adjusting for a range of socioeconomic and demographic characteristics expected to affect food security and spending on health care (both out-of-pocket and paid by insurance, including Medicare and Medicaid), people in food-insecure households spend roughly 45 percent more on medical costs in a year (\$6,100) than people in food-secure households (\$4,200). Annual health care costs are \$4,400 higher among those with diabetes, \$2,200 higher among those with hypertension, and \$5,100 higher among those with heart disease.<sup>11</sup>

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Patience Afulani *et al.*, “Food Insecurity and Health Outcomes Among Older Adults: The Role of Cost-Related Medication Underuse,” *Journal of Nutrition in Gerontology and Geriatrics*, 34(3):319-342, August 12, 2015, <http://www.tandfonline.com/doi/abs/10.1080/21551197.2015.1054575>.

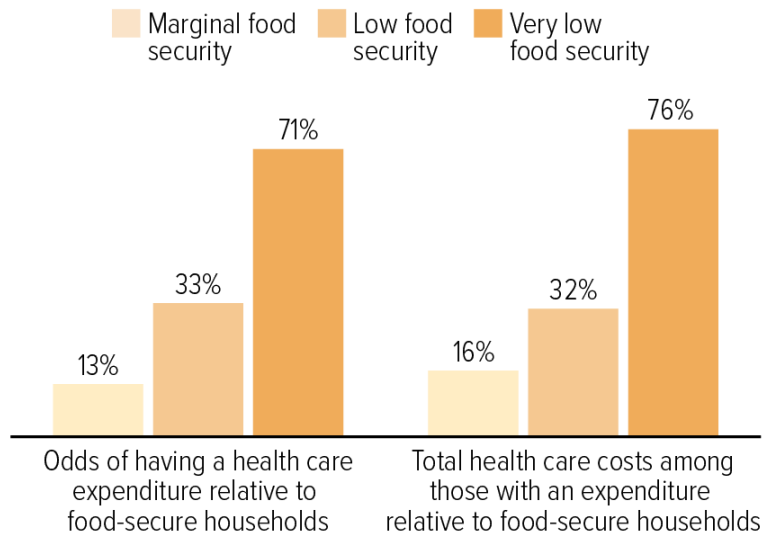
<sup>9</sup> Though fraught with uncertainty, some estimates suggest the annual cost of poor health and illness associated with food insecurity in the United States is as much as \$160 billion. Donald S. Shepard, Elizabeth Setren, and Donna Cooper, “Hunger in America: Suffering We All Pay For,” Center for American Progress, October 2011, [https://www.americanprogress.org/wp-content/uploads/issues/2011/10/pdf/hunger\\_paper.pdf](https://www.americanprogress.org/wp-content/uploads/issues/2011/10/pdf/hunger_paper.pdf); and John T. Cook and Ana Paula Poblacion, “Estimating the Health-Related Costs of Food Insecurity and Hunger,” in *The Nourishing Effect: Ending Hunger, Improving Health, Reducing Inequality*, Bread for the World, 2016, [http://childrenshealthwatch.org/wp-content/uploads/JohnCook\\_cost\\_of\\_hunger\\_study.pdf](http://childrenshealthwatch.org/wp-content/uploads/JohnCook_cost_of_hunger_study.pdf).

<sup>10</sup> Valerie Tarasuk *et al.*, “Association Between Household Food Insecurity and Annual Health Care Costs,” *Canadian Medical Association Journal*, 187(14):E429-E436, October 6, 2015, <http://www.cmaj.ca/content/187/14/E429>. Note that the Canadian classifications (marginal, moderate, and severe) differ from those used to monitor food security in the United States (food insecure and very low food security), though both measures are based on the same set of questions. The authors also report results that include prescription drug benefits. Because these benefits are available only to low-income households in Ontario, and having low income is a strong predictor of food insecurity, their inclusion is likely to confound (and probably overstate) the association between food insecurity and health care costs. As expected, the inclusion of prescription drug costs results in even greater differences in total health care expenditures: 49 percent higher for households with moderate food insecurity and 121 percent higher for those with severe food insecurity.

<sup>11</sup> Seth A. Berkowitz, Sanjay Basu, James B. Meigs, and Hillary K. Seligman, “Food Insecurity and Health Care Expenditures in the United States, 2011-2013,” *Health Services Research*, June 13, 2017, <http://onlinelibrary.wiley.com/doi/10.1111/1475-6773.12730/full>.

FIGURE 3

## Adults in Households with More Food Insecurity Are Likelier to Use Health Care, Have Higher Costs



Note: "Marginal food security" = household reports at least one indication of difficulty with food access due to limited resources. "Low food security" = household reduces quality or quantity of their diet at some point during the year because of limited resources. "Very low food security" = one or more household members skip meals or otherwise eat less at some point during the year because they lack money. "Health care expenditures (costs)" = public expenditures on direct medical costs, excluding out-of-pocket and private insurance payments.

Source: Adapted from Valerie Tarasuk et al., "Association Between Household Food Insecurity and Annual Health Care Costs," *Canadian Medical Association Journal*, October 2015. Based on linked survey and administrative health care records for adults age 18 to 64, Ontario, Canada.

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While these results do not on their own fully establish a causal relationship, the study's longitudinal design provides evidence that exposure to food insecurity is likely to be associated with higher subsequent health care expenditures. But it is also worth noting that this study determined food security status only once based on a household's food-related problems in the 30 days before the survey interview took place. Food security, however, can change from month to month as a family's circumstances improve or worsen. As a result, the question of whether, and how much, the duration of exposure to food insecurity matters for subsequent health care expenditures remains unanswered.

