Eating At The End Of The Month: The Snap Cycle, Its Management And Impacts On The Health Of Low-Income Households

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Abstract
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EATING AT THE END OF THE MONTH: 
THE SNAP CYCLE, ITS MANAGEMENT AND 
IMPACTS ON THE HEALTH OF LOW-INCOME HOUSEHOLDS

Eliza Davenport Whiteman

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EATING AT THE END OF THE MONTH:
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Dedication

For all the households I met who generously shared their stories with me and without whom this research would not be possible.
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ABSTRACT

EATING AT THE END OF THE MONTH: THE SNAP CYCLE, ITS MANAGEMENT AND IMPACTS ON THE HEALTH OF LOW-INCOME HOUSEHOLDS

Eliza Davenport Whiteman

Amy Hillier

Nationally, 12.3% of households are food insecure and, despite numerous federal food assistance programs, this rate has barely changed since the U.S. started measuring domestic food insecurity in 1995. Rates of obesity and diet-related chronic disease are also dangerously high and recent introduction of grocery stores into underserved ‘food desert’ areas has yielded only moderate health improvements. The intractability of these health and social challenges may be partially due to oversimplification of the problem; healthy food access is insufficiently explained by largely static, spatial constructs. To address these issues, we need a dynamic understanding of the interplay between and spatiotemporal dimensions of food consumption, food environments, institutional food resources, and social networks. Using a mixed-methods approach, this dissertation examines associations between the monthly SNAP (food stamp) benefit distribution cycle and the diet quality, chronic disease management, and coping strategies of low-income households. By working at the policy, community and household levels, this research illustrates how food access and food insecurity are the product of a relational, ecological model. Statistical analysis using the nationally representative FoodAPS dataset revealed low diet quality for SNAP households throughout the month with small, but significant declines in healthfulness of food purchases in the final 10 days of the benefit cycle, suggesting that as benefits are depleted, households adjust their food purchasing. Complementing the national scan, primary research (including 50+ hours of interviews and participant observation) explored the experiences of 18 Philadelphia households in the end-of-month period when SNAP runs out, with particular attention to impacts on health. This in-depth fieldwork revealed frequent use among SNAP households of physically distant (non-neighborhood) food resources, difficulty affording foods necessary for chronic disease management, and reliance on social support and emotional coping strategies, particularly at the end of the SNAP cycle, to ease the stress of monthly financial volatility. Findings elucidated how, in filling the gaps of a weakened social safety net, low-income households are often required to make tradeoffs that do not favor health. This research provides compelling new contributions to investigations of urban food access, food insecurity, and the health and social welfare consequences of SNAP policy.
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CHAPTER 1: INTRODUCTION

PREFACE
The U.S. is in the midst of a food and nutrition crisis. Several decades of scholarly and journalistic writing have highlighted the various cultural trends that have undermined our historical nutritional foodways, including a dramatic consolidation and loss of farmland, agricultural subsidies for crops used to make energy-dense food items like high fructose corn syrup, and the development of modern cooking conveniences such as microwaves. Food activists like Michael Pollan and Alice Waters have gained cultural icon status through their promotion of local food systems and a reengagement with understanding where our food comes from. Simultaneously, public health experts have nervously tracked the growing obesity epidemic, which now impacts more than 30% of American adults and is largely attributed to overconsumption of energy-dense, nutrient-poor foods and the sedentary, car-oriented American lifestyle. Add to all this, recent spotlighting of disparities in access to healthy, fresh foods for low-income Americans, which many sectors, including urban planning, social welfare and transportation, have actively sought to address through policy interventions.

Why then, given the abundant attention these issues have received, do they continue to be such intractable problems? For example, introduction of new grocery stores into underserved ‘food desert’ areas has yielded only moderate change in dietary consumption.1-4 Nationally, 12.3% of households report difficulty finding enough food at times during the year.5 Despite numerous federal food assistance policies, including the Supplemental Nutrition Assistance Program (SNAP, formerly food stamps) and the National School Lunch Program (NSLP), this rate has remained relatively steady since the U.S. started measuring domestic food insecurity in 1995.6

One key reason why the food and nutrition crisis—and its comorbid conditions of inequitable food access, diet-related disease disparities, and food insecurity—may not be shifting proportionally to the attention it has received is an oversimplification of the problem. Healthy food access is insufficiently explained by current conceptual models linking health, food production, distribution, and security through largely static, spatial constructs. Federal food assistance programs, including SNAP, are administered following outdated benefit formulations that underestimate the complexity and variability of relationships between individuals and their social and built environments.7 To adequately address these critical health and social challenges, more dynamic and nuanced understanding of the interplay between and spatiotemporal dimensions of agricultural production, food consumption, physical food environments, institutional food resources and social networks are essential.

BACKGROUND
Prevalence of food insecurity exists within an economic context of both rising income inequality and dramatically increased income volatility.8 From 1996 to 2011, the number of households in deep poverty—defined by those living on less than $2 a day in cash income—grew by as much as 130%.9 Many households, in fact, have no source of...
unrestricted financial support; the number of households for whom SNAP is their sole source of income has quadrupled since 1996. This, along with a near doubling in family income instability since 1973 (as measured by either short or long-term drops in income), demonstrates the need for greater attention to the impact of federal food assistance programs on smoothing episodic food insecurity.

As with income stability, food access and food insecurity are not static conditions, but vary over both place and time and with the occurrence of unanticipated events. Minor aberrations in income or changes in the food environment, such as the closing of a supermarket or school cancellations for a weather-related emergency, can have significant household and community impacts. These types of fluctuations can determine whether or not a child eats lunch or force a family to make tradeoffs between buying food or paying the rent. Similarly, cyclic patterns of spending and depletion of social welfare benefits, sometimes referred to as the benefit or “SNAP cycle”, point to within-month volatility for low-income households, which can have implications for health and wellbeing.

Lastly, food insecurity can have disparate impacts on health depending on when it occurs during the life-cycle.

Most of the research measuring the impact of food access and food assistance programs on health, however, has used a cross-sectional and spatial approach, which measures access to food only once at a fixed point-in-time with a prioritization of physical distance to food resources as a marker of access. This method of data measurement masks much of the financial volatility concomitant with poverty. Without a time-measure conceptual framework of food access that also incorporates the complex social and environmental dynamics at play in the lives of low-income populations, policy interventions to address food access and food insecurity risk misdiagnosis and result in ineffectual policy solutions.

Current measures of healthy food access and food insecurity have served as instrumental catalysts in identifying and addressing disparities in food access and health status, but as this inquiry has matured, a growing body of evidence suggests that healthy diets require more than physical access or nutrition education. Despite a broad acceptance within the social and behavioral sciences of more holistic, relational models to explain health behaviors and disparities, much of the existing literature has addressed these challenges through a narrow lens—focusing interventions and evaluations on one dimension of the problem rather than zooming out to view the full system. As a result, current literature has not much explored the effect on dietary quality of episodic food insufficiency, nor has it examined how and when social support is used in tandem with institutional food assistance to manage food insecurity.

This dissertation follows the assumption that food access and food insecurity are situated within a relational, ecological model of health behaviors and outcomes. Using this broader framework, the research explores how food acquisition, diet quality, chronic disease management and food security are influenced by factors at the sociopolitical, organizational, interpersonal and individual level, as well as their variations over time.
Specifically, the research will examine the associations between program administration and the health and wellbeing of SNAP recipients. Using a mixed-methods approach, this dissertation addresses gaps in the literature by exploring the timing and nature of social networks as a coping strategy for managing food insecurity. Friends and family provide instrumental support in times of financial and food precarity, often in the form of money and food, and I refer to the character and quality of these resources throughout my research as the “social food environment”. The term, social food environment is intended to be a complement to the abundant literature examining the consumer, retail and neighborhood food environments.18

The research also provides understanding of how households make use of diverse social and informal food environments, in tandem with their physical environments—often including places far from their own neighborhoods—to acquire food throughout the month and explores impacts of these food insecurity coping strategies on chronic disease management. A more nuanced understanding of the complicated and changing dynamics experienced by food insecure households will enable design of more effective policy, programming and educational interventions to alleviate hunger and improve health outcomes.

SUMMARY OF THE LITERATURE
This section of the dissertation will review the relevant literature, first on food and health, and then on both food access and food insecurity. Within these latter two sections, I will begin by summarizing the primary definitions and measurement of each and then by reviewing the policy responses stemming from their conceptualization. As I argue in the limitations section of this review, this literature as a body has failed to effectively implement relational, ecological models of food access and food insecurity that sufficiently account for the interplay between levels and across time. This has resulted in policy responses that are not adequately reducing prevalence of food insecurity or disparities in food access and diet-related chronic disease.

Our food system & health
Suboptimal diet is the leading risk for death and disability in the United States.19 In 2010, 678,000 deaths from all causes were attributable to poor diet quality, particularly related to insufficient intake of nuts, whole grains, fruits and vegetables and excess intake of sodium.19 Today’s high prevalence of diet-related chronic disease is in large part a result of changes in American food production and consumption dating back to the middle of the last century.20 Shifts in agricultural production, improved processing efficiencies as well as the lower cost and high palatability of more energy-dense foods, have resulted in a modern American diet that is heavily comprised of processed, ready-to-eat foods.21–23 Since the 1970s, the poorer-quality diet within the U.S. has been fueled by the overconsumption of foods high in added sugars, refined carbohydrates, sodium and unhealthy fats21,24–28 coupled with under-consumption of fruits, vegetables and legumes.29 Total energy intake per person has also increased since 1977.26
Following these trends in food consumption, the obesity rate within the U.S. increased dramatically until around 2003 when the rate levelled off, however the prevalence of obesity is still alarmingly high.\textsuperscript{30,31} Similarly, the prevalence of other diet-related chronic conditions has escalated in recent decades. There was a 35\% increase in the prevalence of diabetes between 1988 and 2014 and diabetes was the 7th leading cause of death in the U.S. in 2015.\textsuperscript{32} In addition, the prevalence of persons in the U.S. with multiple chronic conditions increased to 26\% between 2000 and 2010.\textsuperscript{33}

**Healthy food access**

*Definition & Measurement*

Though consensus has not been reached around a conceptual definition of healthy food access, the U.S. Department of Agriculture’s (USDA) operationalized indicators of food access are: 1) accessibility to healthy food sources as measured by distance to stores or number of stores in a given area, 2) individual and household-level resources for obtaining food, including a vehicle and annual household income, and 3) neighborhood level resources that affect access including public transportation and average household income.\textsuperscript{34}

While not specific to food, several fields of study have sought to operationalize the concept of access. Definitions of access from the health care literature explain it as the “fit” between the characteristics, expectations and perceptions of the client and the characteristics of the provider.\textsuperscript{35,36} Penchansky and Thomas define access as including five distinct, yet interrelated dimensions: availability, accessibility, accommodation, affordability and acceptability. Problems with any of these dimensions can influence clients’ utilization and perception of services and can also impact the practices of the providers. Medical geography literature has noted the existence of both spatial (physical proximity to resources) and non-spatial (demographic and socioeconomic characteristics) factors of health.\textsuperscript{37} Combining these spatial and non-spatial factors in analysis, argue Wang and Luo, is essential for effective measurement of access.\textsuperscript{38} Transportation planners, on the other hand, have defined access as not just the spatial distribution of resources, but also the quality and character of those resources and the ease of traveling to them.\textsuperscript{39} All these definitions lend credence to the idea that access is multidimensional and that geographic proximity is not the sole contributor to high or low access outcomes. That said, these definitions of access have prioritized the spatial dimension above others.

Much of the early healthy food access literature was operationalized around spatial measures that highlighted the importance for healthy eating and health outcomes of distance to and density of food retail.\textsuperscript{40–46} Proximity to food stores has been shown by some studies to be positively associated with lower BMI and with higher consumption of fruits and vegetables.\textsuperscript{42,43,47,48} Low food access has been measured using density of food retail outlets per person per area unit, distance to retail outlets and total number of retail outlets in a geographic area, originally by Euclidean distance, and subsequently accounting for different modes of transit.\textsuperscript{41,46,49,50} Further, low access to healthy food retail, obesity and other negative diet-related health outcomes have been shown to disproportionately affect minority and low-income communities.\textsuperscript{51–54} Food access
assessments typically employ cross-sectional or point-in-time measures, although some food access literature has incorporated temporal dynamics by exploring trip-chaining and “activity-space” concepts that use a more comprehensive measure of all the places a person spends time in a given day.49,55–58

Building on proximity models of food access, researchers have also studied the food environment, which encompasses not just distance to food retail, but also the variety, affordability, healthfulness, and quality of food retail locations.43,44,48,59–66 Evaluating what foods are in the stores rather than simply the presence or lack of food retail in a given geographic area provides a more complete picture of food access. These studies have shown that the quality of food retail environments is important. Additional shelf space devoted to vegetables is a positive predictor of vegetable intake.43 Food quality and food purchasing varies by store type;67 supermarkets have the largest amount of shelf space for both healthy and unhealthy items, while corner stores have the highest ratio of unhealthy to healthy foods.64 Further, in studies where food store quality and price were incorporated into food access models, the association with BMI was shown to be more tenuous.48,68,69

Combining both the food environment and physical proximity measures, several more recent studies have found that individuals are often not choosing to shop at the store closest to their home, but instead are traveling to stores farther away in search of greater variety, healthier options and lower prices.68,70–73 Epidemiologist Steven Cummins has argued that measuring food access by what is local to home may not be the correct scale, given the highly individualized nature of people’s lives.74 In fact, studies examining individual behavior within the context of the local food environment have shown some surprising findings, including no increase in fruit and vegetable consumption among those shoppers who used a car to access food stores and a preference for full service, chain supermarkets even if it means traveling farther to shop.70,72,75

Price of foods has also been examined within the context of the food environment with the conclusion that on average prices are higher in small stores compared to larger, full-service supermarkets.34 Additional price research has found an inverse relationship between the energy density and costs of foods, such that foods with high calories per gram are less expensive per unit weight than healthier options like lean meats and fresh fruits and vegetables.22,23 This price differential between the processed, less healthy food options and healthier items is attributable at least in part to federal agricultural subsidies that are directed overwhelmingly towards commodity crops such as corn that are then incorporated into processed foods.76–78

Policy Responses
Much of the food access research, policy funding and interventions has focused on the “deprivation-amplification” model highlighted by Macintyre et al. and Cummins, among others.79,80 This model, an extension of the socio-ecological model, suggests that neighborhood deprivation amplifies individual-level hardship, thereby emphasizing the significance of environmental characteristics in influencing health behaviors and
outcomes as opposed to prior models that focused solely on individual behavior as predictors of health.^{61,81} The implicit policy strategies to improve food access that flow from this conceptual model involve changing the food environment by increasing availability of healthy food options.

Federal policy, largely stemming from the Farm Bill and the U.S. Department of Agriculture, as well as support from foundations (e.g. Robert Wood Johnson Foundation, Reinvestment Fund) around food access have subscribed to this theory as well. Government and foundation funding efforts have focused on increasing the number of food stores selling fresh fruits and vegetables in low-income neighborhoods in order to improve dietary quality and reduce obesity. The USDA, in partnership with the U.S. Department of Health and Human Services, has supported the development of food retail options through funding mechanisms such as the Healthy Food Financing Initiative (HFFI) and a variety of other grants, loans and incentive programs to encourage healthy food retail. Given the absence of supermarkets in certain underserved areas—termed food deserts—and the relative disparity in income levels often found in these neighborhoods, the operating assumption behind federal policy is that stores will only be built successfully by using state subsidy (e.g. HFFI) and that improving physical proximity to food retail is essential for improving health outcomes. While the efforts to increase the availability of fresh food have improved the retail environment of underserved communities, and in some cases have improved residents’ perception of food accessibility and modestly improved diet, evidence linking the introduction of new stores themselves to positive changes in health behaviors and health outcomes is still modest.\(^1-4,82,83\)

Attempts to improve healthy food access on the production-side of the food system have focused largely on increasing availability of locally grown fresh food, thereby improving the market and distribution channels for regional producers. These efforts are demonstrated through Farm-to-School initiatives, healthy corner store programs linking small producers with inner-city business owners, federal grants to assist with farmers’ market operations (including providing infrastructure to accept SNAP at markets) and other innovative food retail models such as mobile grocery markets. These efforts similarly follow the “deprivation-amplification” model of augmenting the supply and environmental infrastructure of healthy food options.

More recently in the 2014 Farm Bill, the USDA added funding for demand-side food access initiatives in the form of the Food Insecurity Nutrition Incentive (FINI) Program Grant. This grant funding stream supports projects that increase the purchase of fresh fruits and vegetables by low-income shoppers by providing incentives at the point-of-sale.\(^84\) FINI has funded numerous SNAP-matching programs across the country.

**Limitations of Current Measures**

Critics of food access and environment research methods have highlighted the need for more rigor in the tools used to measure the environment, better agreement on the indicators of health risks, and employment of study designs that are not cross-
Cummins and Lytle also call for a more nuanced understanding of the ecological model, stating that the “deprivation-amplification” construct fails to accurately explain the interactions between individuals and their environment. Not accounted for in this construct of access are personal behaviors and preferences and their influence on where people shop; how far people are willing to travel; and other factors that affect food shopping decisions such as mobility, price, household budget constraints, time, seasonality, health concerns and cleanliness of stores. Physical access still matters when applying a more complex ecological model, but in a very different way than with a primarily spatial definition, and in ways that are largely not being accounted for in current policy responses.

To illuminate the more complex socio-ecological framework necessary to understand food access, Cummins underscores the highly individualized nature of people’s lives, health behaviors and decisions. Cannuscio et al. demonstrate the subjectivity and nuance of measuring the social and physical environment, which further emphasizes that food acquisition is a very complicated social process. Growing attention to adding the interaction effect between individual and neighborhood back into the environment-based analysis has spurred innovative study design linking consumer and store-level data. Much of this research has emphasized the ways in which factors beyond proximity, including price and transit patterning, weigh heavily in food shopping behaviors.

Recently others have sought to incorporate temporal dynamics in the food access conversation, arguing that time is a significant predictor of and constraint to access. Widener and Shannon advocate for the use of time measures in food desert and food access research, suggesting that longitudinal explorations around seasonality, welfare assistance distribution cycles, broader neighborhood restructuring and mobility may yield new data on consumption patterns.

**Food insecurity**

*Definition & Measurement*

The United States only first developed a tool for measuring domestic food insecurity and hunger as recently as 1995. Food insecurity has long been understood to be a concern in developing countries, but it was not until the economic crisis in the 1980s that researchers and policy makers began to recognize the relevance of measuring food insecurity in wealthier countries such as the U.S. In an international context food insecurity and hunger have traditionally been measured based on nutritional status using anthropomorphic measures, however in wealthier countries where obesity is the critical issue as opposed to stunting and wasting, the use of anthropomorphic measures to assess food insecurity has not proven effective. In order to accurately assess these conditions in a domestic context, the USDA developed a food security measurement tool based largely on the Radimer/Cornell hunger scale and the Childhood Hunger Identification Project scale.

The USDA measures the national food security rate annually using this tool via the food security supplement to the Current Population Survey (CPS). Respondents are asked a
series of questions about conditions and behaviors experienced in the prior 12 months that characterize when individuals and families are having a difficult time meeting their food needs.5 In contrast to the static measures of food access, food insecure households, as currently defined by the USDA, are “at times during the year […] uncertain of having, or unable to acquire enough food to meet the needs of all their members because they had insufficient money or other resources for food”. Alternately, “‘food secure’ means that all household members had access at all times to enough food for an active, healthy life”.5 Being food secure includes at a minimum: 1) “the ready availability of nutritionally adequate and safe foods and, 2) assured ability to acquire acceptable foods in socially acceptable ways (that is, without resorting to emergency food supplies, scavenging, stealing, or other coping strategies)”.

Per the recommendation of the Committee on National Statistics (CNSTAT) of the National Academies, in 2006 the USDA changed the labels used to classify food security in order to improve the accuracy of the food insecurity prevalence measurement. The new categories are: 1) high food security, 2) marginal food security, 3) low food security, and 4) very low food security. Low food security households experienced challenges with food access, which they addressed with a variety of coping strategies such as using emergency food resources or obtaining federal food assistance, but generally did not have a disruption or overall decrease in their food consumption. Those households with very low food security found that at least one member of the household had to reduce their food intake at some point during the year due to insufficient resources for obtaining food.

These changes in classification were made in response to the CNSTAT’s recommendation that hunger was not adequately being assessed via the CPS and that a new tool be created for measuring hunger that samples individuals rather than households. As a result, the USDA no longer classifies people as “food insecure with hunger” as it had done in previous iterations of the CPS tool. Instead a distinction is now drawn in the USDA definition between food insecurity and hunger: “food insecurity—the condition assessed in the food security survey and represented in USDA food security reports—is a household-level economic and social condition of limited or uncertain access to adequate food. Hunger is an individual-level physiological condition that may result from food insecurity”.93 Changes such as these in the assessment tools and conceptual definition highlight the lengthy debate both in the research and policy communities about how best to measure food insecurity.94,95

Research on domestic food insecurity has centered primarily on quantifying, characterizing and understanding the source of the problem and has used survey and interview data as the primary measurement tools. Food insecurity is a significant and enduring problem in the United States. Rates of food insecurity have shifted very little since the USDA first started measuring it in mid-90s, despite the implementation of numerous federal food assistance programs, suggesting that our current strategies for alleviating food insufficiency may not be working.6,96 In 2016, 12.3% of households in the U.S. reported difficulty with meeting their food needs at some point during the year, with 4.9% experiencing very low food security.5 While this demonstrates a slight dip in
Food insecurity since the recession of 2008, when national rates were elevated to 14.6%, food insecurity nationally remains higher than at the turn of the century (11.9% in 2004).

Food insecurity has significant negative dietary implications, including lower intake of fruits and vegetables, an increase in disordered eating, and reduced nutritional status. Food insecurity can have long-lasting health impacts; it is associated with increased chronic disease risk and poorer chronic disease management; overweight and obesity; depression and anxiety; and disparities in cognitive, emotional and motor development in children. Studies have found a strong positive correlation between overweight and obesity status and food insecurity among women and there is mounting evidence of a relationship among adolescents. Some studies suggest that participation in SNAP may exacerbate this relationship.

Food insecurity can also have differing implications for health, depending on the point in the life-cycle when a person experiences food insufficiency. Among older adults, food insecurity has been associated with increased odds of worsening health, functional decline and chronic disease. Compared to children from food secure households, children from food insecure households are twice as likely to report fair or poor health, 1.4 times more likely to have asthma and 5 times more likely to be obese.