Food insecurity is also associated with greater use of health care services. Adults in food-insecure households are about 50 percent more likely to visit an emergency room and to be admitted to a hospital, and they stay hospitalized about 50 percent longer, than adults in food-secure households

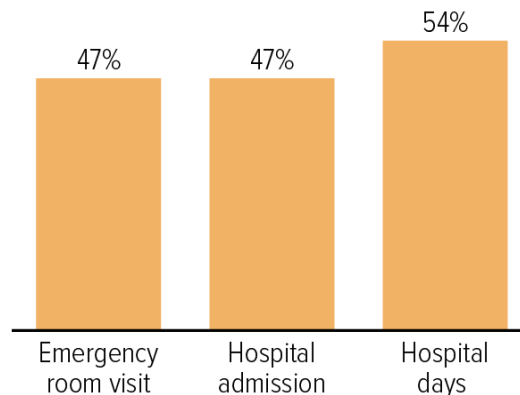


(see Figure 4). Food-insecure seniors are more likely to make use of health care services, including office visits, overnight stays in a hospital, and emergency rooms, than food-secure seniors.<sup>12</sup>

FIGURE 4

### Adults in Food-Insecure Households Have More Emergency Room Visits and Hospital Admissions

Percent more likely relative to food-secure households



Note: "Food-insecure" = lacking consistent access to nutritious food during the year due to limited resources.

Source: Seth Berkowitz, Hilary K. Seligman, and Sanjay Basu, "Impact of Food Insecurity and SNAP Participation on Healthcare Utilization and Expenditures," University of Kentucky Center for Poverty Research, 2017.

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### SNAP Helps Put Food on the Table and Improves Food Security

SNAP serves a vital role in improving the health and well-being of low-income people by making adequate, nutritious food more affordable. Because SNAP enables low-income households to spend more on food than their limited budgets would otherwise allow, it makes it easier to put enough food on the table.

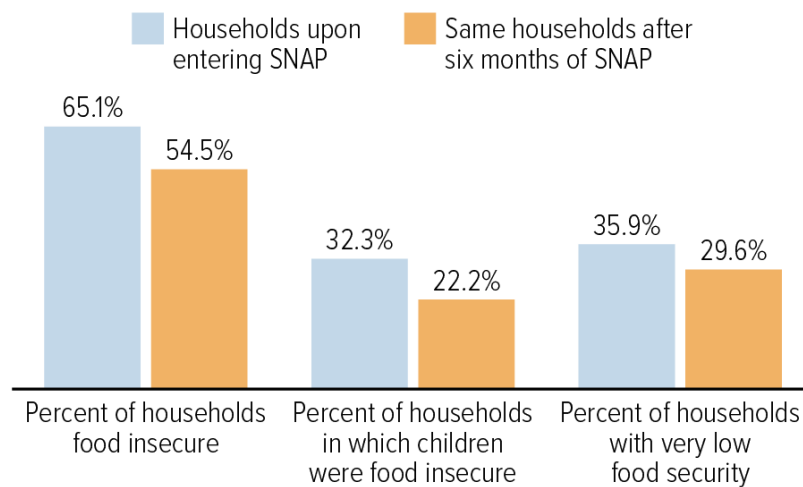
Estimating SNAP's impact on food security is challenging, however, because households that participate in SNAP differ in systematic ways from households that do not. Notably, one of the main tools researchers use to separate a program's impact from such differences — a randomized control trial — is generally not feasible as a way to measure the impact of SNAP because withholding nutrition benefits from a random sample of low-income individuals raises serious

<sup>12</sup> Seth Berkowitz, Hilary K. Seligman, and Sanjay Basu, "Impact of Food Insecurity and SNAP Participation on Healthcare Utilization and Expenditures," University of Kentucky Center for Poverty Research Discussion Paper Series, DP2017-02, 2017, [http://uknowledge.uky.edu/cgi/viewcontent.cgi?article=1105&context=ukcpr\\_papers](http://uknowledge.uky.edu/cgi/viewcontent.cgi?article=1105&context=ukcpr_papers); and Vibha Bhargava and JungSun Lee, "Food Insecurity and Health Care Utilization Among Older Adults in the United States," *Journal of Nutrition in Gerontology and Geriatrics*, 35(3):177-192, 2016, <http://www.tandfonline.com/doi/abs/10.1080/21551197.2016.1200334>.

ethical questions (see Appendix). Failing to account for those differences can lead to misleading results. It is hard to imagine how, for example, giving a family more resources to buy food could reduce their food security as some early studies suggested. Recent evidence, based on studies with stronger research designs that support causal inferences, shows that SNAP participation does substantially improve food security. SNAP reduces the overall prevalence of food insecurity by as much as 30 percent, and is even more effective among the most vulnerable, such as children and those with very low food security.

FIGURE 5

### SNAP Helps Families Afford Adequate Food



Note: "Food insecure" = household lacks consistent access to nutritious food at some point during the year because of limited resources. "Households in which children were food insecure" = households in which both children and adults experience food insecurity during the year. "Very low food security" = one or more household members have to skip meals or otherwise eat less at some point during the year because they lack money.

Source: Agriculture Department, "Measuring the Effect of Supplemental Nutrition Assistance Program (SNAP) Participation on Food Security," August 2013. This chart shows the results of a study that looked at longitudinal data comparing SNAP households upon beginning to receive SNAP, and six months after SNAP receipt.