Much like poverty, food insecurity is not constant. For example, a greater prevalence of food insecurity occurs in the summer among families with school-aged children than among other families. This aligns with other studies demonstrating that families with children have a more difficult time meeting their food needs during the summer months when they do not have the assistance of school meals and that only 14% of children who received free or reduced-price school lunch are reached by the Summer Food Service Program (SFSP). Transitions in and out of food insecurity for school-aged children have also been associated with teacher reporting of poorer externalizing behaviors by children, interpersonal skills and self-control. Periodic or episodic food insecurity, particularly over a monthly period, has been associated with increased odds of hypoglycemic incidents, as well as childhood anemia, while persistent food insecurity has been associated with poorer overall health.

Periodic food insecurity has also been found among SNAP recipients. Benefits are distributed only once a month and studies have found decreasing benefit expenditures over the course of the month. In addition, SNAP shoppers spend most of their benefits within a short period after receiving them, typically running out before the end of the month. This pattern is referred to as the food stamp or “SNAP cycle”, suggesting that resources for food acquisition are ample directly after distribution, but do not last for the entire period until they are renewed. The number of days since benefit distribution has also been shown to be significantly negatively associated with calorie consumption—particularly for those participants who are infrequent grocery shoppers—and positively associated with reported days without eating. The duration of benefits has also been associated with increased food security and reduced physiological symptoms of hunger. There is very little literature on the effects of the SNAP cycle on
diet quality. Of the two studies to date, one found no change in diet quality scores,\textsuperscript{124} while the other showed a U-shaped pattern in calorie and nutrient consumption with a dip in the middle of the SNAP cycle, which may be attributable to the relatively higher costs of fruits and vegetables and the higher energy density of more processed foods.\textsuperscript{129}

Recent studies have found a number of other correlational health implications for the SNAP cycle, including lower testing scores and increased disciplinary infractions among school-aged children at the end of the benefit cycle.\textsuperscript{12,14,130} One study found a 27\% increased risk of hospital admissions among low-income populations for hypoglycemia in the final week of the month compared to the first week.\textsuperscript{131} When this study was recreated subsequently, timing of benefits had no impact on ER claims for hypoglycemia, however visits to the ER for hypoglycemia were associated with size of the SNAP benefits.\textsuperscript{132}

\textit{Policy, NGO and Individual Responses}

The most significant policy attention towards food insecurity has come in the form of federal food assistance programs that provide food and financial resources. The Food Stamp Program, renamed in 2008 to SNAP, now comprises nearly 2\% of the federal budget, making it one of the largest federal social welfare programs. SNAP is a federally funded and state administered entitlement program, meaning its rolls respond cyclically to fluctuations in the economy and particularly to changes in the unemployment rate. SNAP is means-tested; eligible recipients must meet an income test of gross monthly income at or below 130\% of poverty or net monthly income at or below 100\% of poverty.\textsuperscript{1} In addition to meeting income thresholds, work requirements were added to the eligibility standards for SNAP as part of Clinton’s 1996 Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA). Under this welfare reform able-bodied adults without dependents (ABAWDs) were now required to work or participate in a work program for at least 20 hours per week to receive SNAP for more than 3 out of every 36 months. Other federal food assistance benefits include the National School Lunch Program (NSLP), the Special Supplemental Nutrition Program for Women, Infants and Children (WIC), the Child and Adult Care Food Program (CACFP), and The Emergency Food Assistance Program (TEFAP).

These food assistance programs provide tangible benefits to low-income households. These cash or in-kind transfers more closely target the underlying issue of poverty leading to disparities in food access and food insecurity than do some of the environmental interventions previously discussed. However, measuring their impact can sometimes be challenging. Measuring the success of SNAP, in particular, has proven difficult; estimates suggest that SNAP reduces the poverty rate by 5 to 10 percent, with a

\begin{footnotesize}
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\item Eligible recipients may have up to $2,250 in assets ($3,250 if someone in the household is disabled or over the age of 60). Income from social security (SSI), cash welfare (TANF) and pensions are not counted, nor are certain tangible assets such as houses or vehicles. Net monthly income is calculated after applying standard deductions for child support, child care, shelter and certain medical expenses. People eligible for TANF and other welfare assistance can, in some states, be waived through the eligibility screening for SNAP by way of categorical eligibility.
\end{enumerate}
\end{footnotesize}
stronger effect in recessionary times. Impact on poverty levels may be understated due to underreporting of participation and benefit rates in the CPS, which holds the data for the official U.S. poverty measure.\textsuperscript{7}

Similarly, measures of the impact of SNAP on food security, health and nutrition have been mixed possibly due to reverse causation. The most food insecure households, or those in worse health, may self-select into the program making accurate measurement of SNAP’s impact challenging. That said, non-experimental evaluation techniques used to assess the program’s impact on food insecurity find a reduced risk.\textsuperscript{7} The literature on SNAP’s impact on health, nutrition and obesity is limited, although findings suggest that SNAP has positive long-term health impacts and does not contribute to obesity.\textsuperscript{7} Other literature has found continued food insecurity within SNAP populations, often exacerbated on a cyclic schedule such as at the end of the month or during summer months when school is not in session.\textsuperscript{10,11,17,118,123,125}

As a result of economic recession, increasing poverty, and government retrenchment of social welfare benefits (e.g. work requirements and cuts to SNAP in recent decades) the private and non-profit sector, as well as individuals, have been forced to fill in the gaps. The charitable emergency food system exploded in the 1980s and has continued to grow. What originally started alongside SNAP as a temporary relief measure during the Great Depression has grown into an enormous, non-profit industry serving millions of Americans each year.\textsuperscript{133} The emergency food sector’s reliance on food waste and agricultural surplus has raised outcry in public health and anti-hunger circles around the nutritional inadequacy and indignity of charity food handouts, however. Insufficiency is also a perennial problem in emergency food relief; despite the burgeoning charitable food industry people are still regularly turned away when pantries and soup kitchens run out of supplies.\textsuperscript{133} Well-documented individual-level coping strategies for managing food insecurity include borrowing money from friends and family, accessing alternative food sources, food sharing among social networks, omitting food items and skipping or cutting the size of meals.\textsuperscript{11,134–138} In the poverty literature more broadly, strong and often reciprocal reliance on kin networks, as well as working within the informal economy, have been highlighted as essential poverty-coping techniques.\textsuperscript{139–141}

Limitations of Current Measures
With most of the studies on food insecurity we know relatively little about the mechanics of households’ food acquisition routines and how households do or do not interact with their food environments. Additionally, while there is a general appreciation in the literature that food insecurity is not constant over time, there has been little empirical research that explores the nutritional implications of episodic food insecurity or how it is related to food acquisition.

Lastly, while the literature has clearly articulated the influence of policy, interpersonal and individual factors on food insecurity, as well as the temporal dimension, the majority of the literature is not spatial in its methodology or design and draws very few connections to the food access literature that is centered around distance to food retail and
the composition of the food environment. A merging of methods and scales of analysis between the food access and food insecurity literature would translate into a greater understanding of the relational, multi-dimensional nature of food acquisition. Practically this means evaluating where people go to obtain food, what they buy, how they travel to and from the store, at what point in the month they do their shopping and how this is impacted not just by the food environment, but also by the social food environment and temporal fluctuations such as the SNAP cycle.

CONCEPTUAL MODEL

The questions posed in this dissertation rely on the assumption that health behaviors and outcomes are influenced by forces at multiple scales, including the individual, interpersonal, organizational and policy or societal levels. Health behaviors and outcomes are also shaped and constrained by temporal dynamics including time (e.g. time of month or year, time resources for cooking or shopping) and the life-cycle. These assumptions or principles form the basis of the ecological model of health behavior, which has a long and rich history in the social and behavioral sciences. Originally premised on the idea that the physical environment could have direct impacts on human behavior, the ecological model has evolved to provide a broad framework for understanding the relationship between individuals and the social, physical, organizational and policy environments that surround them. (See Figure 1) Given the broad framing of specific health behaviors or outcomes (e.g. obesity, physical activity, smoking cessation), multiple behavioral theories can be incorporated into ecological models as testable hypotheses for measuring interventions or behavior change. The core proposition of the ecological model, both in the literature and in this dissertation, is that multilevel interventions at the individual-, environmental- and policy-level are necessary for achieving significant positive changes in health behavior and health outcomes.

One noted critique of multilevel or ecological model analysis has been the lack of detail about the precise nature of the interactions of variables across the individual, environmental and policy levels. Additionally, a recent evaluation of health intervention studies from the past 20 years showed a much greater prevalence of interventions targeting individual or interpersonal characteristics, as opposed to interventions that either highlighted changes to the policy or environmental spheres or incorporated a truly multilevel approach.

Current measures of healthy food access have been essential in identifying and addressing disparities in food access and health status, but as this research has developed, a growing body of evidence suggests that healthy diets require more than physical access. Descriptive and geographic indicators of food access are limited by their attention to distance and the food environment. Studies that combine the spatial conceptualization of food access with the temporal dimensions of food insecurity would add nuance to our understanding and definition of both these concepts. Looking for points of intersection between these two well-researched fields of study can enable a more thorough understanding of the complex dynamics influencing access to a secure and healthy food
supply. This way we can ask not just about the location of food deserts and the timing of food insecurity, but also *when are food deserts? And where is food insecure?*

To further flesh out the framework used in this research, three important premises guiding the conceptual model should be identified here: 1) the tangible and significant influence of social networks on food behaviors, 2) use of a time-measure approach, and 3) explicit attention to the interaction effect between variables at the policy, community and individual levels.

**Social food environment**

The current models of food access, whether measured by density of food retail or by more detailed characterizations of the food environment, are largely generic and static. These measures focus on composition of place and neighborhoods and, as such, largely lack exploration of the highly individualized nature of people’s lives. We know from many prior studies that food acquisition is a very complicated social process and one that is influenced by numerous factors including where people live and work (i.e. activity space), social networks, race, gender, family composition, socioeconomic status, cultural values, health concerns, seasonality, prices and mobility. Prior evidence has also demonstrated the significance of interpersonal or psychosocial variables such as social support and self-efficacy, not only in influencing health behaviors directly, but particularly in moderating the effects of environmental or policy-level interventions. For example, a study of physical activity within older adults found supportive physical environments, such as sidewalks, to be more important to physical activity when accompanied by robust interpersonal relationships. Another recent study showed that SNAP participation did not reduce the risk of food insecurity among mothers with very low levels of informal support.

In addition to exploring individual beliefs and behaviors, as well as the physical food environment, the conceptual model proposed in this dissertation (Figure 1) attempts to incorporate more explicitly the influence of people’s social environments on their access to and utilization of healthy food options. This includes the quality and scope of social networks, as well as the timing and receipt of social support from friends, family and professional service providers.

**Time-measure**

Food access has primarily been measured using a cross-sectional approach. Point-in-time measurements assume availability and access occur in a constant state, thus missing the lack of stability inherent in poverty, food security and the seasonality of food production, all of which can contribute to access. While some households do suffer from chronic food insufficiency, as Wilde and Nord observed, households typically “do not come in constant ‘secure’ and ‘insecure’ varieties. Instead, it appears that unobserved hardships strike from time to time, with large effects on…food security”.