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The largest and most rigorous examination of the relationship between SNAP participation and food security found that overall food insecurity fell by as much as one-fifth and that food insecurity among children fell by roughly a third after their families received SNAP benefits for six months (see Figure 5).<sup>13</sup> Researchers at the Urban Institute used national survey data from the late 1990s and

<sup>13</sup> James Mabli *et al.*, "Measuring the Effect of Supplemental Nutrition Assistance Program (SNAP) Participation on Food Security," Food and Nutrition Service, USDA, 2013, <https://www.fns.usda.gov/measuring-effect-snap-participation-food-security-0>. By following families as they enter SNAP, this study avoids two major pitfalls that would otherwise make it difficult to assert that participation is responsible for the improvements in food security. First, it avoids the problems associated with self-selection by using these families as their own controls, comparing their food security status just before entering SNAP to their status six months later (rather than to non-participants). Second, it avoids the problems associated with underreporting of SNAP participation in most surveys by drawing the sample of families directly from the records of local SNAP offices.

early to mid-2000s to show that SNAP reduces the likelihood of being food insecure by roughly 30 percent and the likelihood of being very food insecure by roughly 20 percent.<sup>14</sup>

There is also direct evidence that a more generous SNAP benefit would help many more families afford adequate food. USDA's large-scale randomized experiment to test the effects of providing additional benefits during summer months when children do not have access to free or reduced-price school meals produced striking results: the additional benefits reduced very low food security among children by about one-third.<sup>15</sup> And food insecurity fell after the American Recovery and Reinvestment Act of 2009 temporarily increased SNAP benefits to help those affected most by the Great Recession.<sup>16</sup>

### **SNAP Is Associated with Improved Current and Long-Term Health Outcomes**

Maintaining good health requires ongoing investment of both time and money. It can be difficult for low-income households to make those investments when faced with multiple demands on limited budgets. The food assistance offered by SNAP helps with a modest benefit that may nevertheless make it easier for individuals and families to afford healthier food. SNAP benefits also free up resources that can be used on health-promoting activities and preventive health care by reducing what families must spend out of pocket on food. And the addition of SNAP benefits to a household's budget may reduce the stress associated with not having enough money to feed a family. Some health impacts may be possible in the short term, but other potential health benefits may take longer to emerge and depend on how long families participate and the amount of benefits they receive.

While not conclusive, existing research suggests that SNAP may, in fact, offer a pathway to better health.

- **SNAP is associated with improvements in current health.** After adjusting for differences in demographic, socioeconomic, and other characteristics, adults who participate in SNAP are more likely to assess their own health as excellent or very good (see Figure 6), as are parents who assess their child's health. Adults have fewer sick days, make fewer visits to a doctor, are less likely to forgo needed care because they cannot afford it, and are less likely to exhibit psychological distress.<sup>17</sup>

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<sup>14</sup> Caroline Ratcliffe, Signe-Mary McKernan, and Sisi Zhang, "How Much Does the Supplemental Nutrition Assistance Program Reduce Food Insecurity?" *American Journal of Agricultural Economics*, 93(4):1082-1098, July 12, 2011, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4154696/>.

<sup>15</sup> The demonstration initially provided a monthly benefit of \$60 in the summer of 2012 and then compared the relative effectiveness of a smaller benefit (\$30) in the summers of 2013 and 2014. The results suggested that both increases produced similar improvements in the most severe form of food insecurity among children. See Ann Collins *et al.*, "Summer Electronic Benefits Transfer for Children (SEBTC) Demonstration: Summary Report," prepared for the Food and Nutrition Service, USDA, May 2016, <https://fns-prod.azureedge.net/sites/default/files/ops/sebtfinalreport.pdf>.

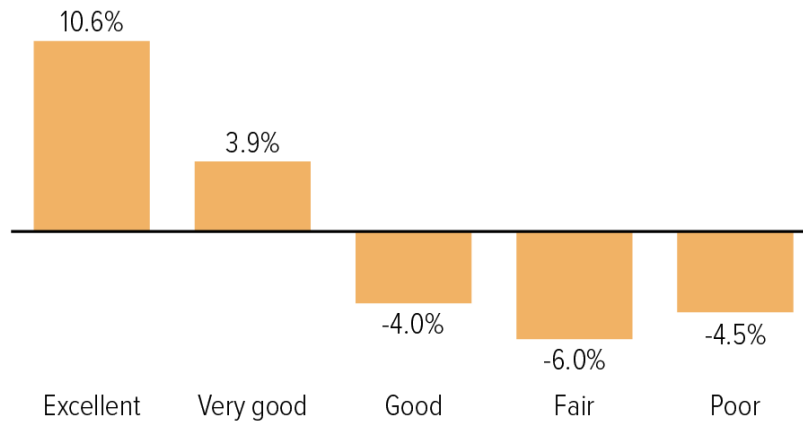
<sup>16</sup> Mark Nord and Mark Prell, "Food Security Improved Following the 2009 ARRA Increase in SNAP Benefits," ERR-116, U.S. Department of Agriculture, Economic Research Service, April 2011, [https://www.ers.usda.gov/webdocs/publications/44837/7469\\_err116.pdf?v=41056](https://www.ers.usda.gov/webdocs/publications/44837/7469_err116.pdf?v=41056).

<sup>17</sup> Christian A. Gregory and Partha Deb, "Does SNAP Improve Your Health?" *Food Policy*, 50:11-19, 2015, <http://www.sciencedirect.com/science/article/pii/S0306919214001419>; Daniel P. Miller and Taryn Morrissey, "Using Natural Experiments to Identify the Effects of SNAP on Child and Adult Health," University of Kentucky Center for Poverty Research, Discussion Paper Series, DP2017-04, January 2017,

FIGURE 6

## SNAP Participants Report Better Health Than Eligible Non-Participants

Percent more or less likely to describe health as:



Source: Christian A. Gregory and Partha Deb, “Does SNAP Improve Your Health?” Food Policy, 2015. Adjusted for differences in demographic, socioeconomic and other characteristics. Sample includes adults aged 20 to 64 in households with income at or below 130% of the federal poverty level.

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Other researchers have shown that children receiving SNAP are less likely than low-income non-participants to be in fair or poor health or underweight, and their families are less likely to make tradeoffs between paying for health care and paying for other basic needs, like food, housing, heating, and electricity.<sup>18</sup> Children who lose some or all of their SNAP benefits are more likely to have poor health and be food insecure compared to children in families that maintain benefits, and families that lose benefits are more likely to forgo medical care or make health care tradeoffs than families who consistently receive SNAP benefits.<sup>19</sup>

[https://uknowledge.uky.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=1103&context=ukopr\\_papers](https://uknowledge.uky.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=1103&context=ukopr_papers); and Vanessa M. Oddo and James Mabli, “Participation in the Supplemental Nutrition Assistance Program and Psychological Distress,” *American Journal of Public Health*, 6:e30-e35, June 2015,

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4431109/pdf/AJPH.2014.302480.pdf>.

<sup>18</sup> Katherine M. Joyce *et al.*, “Household Hardships, Public Programs, and Their Associations with the Health and Development of Very Young Children: Insights from Children’s HealthWatch,” *Journal of Applied Research on Children: Informing Policy for Children at Risk*, 3(1), 2012, [http://www.childrenshealthwatch.org/wp-content/uploads/KJ\\_IARC\\_2012.pdf](http://www.childrenshealthwatch.org/wp-content/uploads/KJ_IARC_2012.pdf); and Stephanie Ettinger de Cuba *et al.*, “The SNAP Vaccine: Boosting Children’s Health,” Children’s HealthWatch, February 1, 2012, <http://childrenshealthwatch.org/the-snap-vaccine-boosting-childrens-health/>.

<sup>19</sup> Allison Bovell *et al.*, “Making SNAP Work for Families Leaving Poverty,” Children’s HealthWatch, November 2014, <http://www.childrenshealthwatch.org/wp-content/uploads/FINALPhilly-Food-to-web3.pdf>; and Stephanie Ettinger de Cuba *et al.*, “Punishing Hard Work: The Unintended Consequences of Cutting SNAP Benefits,” Children’s HealthWatch, December 12, 2013, <http://childrenshealthwatch.org/punishing-hard-work-the-unintended-consequences-of-cutting-snap-benefits/>.

- **Early access to SNAP can improve birth outcomes and long-term health.** Poor nutrition during childhood may harm health and earnings decades later by altering physical development and affecting the ability to learn. Researchers comparing the long-term outcomes of individuals in different areas of the country when SNAP expanded nationwide in the 1960s and early 1970s found that mothers exposed to SNAP during pregnancy gave birth to fewer low-birth-weight babies. Adults with access to food stamps in early childhood had lower risks of obesity and other conditions related to heart disease and diabetes (see Figure 7).<sup>20</sup>

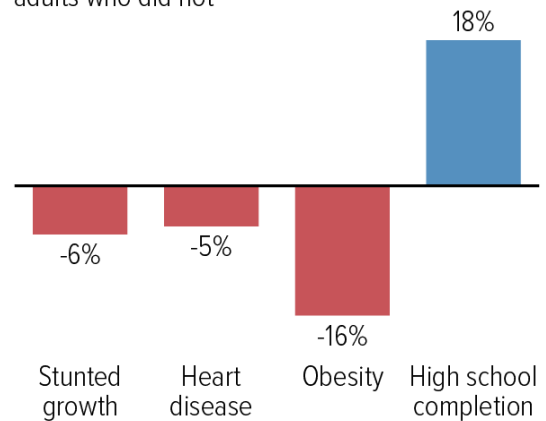
Similarly, the experience of children of immigrants during a period when eligibility rules changed for their parents offers evidence that an additional year of SNAP eligibility in early life (from in utero to age 4) is associated with improvements in health outcomes — parental reports of health status, overnight hospitalizations, and number of doctor’s visits — between ages 6 and 16, providing evidence that participating in the program as a young child can impact later-life health as soon as school age.<sup>21</sup> While immigrants are a select and relatively more disadvantaged group of SNAP participants, children of immigrants account for about a quarter of all children and one-third of children in poverty. Welfare reform eliminated SNAP eligibility for most immigrant families in 1996, but subsequent federal legislation gradually restored eligibility between 1998 and 2003. These changes in eligibility allow for a relatively strong test of the impact of SNAP on children’s health, as the researchers compared health outcomes among children whose parents lost eligibility for SNAP when they were in early childhood to similar children whose parents remained eligible.

Families who live in areas with lower food prices — and who, therefore, have a somewhat easier time stretching their SNAP benefits to meet their food needs — may be more likely to take advantage of needed medical care. One study suggests, for example, that children who live in lower-cost areas (with higher SNAP purchasing power) are more likely to have had an

FIGURE 7

### Children With Access to SNAP Fare Better Years Later

Percentage-point change in outcomes for adults who received SNAP as children, compared to adults who did not



Note: The study compared individuals who had access to SNAP (then food stamps) in early childhood after its introduction in the 1960s and early 1970s to similar children who did not (because they were born before its introduction) in each county.

Source: Hoynes, Schanzenbach, and Almond, “Long-Run Impacts of Childhood Access to the Safety Net,” *American Economic Review*, April 2016.