While all households experience ebbs and flows in income and expenditures, low-income families are more vulnerable to these financial shocks, which can adversely affect food
security.\textsuperscript{136,147} Despite an overall more stable economy, U.S. family income volatility has increased dramatically in the last 40 years. Whether measured as annual family income relative to a 4-year average, short term income changes, or probability of large short-term drops in family income, estimates suggest family income instability has essentially doubled from 1969-2004.\textsuperscript{8} Uncertain work hours, often from multiple jobs, discontinuity in benefit receipt, and exogenous factors such as transportation challenges making it difficult to get to work or unexpected medical bills, are some of the biggest contributors to fluctuations in household income.\textsuperscript{148}

The most oft cited reason for financial shortfalls reported by SNAP recipients is temporal variations in resources or expenses, with respondents noting the holiday season and summer vacation when children are home from school as being the most challenging times of year.\textsuperscript{147} People living in areas with high cooling and heating costs are 27\% and 43\% respectively more likely to report food insecurity.\textsuperscript{149} Income instability itself has been associated with poor health and behavioral outcomes including impacts on child cognitive development, lower engagement in school settings, and increased prevalence of risky behaviors among adolescents.\textsuperscript{13,15,150} These findings demonstrate the risks of failing to include a time-measure approach in healthy food access models. Included in these risks are the masking of variability in access and food security over time, oversimplification or incomplete diagnosis of the problem, and reduction in efficacy of policy interventions that could be targeted toward specific points of vulnerability in people’s lives.

**Interaction effect**

Lastly, current healthy food access models conflate availability with access by assuming that increasing the presence of healthy food in the physical environment will logically lead to an improvement in health outcomes. In reality, however there are a number of intermediary steps needed for these types of health changes to occur including adoption of new shopping and food consumption attitudes and behaviors.\textsuperscript{87} Given the challenges of multilevel interventions and analysis, much of the existing literature has explored the factors of influence within one level at a time – be it the physical food environment or individual-level behavior. By investigating a single health behavior from multiple levels, this dissertation seeks to identify interactions between individuals and households and the social, food and policy environments that surround them. The conceptualization of healthy food access proposed here employs an ecological framework that incorporates broader policy contexts as well as individual-level influences, and also borrows themes from theories of multi-level or contextual modeling.\textsuperscript{151} It does so by endeavoring to understand the distinct roles contextual (i.e. area-level) variables as opposed to compositional (i.e. individual or household-level) variables play in mediating, moderating or confounding relationships affecting food access and food insecurity.

Additionally, while the food insecurity literature has clearly articulated the temporal dimensions of both poverty and diet, it has devoted little attention to understanding how geographic patterns and the built environment impact people’s food security. Using tract-level county health survey data, Mayer et al. found that people who reported lower access to fruits and vegetables also reported higher food insecurity status.\textsuperscript{152} This type of
association linking spatial and temporal measures has not been widely documented in the literature, however. Studies that combine food access, food insecurity and nutrition by, for example, exploring how access to food changes over time and what impact this episodic or temporary lack of access has on both diet quality and food security would add nuance to our understanding of all these concepts.

**METHODS**

**Statement of problem & research questions**

Many low-income families are reliant on SNAP for their food budgets. SNAP benefits are distributed one time per month and national SNAP expenditure data reveals that the majority of SNAP participants expend their benefits before the next distribution period. This leads to a decrease in food purchasing and calorie consumption, referred to in the literature as the SNAP cycle, which can negatively impact food security status.

Despite the many negative health implications of food insecurity and the linkage between food insecurity and SNAP participation, little research exists documenting the impact of the SNAP cycle on the nutritional composition of food purchasing and food consumption. If dietary quality, like spending and calorie consumption, declines as time from benefit distribution increases, this could further contribute to the cyclic health impacts of the SNAP distribution schedule. Many other factors may influence this relationship, including the presence of social networks, poverty management strategies and physical access to both retail and emergency food resources. To understand better the relationship between the SNAP benefit distribution cycle and health, this dissertation will ask the following primary research questions:

- What is the association between cyclic monthly food assistance benefits (SNAP/food stamps) and the food purchasing, dietary quality and chronic disease management of low-income populations?
- How do factors including social networks, poverty management strategies and physical access to food retail and emergency food resources moderate these relationships?

**Hypothesis**

The scholarly and administrative literature on SNAP redemption has demonstrated that food spending and calorie consumption both decrease as time from monthly SNAP benefit increases. This dissertation will evaluate the hypothesis that dietary quality also declines as time from monthly SNAP distribution increases. Since it is likely that this relationship is not directly linear, the research will also examine what impact moderating variables have on calorie consumption, dietary quality and food security. The prediction is that proximity to food resources, strong social networks and established mechanisms for managing poverty will have a positive impact on the relationship between diet and time from receipt of benefits.
Research design

The design of this dissertation is intended to provide a multilevel examination of food and chronic disease health behaviors within disadvantaged populations. (Figure 1) As such, the research explores the forces shaping household food purchasing, food consumption and chronic disease management at the individual, interpersonal, environmental and policy levels. At the individual level, this included in-depth interviews with SNAP recipients about their health beliefs; diet and disease management-related self-efficacy; and food shopping and eating behaviors. Using quasi-ethnographic methods, I also observed and probed extensively around individual’s reliance on and experiences with their social networks. Organizational and environmental-level influences were examined through walking-interviews, surveys and collection of household food shopping receipts. Lastly, the policy environment – specifically federal food assistance benefits – framed the entire research question. Through both local- and national-level data, I explored how SNAP administration and distribution constrains and defines the health behaviors of recipients. Lastly, because none of these spheres of influence is static, I also explicitly examined the temporal dynamic of the monthly SNAP benefit cycle. By approaching the issues of food insecurity and healthy food consumption through a comprehensive, multilevel approach, I intend to more explicitly outline the interactions taking place between individuals and their social, organizational and policy environments. While the research is primarily descriptive and not causal in its explanatory implications, it provides specific accounts of the multiple levels of influence on health behavior, which can next be tested through interventions that target the policy, environmental and individual level.

The study design used a mixed-methods approach blending statistical, spatial and qualitative analysis to address the research questions. (Table 1) The primary data collection portion of the dissertation followed 18 Philadelphia SNAP recipients for a longitudinal in-depth qualitative study in which food acquisition strategies of participants and their households were evaluated. Participation in the Philadelphia portion of the study lasted for a full month and consisted of a screening visit, followed by 3 study visits (including home and food shopping visits) involving participant observation and in-depth interviews, in addition to collection of all food shopping receipts and between 1 and 9 24-hour dietary recalls during the one-month period. Study data were collected over an 18-month period from April 2016 until October 2017. Analysis of the Philadelphia portion of the study involved thematic coding of interview transcripts as well as review of descriptive statistics and geospatial evaluation of food shopping patterns.

The highly detailed, primary data from Philadelphia were complemented by secondary data from the USDA’s nationally representative Food Acquisition and Purchase Survey (FoodAPS). The statistical analysis using FoodAPS, while providing less in-depth data about each participant, used a national dataset with a broader population, which enables greater generalizability. Additionally, combining household-level primary data analysis with a national-level secondary dataset enabled examination of the research questions at multiple scales: individual/household, local (city) and national. More detailed methodology for each component of the study is reported within the following chapters.
of the dissertation.

Dissertation outline
Collectively, the three primary chapters in this dissertation will contribute to the literature on food insecurity and food access, offering a range of empirical evidence to demonstrate how social networks and social support buffer the effects of the SNAP cycle and ensuing food insecurity among SNAP recipients. Chapter 2 describes the association between the SNAP cycle and diet quality of food purchasing within a national sample of SNAP households, demonstrating that although overall diet quality is low throughout the month, there is a significant decline in the final 10 days of the SNAP cycle. Chapter 3 tells the story of African American mothers of young children in Philadelphia who receive SNAP. This chapter documents the timing and nature of participants’ coping strategies to ease the stresses of procuring adequate food throughout the SNAP cycle, including reliance on social networks and social support, emotional resilience and adjustments to shopping and eating. Chapter 4 explores the challenges of chronic disease management for SNAP recipients and the particular difficulties experienced around health and diet in the final days and weeks of the SNAP cycle. Chapter 5 summarizes the findings from the three empirical chapters, explores policy and programmatic implications and discusses possibilities for future research. Combined, the chapters of this dissertation provide compelling new contributions to the literature on food insecurity and food access and the health and social consequences of SNAP policy.
Figure 1. Conceptual model of eating patterns and chronic disease management
Figure 2. Hypothesized relationship of time in SNAP cycle to food spending and diet quality
Table 1. Dissertation study design

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<td>In-depth qualitative analysis of SNAP households (n=18) in Philadelphia</td>
<td>Cross-sectional analysis of SNAP households (n=1,500) in the USDA’s Food Acquisition and Purchase Survey (FoodAPS)</td>
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<td>Semi-structured qualitative interviews</td>
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<td>Thematic coding of qualitative interviews and observational field notes. Descriptive statistics of financial, food purchasing and food consumption data. GIS mapping of store, travel and social network data.</td>
<td>General linear modeling to assess association between time from SNAP distribution and dietary quality as measured by Healthy Eating Index-2010 scores and macronutrient levels of foods purchased.</td>
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REFERENCES


66. Macintyre S. Deprivation amplification revisited; or, is it always true that poorer places have poorer access to resources for healthy diets and physical activity? *Int J Behav Nutr Phys Act*. 2007;4:32. doi:10.1186/1479-5868-4-32


76. Waterlander WE, Luiten CM, Eyles H, Steenhuis IH. Response to two Letters to the Editor: we maintain that ultra-processed supermarket foods are less healthy than their minimally processed counterparts. *Public Health Nutr.* 2016;null(03):571–573. doi:10.1017/S1368980015003420

77. Luiten CM, Steenhuis IH, Eyles H, Ni Mhurchu C, Waterlander WE. Ultra-processed foods have the worst nutrient profile, yet they are the most available packaged products in a sample of New Zealand supermarkets. *Public Health Nutr.* 2016;null(03):530–538. doi:10.1017/S1368980015002177


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CHAPTER 2: A Nationally Representative Analysis of Changes in Diet Quality of Food Purchases Over the SNAP Cycle

INTRODUCTION

Food insecurity is a persistent problem in the U.S. that disproportionately impacts low-income, female-headed, and ethnic-minority households with children.\(^1\) Nationally, 12.3% of households report food insecurity in the past year,\(^1\) and despite fluctuations following the 2008 recession, this rate has shifted very little since the U.S. first measured domestic food insecurity in 1995.\(^2\)

Food insecurity has negative dietary implications, including lower consumption of fruits and vegetables,\(^3\) an increase in disordered eating (e.g. skipping meals),\(^4\) and reduced nutritional intake.\(^5,6\) Food insecurity also has long-term health implications for mental health, cognitive development and risk of diet-related chronic disease.\(^7-9\)

One way the U.S. addresses food insecurity is through the Supplemental Nutrition Assistance Program (SNAP, formerly Food Stamps). More than 44 million people, or roughly 1 in 7 Americans, received SNAP benefits in 2016. SNAP participants generally have lower overall diet quality compared to income-eligible and higher income non-participants,\(^10\) however national data suggest that food purchasing by SNAP households does not differ substantially from purchasing by non-SNAP households and that both groups buy foods inconsistent with the Dietary Guidelines for Americans (DGA).\(^11\)

While SNAP has been shown to improve very low food security by roughly one third,\(^12\) some SNAP households still report times of food insecurity. Studies of SNAP participants showing a decrease in benefit expenditure on a monthly time-scale have illustrated this periodic food insecurity.\(^13-16\) SNAP benefits are distributed once per month, and system-wide assessments show the majority of recipients spend most of their benefits within two weeks after receiving them, typically running out before the end of the month.\(^17\) This monthly spending pattern is referred to as the SNAP cycle. Prior researchers have posited that increasing the frequency of SNAP benefit distribution could alleviate this cyclic spending pattern.\(^13,16\)

The SNAP cycle is associated with health and behavioral outcomes including hypoglycemia\(^18\) and decreased testing scores among school-aged children.\(^20\) The number of days since benefit distribution is also significantly negatively associated with calorie consumption, particularly among infrequent shoppers, and increases the likelihood of days without eating.\(^13,16,20,21\) Others have found a U-shaped pattern in calorie and nutrient consumption with a dip in the middle of the SNAP cycle, which may be attributable to higher energy density of foods purchased when money is scarce.\(^22\)

Despite common acknowledgment that a SNAP cycle exists, longitudinal research exploring changes in dietary quality over this monthly time-scale is limited. Among the few existing studies, results are mixed.\(^21,22\) Additionally, limitations in the design of prior
studies, such as single, 24-hour diet recall measures and small sample size, suggest that further inquiry is warranted. This study is the first to use a nationally representative dataset of food purchasing to evaluate the association between the SNAP cycle and dietary quality. The USDA’s Household Food Acquisition and Purchase Survey (FoodAPS) provides a full week of food purchasing data for each household, which offers a more robust measure of diet quality than prior studies.