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<sup>20</sup> Douglas Almond, Hillary Hoynes, and Diane Schanzenbach, “Inside the War on Poverty: The Impact of Food Stamps on Birth Outcomes,” *The Review of Economics and Statistics*, 93(2), May 2011, [https://www.mitpressjournals.org/doi/pdfplus/10.1162/REST\\_a\\_00089](https://www.mitpressjournals.org/doi/pdfplus/10.1162/REST_a_00089); and Hilary Hoynes, Diane Whitmore Schanzenbach, and Douglas Almond, “Long-Run Impacts of Childhood Access to the Safety Net,” *American Economic Review*, 106(4):903–934, April 2016, <https://pdfs.semanticscholar.org/94b/26c57bb565b566913d2af161e555edeb7f21.pdf>. It is important to note that much has changed since the initial introduction of the Food Stamp Program, including the introduction and growth of the Special Supplemental Nutrition Program for Women, Infants, and Children, and Medicaid.

<sup>21</sup> Chloe East, “The Effect of Food Stamps on Children’s Health: Evidence from Immigrants’ Changing Eligibility,” September 2, 2016, [http://ceast.weebly.com/uploads/8/9/9/7/8997263/east\\_jmp.pdf](http://ceast.weebly.com/uploads/8/9/9/7/8997263/east_jmp.pdf).

annual check-up and may be less likely to delay or go without medical care due to its cost. Children who live in higher-cost areas (with lower SNAP purchasing power) miss more days of school due to illness.<sup>22</sup>

### SNAP Is Linked with Improved Medication Adherence

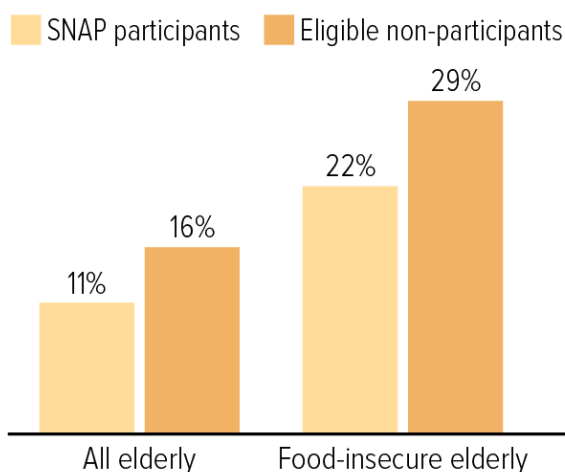
As noted above, people experiencing food insecurity are more likely to put off prescription refills, skip doses, or take less medication than prescribed to save money. SNAP may help participants adhere to medication regimens by improving their food security and reducing their out-of-pocket costs for food, freeing up resources that might be used for medication.

Few studies have considered — and only one has focused on — SNAP’s impact on cost-related medication underuse. An analysis of elderly SNAP participants concludes that they are 5 percentage points less likely to cut back on their medications because of cost than eligible non-participants, a 30 percent reduction. This difference persists even after controlling for differences in food security between the two groups: even among only those in food-insecure households, elderly SNAP participants are still 7 percentage points less likely to have cost-related medication problems than eligible non-participants, a reduction of 26 percent (see Figure 8).<sup>23</sup> These results suggest that increasing access to SNAP might make it easier for low-income seniors to afford their prescription medications.

FIGURE 8

#### Elderly SNAP Participants Less Likely to Skip Needed Medications

Percent who skip or stop medications, take smaller doses, or delay a prescription due to cost



Note: “Food insecure” = lacking consistent access to nutritious food during the year due to limited resources. Adjusted for differences in demographic, socioeconomic, health, and other characteristics.

Source: Mithuna Srinivasan and Jennifer A. Pooler, “Cost-Related Medication Nonadherence for Older Adults Participating in SNAP, 2013–2015.” *American Journal of Public Health*, December 2017

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### SNAP Is Associated with Reduced Health Care Costs

Recognition of the importance of social determinants of health calls attention to programs, policies, and practices that shape the physical and social environments in which individuals live and work. Some of the most important opportunities for improving health and reducing health care spending may be found in economic and social resources that promote healthy living and working conditions and healthy choices. By increasing access to healthier food choices and reducing the

<sup>22</sup> See Hilary Hoynes, Erin Bronchetti, and Garret Christensen, “The Real Value of SNAP Benefits and Health Outcomes,” University of Kentucky Center for Poverty Research, Discussion Paper Series, DP2017-03, January 2017, [https://uknowledge.uky.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=1104&context=ukcpr\\_papers](https://uknowledge.uky.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=1104&context=ukcpr_papers).

<sup>23</sup> Mithuna Srinivasan and Jennifer A. Pooler, “Cost-Related Medication Nonadherence for Older Adults Participating in SNAP, 2013–2015,” *American Journal of Public Health*, published online December 21, 2017, <http://ajph.aphapublications.org/doi/10.2105/AJPH.2017.304176>.

stress of food insecurity, as well as by freeing up resources that participants can spend on their health, SNAP may be one such path to lower health care costs, the available evidence, while limited, suggests.

- **SNAP is associated with a reduced likelihood of nursing home and hospital admissions among low-income elderly participants, compared to low-income non-participating counterparts.** Researchers looking at over 60,000 low-income seniors in Maryland report that SNAP participants are 23 percent less likely to enter a nursing home and 4 percent less likely to be hospitalized in the year after receiving SNAP than non-participants. The amount of SNAP benefits received also matters: larger monthly benefits were associated with a further reduction in the odds of nursing home admissions, the length of stays among those admitted, and the likelihood of hospitalization (see Figure 9).<sup>24</sup>

This research controls for several socioeconomic and demographic characteristics that could otherwise bias the results. Similarly, it also controls for chronic conditions and Medicaid participation, which would affect health and health care utilization outcomes. Despite this design, it may not fully account for unobserved differences between participants and non-participants. It is noteworthy, however, that analyses using the amount of SNAP benefits received rather than simply participation in the previous year reveals a similar relationship with the likelihood of nursing home and hospital admissions. Because that analysis is limited to those who participate in SNAP and looks only at differences in the amount received, it is not subject to the same concern about self-selection into the program.

More generally, research using longitudinal data that followed older adults for ten years suggests that food-insecure seniors who participate in SNAP are 46 percent less likely to be hospitalized than non-participating, low-income seniors. Even among food-secure seniors, participation is associated with an 18 percent reduction in the likelihood of hospitalization.<sup>25</sup>

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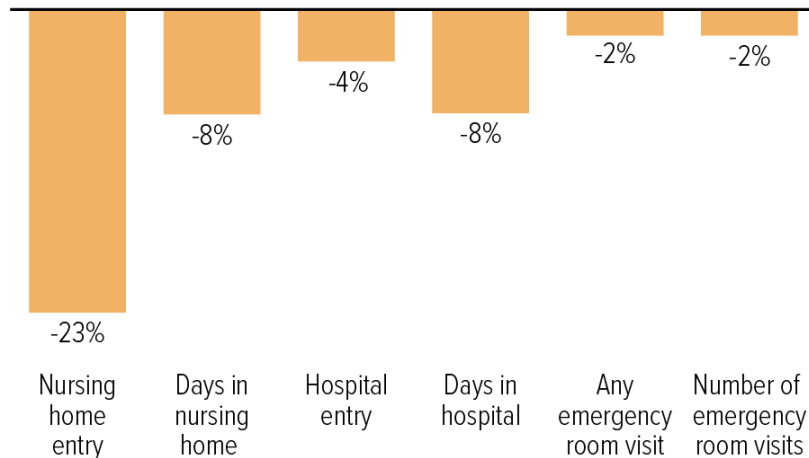
<sup>24</sup> See Sarah L. Szanton *et al.*, “Food assistance is associated with decreased nursing home admissions for Maryland’s dually eligible older adults,” *BMC Geriatrics*, 17(1), 162, 2017, <https://bmgeriatr.biomedcentral.com/articles/10.1186/s12877-017-0553-x>; and Laura J. Samuel *et al.*, “Does the Supplemental Nutrition Assistance Program Affect Hospital Utilization Among Older Adults? The Case of Maryland,” *Population Health Management*, 2017, [http://www.bdtrust.org/wp-content/uploads/2017/07/Pop-Health-Mgmt\\_Hospitalizations\\_linked.pdf](http://www.bdtrust.org/wp-content/uploads/2017/07/Pop-Health-Mgmt_Hospitalizations_linked.pdf). In addition to controlling for demographic and socioeconomic factors that may contribute to differences between SNAP participants and non-participants, hospitalization findings include a control for proportion of time spent on Medicaid. As the authors note, SNAP participants are more likely to participate in Medicaid, and Medicaid participation is linked with hospital utilization. Models that do not include this control (but do control for demographic and socioeconomic factors) find that SNAP participants had a 14 percent lower probability of hospitalization compared to non-participants.

<sup>25</sup> J. Kim, “Are Older Adults Who Participate in the Supplemental Nutrition Assistance Program Healthier Than Eligible Nonparticipants? Evidence from the Health and Retirement Study,” *The Gerontologist*, 55 (Supplement Issue 2):672, November 1, 2015, [https://academic.oup.com/gerontologist/article/55/Suppl\\_2/672/2489236](https://academic.oup.com/gerontologist/article/55/Suppl_2/672/2489236).

FIGURE 9

## Elderly SNAP Participants Are Less Likely to Use Health Care Services

Percent relative to low-income elderly non-participants



Source: Sarah L. Szanton et al., “Food assistance is associated with decreased nursing home admissions for Maryland’s dually eligible older adults,” *BMC Geriatrics*, July 2017; and Laura J. Samuel et al., “Does the Supplemental Nutrition Assistance Program Affect Hospital Utilization Among Older Adults? The Case of Maryland,” *Population Health Management*, 2017. Adjusted for differences in demographic, socioeconomic and other characteristics. Results for hospital and emergency room visits adjust for proportion of the year on Medicaid. Sample includes adults age 65 and older eligible for both Medicare and Medicaid in Maryland.

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- SNAP participation is also linked with lower overall health care expenditures and Medicaid/Medicare costs.** An analysis of national data on overall health care expenditures links SNAP participation to lower health care costs. On average, after controlling for factors expected to affect spending on medical care, low-income adults participating in SNAP incur about \$1,400, or nearly 25 percent, less in medical care costs in a year, including those paid by private or public insurance, than non-participants (see Figure 10). The differences are even greater among those with hypertension (nearly \$2,700 less) and coronary heart disease (about \$4,100 less).<sup>26</sup> While the approach used to generate these results may not fully account for