The aims of this study are to assess: 1) how diet quality of SNAP households compares to eligible and non-eligible households within FoodAPS, and 2) the association between the SNAP cycle and dietary quality of food purchases. Addressing these questions may inform policy decisions regarding SNAP benefit distribution to improve the dietary quality of SNAP recipients.

METHODS
Study sample
This study used FoodAPS to examine the relationship among SNAP recipient households between time since SNAP benefit receipt and the diet quality of food acquisitions (referred to in the paper as diet quality). FoodAPS was the first nationally representative survey of food purchasing and acquisition. Data were collected from 2012 to 2013 with a sample of 4,826 U.S. households (defined as all persons who live together and share food, and who were present at the sampled address during the data collection week) at a range of income levels, including an oversampling of SNAP-eligible households. SNAP participation was determined by self-report and administrative matching (both caseload and alert data) to confirm that households reporting being on SNAP were currently receiving benefits.

Participating households completed an initial survey and were then trained to record and scan all their food purchases and acquisitions to be consumed at home (FAH) and away from home (FAFH) for a 7-day period. Researchers also conducted a final household interview and collected information relevant to food purchasing behaviors including income, household composition, and demographic characteristics. Nutritional content tabulated post hoc included food group servings equivalents for each item, making the calculation of Healthy Eating Index-2010 (HEI-2010) scores possible. Analysis for this paper took place in 2016-2017 and used FAH nutrient data to evaluate the relationship between the SNAP cycle and dietary quality.

Measures
When assessing mean HEI-2010 total and component scores, SNAP households were compared to eligible households not participating in SNAP (n=1,117) and non-eligible households (n=2,128). Non-eligible households were further divided for this analysis by 1) those households with income ≥185% of Federal poverty guidelines (FPL) (n=1,792) and 2) those households with average income below 185% FPL (n=336). SNAP eligibility was determined by using the indicator simulated in FoodAPS (model run 4) based on income, assets and State-level eligibility guidelines.
The primary predictor variable was the number of days since SNAP benefits were distributed (DSS), which was defined as the number of days between date of last reported SNAP disbursement and the last day of the data collection week (Figure 1). Therefore, households with DSS 0-6 received their SNAP benefits during the data collection week, while a household with DSS=8 received their benefits two days prior to the start of their data collection week. For those households nearing the end of the benefit cycle at the time of the initial survey, it was assumed that they received their benefits on the same day the next month; therefore, their benefits would be renewed during the data collection week.

Primary outcome variables included diet quality of foods purchased, as measured by HEI-2010 scores applied to the full week of household purchases, total energy per person, as measured by total kcal/100g, and total spending in dollars. The HEI-2010 was developed by the National Cancer Institute and USDA to measure how American diets compare to the DGA. The HEI-2010 total score is comprised of 12 components – nine measured for adequacy (i.e. sufficient consumption for a person’s age and sex) and three for moderation. Because the index uses a density measure and follows a universal set of standards, it can be applied to measure and compare nutritional quality of foods at various scales including individual consumption or purchasing, restaurants, and the broader food environment.

**Statistical analysis**

Analysis was conducted using STATA 14.2 software. To properly account for the complex sampling design of FoodAPS, sampling weights were applied and variance was estimated using the Jackknife Repeated Replication technique. Univariate and multivariate linear regression were used to determine changes in dietary quality as DSS increased. Univariate models where p<0.25 were admitted into the full model. The DSS was run first as a continuous measure, with values 0-30 for the actual number of days since benefit receipt until the final day of a given household’s data collection week. Then, using visual inspection of the mean distribution of FAH purchases over the SNAP cycle, the DSS variable was divided into time brackets to account for disproportionate food spending early in the benefit month. This bracketing was also informed by USDA program evaluations showing that most SNAP households go shopping within one day of receiving benefits and spend an average of 21.40% of their benefits on this first food shopping trip. Within this sample, the majority of food acquisitions occurred at the beginning of the SNAP cycle (directly after receipt of benefits); therefore, time brackets of ≤2, 3-9, 10-20, and >20 days were used. Other time brackets, including models 1 (≤2, 3-5, 6-19, >19), 2 (≤6, 7-13, 14-20, >20), and 3 (≤6, 7-13, 14-20, 21-27, >27) were also tested.

The DSS was also tested as a dichotomous variable for both 1) households receiving benefits during the data collection week versus all other households and 2) households in the final 10 days of the SNAP cycle during the data collection week versus all other
households. Sensitivity analysis was performed to determine whether different time bracketing substantively changed the outcomes. These analyses showed similar magnitudes of effect on total HEI-2010 scores, with slight variations in statistical significance above and below the p<0.05 level.

Potential covariates were selected based on past SNAP food spending literature. Correlational tests were performed for race/ethnicity, gender, education level, age of primary respondent, household income, household size, whether the household had a child, and residence in a metropolitan or non-metropolitan county. Other potential covariates, including physical access to food retail, household food insecurity status, and use of other food assistance programs (including WIC and USDA school lunch), were evaluated to ensure they did not influence the main research question. A robustness check was run using all potential covariates (showing similar magnitude and significance) and final regression models controlled for those variables that were significantly associated with outcomes.

RESULTS
Of the full sample, 1,581 households received SNAP. After removing observations where households were missing data for date of SNAP distribution (n=16), had no FAH purchases (n=182), or data-entry errors occurred in either macronutrient or household income values (n=6), 1,377 SNAP households remained. Most primary respondents were female (80.00%) and White (64.56%). Seventy-nine percent of households reported annual income lower than $35k and nearly 62% had at least one child living in the home (Table 1).

Overall mean HEI-2010 of foods acquired by SNAP households was 46.14 out of 100 (Table 2). Among the sample, HEI-2010 component scores were relatively low; mean scores for total fruit, whole fruit, total vegetables, dairy, fatty acids, and empty calories were less than 50% of the maximum score for each category, meaning the quality of the mix of household food purchases was well below what is recommended by the DGA-2010. Scores for greens and beans and whole grains were on average lower than 20% of the maximum possible score.

After removing observations among non-SNAP households without any FAH purchases (n=325) and where there were extreme outliers in macronutrients (n=9), there were 992 eligible non-participating households, 303 lower-income ineligible households (income <185% FPL), and 1,616 ineligible households with income ≥185% FPL. Compared to both eligible and non-eligible households, SNAP households had significantly lower total HEI-2010 scores (p<0.05) (Table 2). Higher-income ineligible households (≥185% FPL) had, on average, a 7.36-point greater total HEI score (p<0.001). Eligible non-participants had significantly better scores in several components, including total and whole fruits, total vegetables, whole grains, and empty calories. There were no significant differences among any of the sample groups for total protein, fatty acids, sodium or refined grains.
Among SNAP households, unadjusted mean HEI decreased by 0.11 points for every additional day since benefit distribution (95% CI: -0.24, 0.02). When DSS was run as a dichotomous measure, HEI-2010 was 2.89 points lower among households in the final 10 days of the SNAP cycle compared to all other SNAP households (CI: -5.39, -0.39). As a sensitivity analysis, when households with no FAH purchases were included and assigned an HEI score of zero, unadjusted mean HEI decreased by 0.23 points for each additional DSS (CI: -0.44, -0.02) and 4.63 points for households in the final 10 days of the SNAP cycle (CI: -8.74, -0.51).

After controlling for significant covariates in the prediction model (race/ethnicity, income, age, college degree, marital status, metropolitan-area), mean HEI-2010 total score was 39.01 (CI: 32.80, 45.22) for households who received their benefits on the final day of the data collection week (DSS=0) (Table 3). For each one-day increase in DSS, total HEI-2010 decreased by 0.12 points (CI: -0.25, 0.00, p=0.053), however while the full model was significant at the p<0.05 level, DSS was not a significant predictor of diet quality when run as a continuous measure. With DSS as a dichotomous measure, households in the final 10 days of the SNAP cycle had on average an HEI-2010 total score 2.95 points lower than those households within the first 20 days of the SNAP cycle (CI: -5.31, -0.58, p=0.02). Among covariates, living in a metropolitan area and having a college degree, were significantly positively associated with dietary quality. Total vegetables was the only component score in the full model with a significant negative association with DSS (continuous) (Table 3). For those households in the final 10 days of the SNAP month, there were significant decreases in whole fruit and total vegetable scores. Sodium was the only component score to significantly improve in the final 10 days of the SNAP cycle, indicating reduced acquisition of high-sodium foods.

Mean household spending for the data collection week was $107 and energy per person was 17,226 (kcal/100g). After controlling for significant covariates, for each additional DSS, spending decreased $3.82 (CI: -4.56, -3.08, p<0.001) and calorie acquisition per person decreased 652 (kcal/100g) (CI: -824.01, -478.29, p<0.001). Households in the final 10 days of the SNAP cycle spent, on average, $43.86 less (CI: -56.18, -31.54, p<0.001) and acquired 7,702 fewer calories per person (CI: -10233.45, -5170.06, p<0.001) compared to households at all other points of the SNAP cycle.

**DISCUSSION**

To our knowledge, this is the first study to use a nationally representative sample of household food purchasing to assess dietary patterns during the SNAP cycle. Use of the HEI-2010, an extensively validated tool, provides a robust measure of dietary quality. Overall diet quality among the sample was low compared to the FoodAPS national average, which itself is only 51.95 of the total possible score of 100 reflecting perfect adherence to the DGA. SNAP household component scores reflect proportionally low acquisition of whole grains, seafood, fruits, and vegetables and high acquisition of empty calories, including sugar-sweetened beverages.
The lower diet quality of SNAP households compared to eligible non-participants and higher-income ineligible households is consistent with prior literature, and further highlights the degree to which SNAP households are struggling to meet dietary guidelines. The nutritional disparity exists not just for overall diet quality, where the average SNAP household HEI score was more than 7 points lower than for higher-income non-eligible households, but also for HEI components. The proportion of food purchasing comprised of total and whole fruits was significantly lower for SNAP households than for all non-SNAP households, regardless of eligibility. Among eligible non-participants—those closest resembling SNAP households in terms of income and assets—fruit and vegetable component scores were more than 25% higher than among SNAP households (p<0.001). These disparities may be explained, at least in part, by the relatively higher disadvantage that has been shown among income-eligible households who choose to participate in SNAP.