<sup>26</sup> Seth A. Berkowitz et al., “Supplemental Nutrition Assistance Program (SNAP) Participation and Health Care Expenditures Among Low-Income Adults,” *JAMA Internal Medicine*, November 2017, [https://jamanetwork.com/journals/jamainternalmedicine/article-abstract/2653910?amp%3butm\\_source=JAMA+Intern+MedPublishAheadofPrint&utm\\_campaign=25-09-2017](https://jamanetwork.com/journals/jamainternalmedicine/article-abstract/2653910?amp%3butm_source=JAMA+Intern+MedPublishAheadofPrint&utm_campaign=25-09-2017); and Seth Berkowitz, Hilary K. Seligman, and Sanjay Basu, “Impact of Food Insecurity and SNAP Participation on Healthcare Utilization and Expenditures,” University of Kentucky Center for Poverty Research Discussion Paper Series, DP2017-02, 2017, [http://uknowledge.uky.edu/cgi/viewcontent.cgi?article=1105&context=ukcpr\\_papers](http://uknowledge.uky.edu/cgi/viewcontent.cgi?article=1105&context=ukcpr_papers). An older study that did not fully account for unobserved differences did not find a significant difference in Medicare spending among low-income elderly with diabetes between those who received food stamps (as SNAP was known then) and those who did not. See Lauren H. Nicholas, “Can Food Stamps Help to Reduce Medicare Spending on Diabetes?” *Economics and Human Biology*, 9(1):1-13, January 2011, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3032985/>. Still older work using a different data set and analytic approach concluded that SNAP increased medical expenses of nonelderly women by \$300 to \$700 per year, mainly because program benefits freed up additional discretionary income that could be spent on medical care. See Chad D. Meyerhoefer and Yuriy Pylypchuk, “Does Participation in the Food Stamp Program Increase the Prevalence of Obesity and Health Care Spending?” *American Journal of Agricultural Economics*, 90(2):287-305, May 1, 2008, <https://academic.oup.com/ajae/article-abstract/90/2/287/99451>.



unobserved differences between SNAP participants and non-participants, two alternative analyses that mitigate potential for bias due to self-selection into SNAP also demonstrate reduced health care expenditures — of as much as \$5,000 — associated with SNAP participation. None of these approaches, however, accounts for either the duration or amount of benefits received.

### Conclusion

The research reviewed here suggests that policies to improve the food security of low-income individuals and families and increase their access to SNAP might reverberate across a variety of health outcomes. Food insecurity is strongly associated with increases in the risk of adverse health outcomes, may complicate the ability to manage illness, and is linked to higher health care costs. SNAP improves food security, offers benefits that enable families to purchase healthier diets, and frees up resources that can be used for health-promoting activities and needed medical care. Policies that address food insecurity, SNAP participation, and benefits could improve health, reduce health disparities, and lower costs.

States should be especially interested in the possibility that enrolling low-income eligible individuals and families in SNAP might help reduce health care costs. States and the federal government share the cost of providing health care coverage for low-income individuals and families through Medicaid. The state share of Medicaid costs ranges from about 25 percent to 50 percent, with poorer states paying less. Overall, Medicaid accounts for roughly a quarter of total state expenditures. In contrast, the federal government is responsible for the entire cost of SNAP benefits.<sup>27</sup> As a result, changes in policies that improve access to SNAP's benefits could provide short- and long-term relief to state Medicaid budgets.

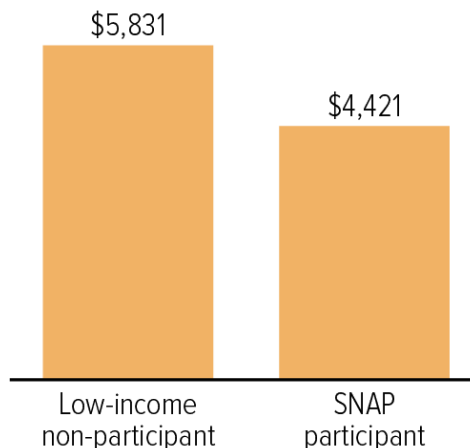
While the existing evidence has advanced understanding of the relationship between SNAP, food security, and health, important gaps remain. High-quality studies with rigorous designs that adequately address issues of self-selection, underreporting of program participation, and the direction of causation are relatively scarce. Additional investment in future research efforts is needed to:

<sup>27</sup> While states are responsible for half of the administrative cost of eligibility determinations, employment and training, nutrition education, and anti-fraud activities, these costs represent a small part of SNAP's overall costs. In fiscal year 2016, the federal government spent about \$73 billion on SNAP. Ninety-three percent went directly to benefits that households used to purchase food, and 6.5 percent went to state administrative costs.

FIGURE 10

## A SNAP Participant Incurs \$1,400 Less for Health Care

Estimated annual per-person health care spending



Note: Health care spending includes out-of-pocket expenses and costs paid by private and public insurance, including Medicare and Medicaid.

Source: Seth Berkowitz, Hilary K., Seligman, and Sanjay Basu, "Impact of Food Insecurity and SNAP Participation on Healthcare Utilization and Expenditures," University of Kentucky Center for Poverty Research, 2017.

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- Confirm the direction and determine the strength of the causal relationship among: 1) food insecurity, SNAP participation, and health status; 2) use of health care services; and 3) health care costs;
- Identify and understand the ways that food insecurity and SNAP participation could lead to changes in health status, use of services, and costs; and
- Determine the extent to which factors such as the duration of exposure to food insecurity or the amount of SNAP benefits received affects health status, use of services, and costs.

## Appendix

The modern form of SNAP (formerly, the Food Stamp Program) has been a widely available and deeply entrenched part of the nation's safety net for low-income Americans for 40 years. Key features of the program — including a funding structure that makes benefits available to anyone who qualifies under the program's rules without restrictions to certain categories of low-income individuals — are critical to its success. These same features make the task of evaluating its impacts more difficult.

The gold standard for evaluating the effectiveness of a program or intervention is the randomized control trial, which is designed to minimize the risk that factors unrelated to the program influence the results. If people are randomly assigned to a program, researchers can accurately estimate its impact as the difference in outcomes between those who participate and those who do not because they were randomly selected from the same population, lived through the same shifting programmatic, economic, and social conditions, and differ only in their program experience. However, randomized control trials are generally not feasible to evaluate SNAP's effectiveness, in part because the program is so widely available, and because withholding nutrition benefits from a random sample of low-income individuals would raise serious ethical questions.

As a result, estimating the effect of SNAP on health, health care utilization, and costs presents a daunting challenge. In addition to disentangling and isolating SNAP participation and benefits from the complex interactions of other social and economic factors, the physical environment, and individual behaviors that determine health, researchers must wrestle with three thorny issues: selection bias, measurement error, and causation.

**Selection Bias.** In the absence of a randomized control trial, research results may be biased by the self-selection of low-income individuals and families into SNAP. Households that participate in SNAP may differ in systematic ways from households that do not. If those who choose to enroll in SNAP are more able, more motivated, healthier, or have access to better health care than those who do not, then selection bias may lead researchers to mistakenly conclude that SNAP is more effective than it really is. But if those who enroll in SNAP are more disadvantaged, more food insecure, less healthy, or exhibit more risky behaviors than those who do not, then selection bias may lead to conclusions that SNAP is *less* effective than it really is. Most analyses routinely control for some potential differences, but others — local attitudes toward health and program participation, for example — are usually unobserved and not measured.

The research studies reviewed here have used a variety of data sources and empirical methods, some more rigorous than others, to isolate SNAP's impact on food insecurity and health from the compositional differences between participants and non-participants. There is little reason to put too

much confidence in the results of any single study. The consistency of results across studies, however, adds considerable weight to the validity of their collective conclusion that SNAP improves food security.

In addition, most of the available evidence suggests that selection bias is more likely to lead to *underestimates* of SNAP's beneficial impacts because participants are more disadvantaged and prone to adverse health outcomes than non-participants. National survey data show that SNAP participants are much less likely to be in excellent or very good health; more likely to be disabled or have a family member with functional limitations; more likely to be diagnosed with attention deficit disorder, asthma, diabetes, back problems, stroke, heart attack, and ulcer; and much more likely to have contact with the medical system but less likely to be able to afford care. When compared to low-income non-participants, SNAP participants are more likely to report worse health, more sick days, and greater use of health care *before* entering the program than non-participants. SNAP participants are also about a third more likely to die from any cause than low-income non-participants.<sup>28</sup>

**Measurement Error.** A second issue arises because SNAP participation is underreported in most household surveys. As many as half of SNAP recipients fail to report their participation in the program in large-scale national surveys, while virtually none mistakenly report participating when they do not. An example illustrates why this matters. Imagine that we can correctly identify a group of 1,000 people eligible for SNAP. Among this group, we know that 800 receive SNAP benefits and 200 do not, consistent with current estimates of SNAP participation rates. We then survey each of them and ask whether they receive SNAP. If half of those who truly participate mistakenly report that they do not, we would count only 400 participants (assuming none of those who did not participate mistakenly report that they did). The other 400 would appear in the survey to be non-participants. Thus, there would be twice as many *participants* as non-participants in the comparison group of “non-participants,” effectively masking any impact SNAP participation might have on outcomes of interest. Few research studies, and none included in this review, have attempted to account for the measurement error introduced by underreporting of program participation.<sup>29</sup>

**Causation.** An extensive body of research reveals a strong *correlation* between food insecurity, and to a lesser extent SNAP, and health. With few exceptions, however, much of this research is based on study designs that make it difficult to determine *causation*. Ideally, we would like to know whether food insecurity causes poor health, whether poor health leads to food insecurity, or whether there are unobserved factors that jointly influence both food insecurity and health. It is hard to draw definitive conclusions about SNAP's impact on health through its positive impact on food security absent a strongly established causal link from food insecurity to health.

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<sup>28</sup> Marianne P. Bitler, “The Health and Nutrition Effects of SNAP: Selection into the Program and a Review of the Literature on Its Effects,” in *SNAP Matters: How Food Stamps Affect Health and Well-Being*, 2016, [http://www.ukqpr.org/sites/www.ukqpr.org/files/documents/DP2014-02\\_0.pdf](http://www.ukqpr.org/sites/www.ukqpr.org/files/documents/DP2014-02_0.pdf); Gregory and Deb (2015); and Zach Conrad, Colin D. Rehm, Parke Wilde, and Dariush Mozaffarian, “Cardiometabolic Mortality by Supplemental Nutrition Assistance Program Participation and Eligibility in the United States,” *American Journal of Public Health*, 107(3):466-474, March 2017, <https://www.ncbi.nlm.nih.gov/pubmed/28103061>.

<sup>29</sup> An exception in the literature is Brent Kreider *et al.*, “Identifying the Effects of SNAP (Food Stamps) on Child Health Outcomes When Participation Is Endogenous and Misreported,” *Journal of the American Statistical Association*, 107(499):958-975, September 2012, [http://batten.virginia.edu/sites/default/files/research/attachments/JASA\\_KPGJ\\_online\(1\).pdf](http://batten.virginia.edu/sites/default/files/research/attachments/JASA_KPGJ_online(1).pdf). Using relatively strong but plausible assumptions to address self-selection and classification errors simultaneously, the authors estimate that SNAP reduces the prevalence of child food insecurity by at least 8 percentage points.