Aligned with prior SNAP cycle literature, food spending and calorie acquisition among the sample decreased significantly as time from benefit distribution increased. A key finding from this study, however, is that dietary quality was low throughout the entire SNAP cycle. There was a small, but significant 2.95-point decrease in HEI-2010 for households in the final 10 days of the SNAP cycle compared to those households who were within 3 weeks of receiving SNAP. This decline in diet quality was largely attributable to decreased density among food acquisitions of fruits and vegetables. Households in the final 10 days of the SNAP cycle had a 21% lower total vegetable score compared to all other SNAP households. Declines in diet quality at the end of the SNAP cycle may be explained by depletion of resources with which to purchase more expensive, nutrient dense foods such as fruits and vegetables. As diet quality in this sample was notably low throughout the SNAP cycle, not just in the final week, this suggests current benefit levels are insufficient to purchase foods in accordance with the DGA. While previous SNAP cycle literature has hypothesized that changing the benefit distribution cycle may help with present-biased spending of benefits early in the month, the findings from this study suggest that more frequent benefit disbursements are unlikely to significantly impact diet quality.

The modest changes in both total and component HEI scores should not be discounted, especially given the proportionally large declines in purchasing of certain foods. Low fruit and vegetable scores throughout the SNAP cycle, and particularly at the end of the month, are concerning as fruit and vegetable consumption is an important protective factor against chronic disease. Studies have shown that individuals who most closely follow the DGA have an 11-28% reduced risk of all-cause, cardiovascular disease and cancer mortality, and 16% and 18% lower major chronic disease and diabetes risk, respectively. These findings are particularly important in the context of this study, where the decline in diet quality at the end of the SNAP cycle suggests the nutritional gap between SNAP households and the general population grows even larger during periods of the month. Addressing disparities in diet quality between SNAP participants and non-participants is a critically important step in reducing the higher rates of mortality among
SNAP participants from diet related diseases including cardiovascular disease and diabetes.\textsuperscript{34}

**Limitations**
Study limitations relating largely to the FoodAPS dataset, discussed elsewhere,\textsuperscript{23,35,36} include lack of full-month purchasing data, reporting error in the date of SNAP receipt, and lack of food consumption data. The limitation of having only one week of purchasing data means that this study compares households at different points in the SNAP cycle to each other, rather than evaluating changes during the SNAP cycle within each household. Additionally, households without any FAH purchases were omitted, as it was not possible to calculate an accurate HEI score for them. Lack of consumption data limits interpretation of the HEI scores, as the possibility cannot be ruled out that higher diet quality purchases made early in the month are stored and consumed later in the SNAP cycle.

Future research should employ longitudinal methods and further explore the complex factors influencing food purchasing during the SNAP cycle, including diet quality of restaurant and other away-from-home food purchases, as well as how SNAP interacts with other food assistance programs, such as WIC.

**CONCLUSIONS**
One of the most important contributions of this study is the finding that although SNAP beneficiaries experienced extremely low diet quality throughout the month, as measured using the HEI-2010, there was a significant drop in diet quality in the final 10 days of the benefit cycle, suggesting that insufficient benefits lead to poorer quality food purchases later in the month. These critically important social benefits define and constrain the food choices available to low-income Americans and therefore prove centrally important in determining the health of the population.
Table 2. Description of the FoodAPS sample

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
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<td>Total</td>
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<td><strong>Age of Primary Respondent</strong></td>
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<td>16-30</td>
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<tr>
<td>31-45</td>
<td>447</td>
<td>32.46</td>
</tr>
<tr>
<td>46-60</td>
<td>394</td>
<td>28.61</td>
</tr>
<tr>
<td>&gt;60</td>
<td>185</td>
<td>13.44</td>
</tr>
<tr>
<td><strong>Gender of Primary Respondent</strong></td>
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<td></td>
</tr>
<tr>
<td>Male</td>
<td>276</td>
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<tr>
<td>Female</td>
<td>1,101</td>
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<td><strong>Married</strong></td>
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<td><strong>Child in Home</strong></td>
<td>851</td>
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</tr>
<tr>
<td><strong>Non-Metro County</strong></td>
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<td>9.30</td>
</tr>
<tr>
<td><strong>Race of Primary Respondent</strong></td>
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<td></td>
</tr>
<tr>
<td>White</td>
<td>889</td>
<td>64.56</td>
</tr>
<tr>
<td>Black/African American</td>
<td>274</td>
<td>19.90</td>
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<tr>
<td>Multiple/Other</td>
<td>213</td>
<td>15.47</td>
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<tr>
<td><strong>Hispanic</strong></td>
<td>349</td>
<td>25.34</td>
</tr>
<tr>
<td><strong>Education level</strong></td>
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<td></td>
</tr>
<tr>
<td>Less than high school</td>
<td>375</td>
<td>27.23</td>
</tr>
<tr>
<td>High school or GED</td>
<td>452</td>
<td>32.82</td>
</tr>
<tr>
<td>Some college</td>
<td>438</td>
<td>31.81</td>
</tr>
<tr>
<td>College graduate</td>
<td>111</td>
<td>8.06</td>
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<tr>
<td><strong>Annual Household Income</strong></td>
<td></td>
<td></td>
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<tr>
<td>Less than $15k</td>
<td>534</td>
<td>38.78</td>
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<tr>
<td>$15-24,999k</td>
<td>346</td>
<td>25.13</td>
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<td>$25-34,999k</td>
<td>211</td>
<td>15.32</td>
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<td>$35-49,999k</td>
<td>145</td>
<td>10.53</td>
</tr>
<tr>
<td>$50-74,999k</td>
<td>141</td>
<td>10.24</td>
</tr>
</tbody>
</table>

GED, General Education Development
### Table 3. HEI-2010 scores by SNAP eligibility and participation

<table>
<thead>
<tr>
<th>HEI-2010 Score</th>
<th>Max. Score</th>
<th>SNAP participants (n=1,377)</th>
<th>Eligible, non-participants (n=992)</th>
<th>Not SNAP Eligible</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean (SE)</td>
<td>Mean (SE)</td>
<td>&lt;185 FPL (n=303)</td>
</tr>
<tr>
<td>Adequacy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Fruit</td>
<td>5</td>
<td>1.80 (0.09)</td>
<td>***2.40 (0.10)</td>
<td>**2.28 (0.12)</td>
</tr>
<tr>
<td>Whole Fruit</td>
<td>5</td>
<td>1.95 (0.12)</td>
<td>***2.75 (0.11)</td>
<td>**2.52 (0.15)</td>
</tr>
<tr>
<td>Total Vegetables</td>
<td>5</td>
<td>2.24 (0.09)</td>
<td>***2.82 (0.09)</td>
<td>2.51 (0.14)</td>
</tr>
<tr>
<td>Greens &amp; Beans</td>
<td>5</td>
<td>0.86 (0.08)</td>
<td>***1.59 (0.11)</td>
<td>1.16 (0.13)</td>
</tr>
<tr>
<td>Whole Grains</td>
<td>10</td>
<td>1.73 (0.11)</td>
<td>*2.13 (0.16)</td>
<td>2.05 (0.28)</td>
</tr>
<tr>
<td>Total Dairy</td>
<td>10</td>
<td>4.64 (0.12)</td>
<td>4.91 (0.20)</td>
<td>4.40 (0.24)</td>
</tr>
<tr>
<td>Total Protein Foods</td>
<td>5</td>
<td>3.46 (0.08)</td>
<td>3.26 (0.08)</td>
<td>3.61 (0.16)</td>
</tr>
<tr>
<td>Seafood and Plant Proteins</td>
<td>5</td>
<td>1.49 (0.10)</td>
<td>*1.83 (0.08)</td>
<td>1.76 (0.15)</td>
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<tr>
<td>Fatty Acids</td>
<td>10</td>
<td>4.86 (0.17)</td>
<td>4.96 (0.24)</td>
<td>5.15 (0.27)</td>
</tr>
<tr>
<td>Moderation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refined Grains</td>
<td>10</td>
<td>6.68 (0.16)</td>
<td>6.85 (0.16)</td>
<td>7.40 (0.33)</td>
</tr>
<tr>
<td>Sodium</td>
<td>10</td>
<td>6.47 (0.16)</td>
<td>6.51 (0.26)</td>
<td>6.91 (0.37)</td>
</tr>
<tr>
<td>Empty Calories</td>
<td>20</td>
<td>9.98 (0.20)</td>
<td>***11.57 (0.27)</td>
<td>10.72 (0.67)</td>
</tr>
<tr>
<td>Total Score</td>
<td>100</td>
<td>46.14 (0.56)</td>
<td>***51.57 (0.60)</td>
<td>*50.49 (1.32)</td>
</tr>
</tbody>
</table>

Adjusted Wald tests, all compared to SNAP participants.

Boldface indicates statistical significance (*p<0.05, **p<0.01, ***p<0.001)

HEI-2010, Health Eating Index 2010; FPL, Federal Poverty Level; SNAP, Supplemental Nutrition Assistance Program

a Scores based on adherence to recommendations from the Dietary Guidelines for Americans. Higher scores equate to better diet quality.
Table 4. Adjusted regression models of days since SNAP on HEI-2010 total score

<table>
<thead>
<tr>
<th></th>
<th>Continuous Measure</th>
<th></th>
<th></th>
<th>Dichotomous Measure (DSS&gt;20)</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Total Score*</td>
<td>Total Vegetables*</td>
<td>Whole Fruits**</td>
<td>Total Score**</td>
<td>Total Vegetables**</td>
<td>Whole Fruits**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coef. (95% CI)</td>
<td>Coef. (95% CI)</td>
<td>Coef. (95% CI)</td>
<td>Coef. (95% CI)</td>
<td>Coef. (95% CI)</td>
<td>Coef. (95% CI)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P&gt;</td>
<td>t</td>
<td></td>
<td>P&gt;</td>
<td>t</td>
<td></td>
<td>P&gt;</td>
</tr>
<tr>
<td>HEI-2010 Total Score</td>
<td>-0.12 (-0.25,0.00)</td>
<td>*-0.01 (-0.25,0.00)</td>
<td>-0.03 (-0.06,0.00)</td>
<td>0.09</td>
<td>*-2.95 (-5.32,-0.58)</td>
<td>0.02</td>
<td>**-0.45 (-0.75,-0.16)</td>
</tr>
<tr>
<td>Race</td>
<td>White (Ref.)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Black/AA (-1.17 (-4.32,1.98)</td>
<td>0.45 (-0.78,0.12)</td>
<td>0.14 (-0.80,0.27)</td>
<td>0.32</td>
<td>-0.99 (-4.01,2.03)</td>
<td>0.51</td>
<td>-0.31 (-0.74,0.13)</td>
</tr>
<tr>
<td></td>
<td>Other / Multiple</td>
<td>1.71 (-2.24,5.66)</td>
<td>0.38 (-0.59,0.25)</td>
<td>0.40</td>
<td>*0.43 (-2.27,5.62)</td>
<td>0.04</td>
<td>1.68 (-0.58,0.24)</td>
</tr>
<tr>
<td>Monthly Income (hundreds)</td>
<td>0.01 (-0.04,0.07)</td>
<td>0.65 (-0.01,0.1)</td>
<td>0.00 (-0.01,0.01)</td>
<td>0.71</td>
<td>0.01 (-0.00,0.01)</td>
<td>0.11</td>
<td>0.01 (-0.05,0.07)</td>
</tr>
<tr>
<td>Age</td>
<td>0.08 (-0.01,0.17)</td>
<td>0.08 (-0.00,0.02)</td>
<td>0.11 (-0.00,0.02)</td>
<td>0.06</td>
<td>**0.02 (0.01,0.03)</td>
<td>0.01</td>
<td>0.08 (-0.01,0.17)</td>
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<tr>
<td>Married</td>
<td>1.28 (-1.68,4.23)</td>
<td>0.38 (-0.20,0.49)</td>
<td>0.15 (-0.44,0.15)</td>
<td>0.40</td>
<td>-0.15 (-1.72,2.41)</td>
<td>0.31</td>
<td>1.24 (-0.20,0.48)</td>
</tr>
<tr>
<td>Non-metro Area</td>
<td>**-4.68 (-7.73,-1.62)</td>
<td>0.04 (-1.13,-0.02)</td>
<td>*-0.57 (-0.87,0.37)</td>
<td>**-4.74 (-7.83,-1.66)</td>
<td>0.04 (-1.14,-0.03)</td>
<td>0.00</td>
<td>*-0.58 (-0.45,0.66)</td>
</tr>
<tr>
<td>College Degree</td>
<td>*4.63 (0.32,8.93)</td>
<td>0.04 (-0.46,0.66)</td>
<td>0.04 (-0.12,0.1)</td>
<td>**4.73 (0.44,9.03)</td>
<td>0.03 (-0.45,0.66)</td>
<td>0.11</td>
<td>0.69 (-0.10,1.23)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.94 (-3.53,5.41)</td>
<td>0.70 (-0.26,0.61)</td>
<td>0.17 (0.18,1.01)</td>
<td>**0.59 (1.00,0.01)</td>
<td>1.00 (-3.44,5.43)</td>
<td>0.65</td>
<td>0.18 (-0.25,0.61)</td>
</tr>
</tbody>
</table>

Boldface indicates statistical significance (*p<0.05, **p<0.01, ***p<0.001)
SNAP, Supplemental Nutrition Assistance Program; AA, African American; DSS, Days since SNAP; HEI-2010, Healthy Eating Index 2010
Figure 3. Construction of the Days Since SNAP Variable

DSS, Days Since SNAP until the final day of data collection week
REFERENCES


CHAPTER 3: Food and Financial Coping Strategies During the SNAP Cycle

INTRODUCTION

Despite the existence of numerous federal food assistance programs, the food insecurity rate in the United States is 12.3%, a rate which has remained relatively unchanged since domestic food insecurity was first measured in 1995. Defined by the U.S Department of Agriculture as “access by all people at all times to enough food for an active, healthy lifestyle,” the commonly accepted measurement for household food security is an 18-question survey module that assesses the presence of or resources for obtaining adequate food within the past year. Among other federally funded food assistance programs, the Supplemental Nutrition Assistance Program (SNAP) is an income-eligible entitlement program intended to mitigate household food insecurity by providing supplemental income—earmarked for food purchases—to low-income families. One in seven Americans participates in SNAP, making it by far the largest federally funded food assistance program.

Today’s prevalence of food insecurity exists within an economic context of both rising income inequality and dramatically increased income volatility. From 1996 to 2011, the number of households in deep poverty – defined by those living on less than $2 a day in cash income – grew by as much as 130%. Many households, in fact, have no source of unrestricted financial support; the number of households for whom SNAP is their sole source of income has quadrupled since 1996. This inequality has been accompanied by a near doubling in family income instability since 1973 (as measured by either short or long-term drops in income), which disproportionately afflicts lower-income households.

Income inequality and volatility has been exacerbated by retrenchment of the social safety net in recent decades. Cash welfare assistance, called Aid to Dependent Children (ADC), started in the United States as a New Deal program to support poor widows and their dependents. Intended to be only a temporary measure, ADC grew over the years as eligibility requirements loosened, with some of the largest growth in caseloads occurring in the late 1960s and early 1970s. Rising caseloads, along with conservative backlash against the “pathology” of poverty articulated in Patrick Moynihan’s 1965 report, led to a mounting attack against welfare and particularly against young, black, unmarried mothers. During his run for presidency, Ronald Reagan used the trope of the “welfare queen” to condemn state dependency, leading to more a virulent and persistent emphasis on the racial stereotypes of welfare recipients than had ever been seen before. By the time of Bill Clinton’s bid for the White House, there was little remaining political or social tolerance for cash welfare, and Clinton ran successfully on a platform that pledged to “end welfare as we know it”.

After the block-granting of AFDC (formerly ADC) in 1996–now Temporary Assistance for Needy Families (TANF)–instated lifetime limits and work requirements, the number of households on the welfare roles fell precipitously. At its height in 1994, AFDC enrolled 4.6 million adults and 9.6 million children. By 2012 this number had decreased
69% to only 1.1 million adults and 3.3 million children. Through her in-depth interviews with poor families, sociologist Kathryn Edin reported that TANF is given out so infrequently that many believe “they just aren’t giving out cash anymore.”

As cash welfare roles have shrunk in the U.S. in recent decades, food assistance programs now serve as one of the largest components of the social safety net. Spending on SNAP in 2016 was roughly $73 billion dollars, which represented nearly 2% of the 2016 federal budget. While food assistance programs may not be what people typically think of as “welfare”, total SNAP allocations in 2015 were more than four times as large as the block grant funding designated for the more traditional cash welfare program, TANF. The significant role that SNAP now plays in our social safety net demonstrates the need for greater attention to the impact of federal food assistance programs in smoothing income volatility and episodic food insecurity.

The administration of SNAP—a federally funded, but state administered program—is something that has been much debated in the literature. SNAP benefits are distributed once per month, typically within the first two weeks of the month, with the precise distribution schedule varying by state. There is robust evidence demonstrating that both food spending and calorie consumption decrease as time from benefit distribution increase and this monthly pattern has been termed the “SNAP cycle”. National SNAP expenditure data have shown that not only do most families run out of benefits before their next distribution date, on average households are spending more than 75% of their benefits by the end of the second week after receiving them.

The SNAP cycle has serious implications, not just for nutrition and food security, but also for the financial stability of low-income families for whom SNAP makes up a large percentage of their monthly income. Food insecurity is associated with a number of long-term health outcomes, including increased risk of chronic disease, cognitive and functional impairments, and depression. Recent literature exploring the social impacts of the SNAP cycle has found decreased testing scores and increased episodes of disciplinary infractions among school-aged children as time from SNAP benefit distribution increases. End-of-month calorie restriction is evident within the SNAP cycle and while the research exploring the impacts of the SNAP cycle on diet quality is more equivocal, there is evidence to suggest that healthy food purchasing is highest immediately after SNAP benefits are distributed and that increasing time from benefit distribution is associated with higher likelihood of skipping meals. Lastly, income instability itself has been associated with poor health and behavioral outcomes including impacts on child cognitive development, lower adolescent engagement in school settings, and increased prevalence of risky behaviors among adolescents.

Dissolution of the social safety net, which is exemplified in the episodic food and financial instability of the SNAP cycle, has forced low-income households to develop informal coping strategies to fill in the gaps in the formalized and institutional economy. Previous poverty literature has studied this phenomenon extensively, showing that to
make ends meet, people work multiple low-paying jobs, rely on their social networks for instrumental, emotional and informational social support, and seek resources from a burgeoning charitable relief sector.\textsuperscript{22–27}

Specifically, with regard to food insecurity, Edin et al.’s USDA study of SNAP recipients found that households with higher food security relied significantly on family networks as a food coping strategy, including receiving food and money as well as informational and emotional support.\textsuperscript{28} In fact, social support, social capital and social cohesion have all been shown to reduce the risk of food insecurity.\textsuperscript{29–33} One recent study found that SNAP participation did not reduce the risk of food insecurity among mothers with very low levels of informal support.\textsuperscript{30} Familial social support, coupled with access to public benefits or employment, has also been shown to be essential for sustained economic security among formerly incarcerated populations who otherwise have struggled to acquire basic material needs such as food and shelter.\textsuperscript{34} Interactions and exchange with social networks can also provide a buffer against depression and mental illness, which are associated with higher rates of food insecurity.\textsuperscript{35,36}

In addition to relying on social networks, low-income households use numerous other informal techniques to buffer against food insecurity. Among these are relying on alternative food resources (e.g. food pantries, soup kitchens) and skipping or cutting the size of meals.\textsuperscript{37,38} Food insecure households have also reported a number of food shopping and meal preparation techniques to manage food insufficiency such as purchasing a limited variety of foods, relying on low-cost options, cooking in bulk and freezing, sharing food, omitting expensive ingredients, choosing stores based on sales, cutting coupons and making tradeoffs between buying food and other household expenses.\textsuperscript{37,39–41}

While there is extensive literature about coping strategies for managing food insufficiency, as well as robust evidence documenting changes in SNAP cycle spending and calorie consumption, to date, there has been very little research exploring how households cope with and mitigate the financial and nutritional instability of the SNAP cycle. There is also little information about the timing or quality of the coping strategies used, including reliance on social networks. In a recent study, Schenk-Fontaine et al. explored the timing of instrumental support and visits to food pantries during the SNAP cycle, finding that households were more likely to borrow money in the third week after receiving their benefits, but that food insecurity levels remained the same throughout the month, suggesting that financial assistance from social networks may be buffering households against food and income instability.\textsuperscript{42} While Schenk-Fontaine examined coping strategies over time, most of the current research on the SNAP cycle is cross-sectional. There is very little understanding of the dynamic (i.e. not point-in-time) use of informal support in tandem with formal (e.g. SNAP) support. Additionally, most of the SNAP cycle research has used quantitative methods to assess associations between time from benefit distribution and a limited range of health outcomes and coping strategies.
This study will add to the literature by using a mixed methods approach to uncover the dynamic coping strategies used for mitigating the SNAP cycle and also exploring what effects those strategies have on diet quality and health. Through survey data, we identify summary statistics about income, expenditures and food shopping behaviors, while we use in-depth qualitative data to articulate the various coping strategies identified by SNAP recipients.

**METHODS**

This paper presents data from a multi-component, prospective, mixed-methods cohort study of mothers (n=12) receiving SNAP benefits. The study took place in Philadelphia between 2016 and 2017 and was approved by the University of Pennsylvania and Children’s Hospital of Philadelphia (CHOP) Institutional Review Boards. In this analysis, I focus on the qualitative and survey data components of the study. Participants were recruited through word-of-mouth, the assistance of several nonprofit agencies in the Philadelphia area, and the CHOP Recruitment Enhancement Core.

**Study components**

Eligibility for the study required that participants were 1) African American female head of households, 2) the primary food shopper, 3) food insecure defined by food security score > 3 on the US Household Food Security Module, 4) overweight or obese (BMI 25.0-34.9 kg/m²), 3) and age 18-40. Of 385 potential participants approached, a total of 81 women agreed to be screened for the study. Of those women, 27 were eligible, 24 consented and 12 completed the full study. For all 12 participants who consented, but did not complete the full study, loss to follow-up occurred between screening and the first study visit.

Participation in the study lasted for one month and included a screening assessment at recruitment, followed by three clinic visits—one within 2-5 days of receiving SNAP benefits, the second two weeks from SNAP disbursement and the third within the final 3 days before households received their next SNAP allotment. Screening included a basic eligibility questionnaire, the U.S. Household Food Security Module and clinical measurement of height and weight. Study visits involved anthropometric and appetite regulating hormone measurements, as well as multiple 24-hour diet recalls and food shopping assessments through collection of household food shopping receipts. On the final study visit, one of the researchers conducted a semi-structured interview with each participant, which covered SNAP cycle coping strategies and experiences with the end-of-month period. The researcher loosely followed an interview script with questions on 1) what coping strategies participants used to get food when SNAP runs out, 2) tradeoffs between food and other things, and 3) participant experiences with the SNAP program. The interviews were 30-60 minutes in length and were audio recorded.

**Analysis of interview transcripts and food shopping surveys**

In this analysis, we focused on the in-depth interviews and food shopping survey data. Survey data were collected using a web-based platform (REDCap) and were analyzed
using Stata version 14.0. Interview audio files were transcribed by a professional transcription service. Five members of the research team did a close reading of six of the transcripts to identify key concepts, which were then condensed and clarified among the research team to create a final codebook of 6 primary codes. Two members of the research team coded the transcripts using NVivo qualitative software version 11. Each researcher coded approximately half of the transcripts. A subset of 20% of the transcripts were coded by both researchers and a 92.5% agreement was achieved across all transcripts. Following coding of the transcripts, the researchers summarized the findings by code and these summaries were used to guide discussion and iterative interpretation of the data by the research team to identify cross-cutting themes that integrated findings across codes.

**Description of study sample**

Table 5 describes the characteristics of the 12 participants. Per the eligibility requirements for the study, all participants were food insecure, African American, female heads of household.\(^b\) The mean age was 34.8 and participants had an average BMI of 32.8 kg/m\(^2\), which is classified as obese. The majority of women were single (including divorced or separated) and the average household size was 3.8 people. The education level among participants was mixed; eight percent did not finish high school, one third had a high school degree, one third attended some college and a quarter were college graduates. Mean self-reported monthly household income (e.g. wages, disability payments, child support and TANF) was $1552, while routine average monthly expenses (e.g. utilities, rent, transportation, child care) were $1230. The mean monthly SNAP benefit amount among participants was $287. Among the sample, two thirds of participants reported very low household food security, meaning that at times during the past year, the eating patterns of one or more household members were disrupted and food consumption declined because they lacked money or other resources with which to procure food.\(^{43}\)

**RESULTS**

Participants reported, both through the survey and interviews, on a variety of coping strategies they used to manage the SNAP cycle and food insecurity. The survival strategies of the participants fell into three main categories: 1) social support, 2) mental accounting and resilience and 3) adjustments to shopping and eating patterns.

**Social support strategies**

The importance of social networks in managing food and financial insecurity was highlighted again and again throughout our interviews with participants. Following the

\(^b\) The percentage of households who reported “very low food security” (66.7%), was substantially higher than the national average, where 40% of food insecure households have very low food security.
three primary constructs of social support, participants received assistance from their social networks in instrumental, emotional and informational forms.\textsuperscript{15}

**Instrumental Support**

All of the participants spoke of their reliance on instrumental social support, most often in the form of money borrowed or gifted from family, at the end of the month when SNAP funds had run out. “Well, money is always tight. After we pay all the bills, we probably have $60.00 left and that’s for whatever the kids need and gas. That’s for the whole month. So it’s almost impossible without my dad helping or someone for us to eat the last couple weeks.” A number of the mothers borrowed money from friends or family in the final days and weeks of the benefit month, while others said that their family members would take them to the store to buy food. In the case of one woman, whose father did not live locally to Philadelphia, her dad put money into her bank account at the end of the month. Despite being stressed about his own finances, the participant reported, “he still tries to give us something.” Several women described exchanging SNAP benefits with friends or family members. “Well, later in the month I’m usually spending my own money. Or like if I have a friend they’d be – oh, I have extra stamps on my card. You want to use it? I’ll say yeah, because most of the time I do need to use them. So that’s usually how it goes. I’m either spending my own money or somebody else is helping me.” Sharing SNAP took place after participants had run out of their own SNAP benefits and typically involved either going to the grocery store with a friend or family member who would purchase items for them or borrowing someone’s electronic benefit transfer (aka EBT) card and using it to buy food. Participants also described getting help from family for paying unusual expenses, such as car repairs or medical bills. Many of the participants expressed that the resources they received from their social network were essential to their survival. “So if it wasn’t for my neighbor this month, I don’t know what we would’ve done…,” explained one woman, who noted that her kitchen shelves were completely empty by the end of the month.

In addition to money, many participants also received instrumental support in the form of groceries and prepared meals. Several participants said a family member would bring groceries to their house towards the end of the month. For those participants who lived in intergenerational households, food sharing throughout the month was common. Friends played a critical role in providing food resources, as well. One mother described taking her children to McDonald’s where her daughter’s godmother worked so they could get free meals at the end of the month. Another had a friend who would regularly take her out to lunch and order extra food so that she could take leftovers home to her children. This informal food sharing network extended beyond family and friends, as well; several participants said they would trade food back and forth with a neighbor. “Thankfully, I have some – my new neighbor, we kinda go back and forth. If she needs food at a certain time, I’ll give it to her. If I need food, she’ll give it to me.” Other mothers mentioned skipping meals at home towards the end of the benefit cycle so that their children could eat, but then having food brought to them at work by a coworker. Still others said they would eat meals at church after services on Sundays.
Lastly, a number of participants described benefiting from informal financial arrangements such as a mechanic who would allow payments in installments or a loose rental agreement with a family member. Informal financial arrangements were not always described positively; one participant said that while she was supposed to receive money from her daughter’s father, he often paid late and rarely provided enough.

**Emotional Support**

Many of the participants described having a strong social support system. Emotional support was an essential component of this, as it provided assistance with and relief from some of the stresses associated with food insecurity. A number of participants described with gratitude the experience of spending holidays, such as Thanksgiving and Christmas together with family – not just because the food expenses were shared, but also because of the reduced burden associated with planning, cooking and cleaning. “It’s relief when you have family or even something at work. When you have that – a special occasion where you can kinda all get together and somebody else cooks for you. That’s beautiful. So if I can get that – I usually don’t like to reach out for it, but if it happens, it’s like a big load off your shoulders.”

Family would often take on extra duties when resources were scarce; one participant lived with a cousin for an extended period of time when her home needed repairs. “I had a horrible situation. I had a horrible situation when my electric wiring was – I don’t know what was messed up in the house. And we had to stay with […] my cousin […] she’s great. She let us stay with her for two months. But she was great. I had someone cooking dinner for me. I had someone taking the kids to school for me. So she was like my husband.” While much of the support participants described receiving from friends and family had an instrumental component (e.g. food, money, errands), it was evident from the way they described the care and love they received from their social network that these relationships also contained a much-needed emotional component. One participant explained how she and her husband, from whom she was separated, continued to look out for each other by sharing responsibilities related to their children and making sure each adult had the time and resources they needed to pursue their individual goals, such as going to school or applying to a new job.

Not all the women we interviewed talked about emotional support within their social networks, however. One participant explained that she preferred not to tell other people about her financial struggles for fear that they would use this information as “ammo”. She had learned this lesson from a friend, who had cautioned her, “if you don’t tell nobody…nobody can bother you about it.” From this woman’s perspective, it was better to keep the stresses and challenges of poverty to herself than to risk the reactions she may get if she reached out to her social network for support.

**Informational Support**

Informational support was discussed most frequently as learning about resources through
word of mouth. This included learning about what stores were having sales, the location and quality of food pantries and also financial support programs such as grants for home repairs or school scholarships. When asked how she chose which food pantry to go to, one participant responded, “oh, we talk about it at work so they – like some people at work know different food pantries. So we’ll talk about it and we’ll figure out like [what are the good ones to go to].” Many of the women worked in the healthcare setting as medical assistants and so had numerous coworkers with whom they interacted on a regular basis.

Another participant described being intentional about seeking out informational support, including speaking with social service providers to learn about opportunities for financial assistance. “And I talked to her, and then she told me about a savings plan that they have. I was like, what else do you guys have? They have a savings plan for college for my daughter. And at work, I found out about another savings plan for college. So, yeah, you just – word of mouth.” One participant recounted a time when a friend had connected her with another mother who had extra SNAP benefits. “I was talking to one of my girlfriends and I was telling her – because I was going to pay one of my bills late just so I could have extra money. And she said, well, I think such and such has extra stamps because she has more kids than you and she didn't use all of them. So she said I'm going to ask her for you.”

Experiences Around Social Support

While all the participants talked about how critical these forms of social support were for managing the SNAP cycle, a number of mothers expressed feeling conflicted about asking for or receiving help. For some, there was a desire not to overburden people or ask for too much from other people who have their own financial struggles. “I don't have no resource other than my dad, but he retired, so I try not to put too much on him.” One participant said she prefers not to ask for assistance as she recounted the gentle pushback she received from her brother when asking for a ride. “But most of the time, I don't like to bother people so – because a lot of people – my brother had told me before my car don’t run on – my gas tank don’t run on love, so I’m like okay.” While living with family, either rent free or with an informal rent agreement, was an important form of instrumental support, this arrangement was often frustrating. As one woman described of living with her mother, “She is the worst. I can't live with her. I can't wait to move.” In this case, the woman viewed the financial burden of paying rent as superior to enduring the challenges of living under the same roof as her mother.

A number of participants described having strong social support networks, which they attributed to “the way we was raised” and the “closeness” and “loyalty” of their family and friends. One participant noted that asking for help from family was easier than asking friends, but said that the relationships she had with her friends at this point were more akin to those with family, which normalized the experience. “Well, it’s become normal now, so I mean, – I guess I don’t – wouldn’t look at it like that? Because I look at them like family, so it’s like I’m asking my family for real. I’m not really asking my friends,
I’m asking my family.” Participants also attributed the strength of their social support network to a reciprocity and shared experience of needing help. “We was always together, and it was always like – it wasn’t always me down, put it that way. You know what I mean? It wasn’t – I wasn’t always the one needed the help. […] If I can help you, I’ll help you. If I can’t, then I can’t do anything. That’s the way it go.” The help the women received from their friends and family was often returned in kind at a later time and this system of sharing resources was essential to the quality and strength of the social networks.

**Mental accounting and resilience strategies**

Both the survey and interview script included questions about budgeting, which many of the women reported using as a financial strategy (58.3% reported sometimes, usually or always creating a weekly or monthly food budget for their household). With the exception of two women who reported using an app called “EBT Fresh” to track their SNAP purchases, the budgeting participants described did not involve a formalized external mechanism for tracking income and expenditures. Instead, the women tabulated their expenditures closely in their heads. On more than one occasion, a participant recounted in precise detail the cost of every item from a shopping trip or the exact amount of each utility bill from the prior month. In this sense, the budgeting participants described was largely a system of mental accounting. As one woman explained, “I keep it in my head. Because, I mean, it’s basically the same stuff every month.” Additionally, only a few women reported setting aside money when possible. “I like to have some sort of savings, so when it – times like this do come up, it’s like, okay, I have a few dollars put to the side where we’re not gonna starve, but we can’t necessarily live off of this forever.”

However, given the limited income of the participants, restricting spending to only essential items through diligent self-control was expressed as the primary budgeting mechanism. One woman explained her budgeting strategy this way: “I try not to impulse shop. That’s the main thing. Because if you do that, then you’re definitely not gonna have everything left to feed everybody.” To “budget” meant to limit impulse purchases, cut luxuries and prioritize “needs” over “wants.” Living within a fixed income was a necessity and was sometimes referred to as “being on a budget”. As one woman explained, “Well, I can’t spend something I don't have.” None of the women reported using a credit card or taking out short-term or payday loans, so their spending was truly limited to the cash resources they had available.

This type of budgeting also resulted in weighing of tradeoffs between different competing needs, such as paying for food, rent or gas. As one woman explained, “So just – like when we was coming up, they’ll say you rob Peter to pay Paul and just like okay, I gotta take this from here and now – I make it work someway, somehow. But I know my goals is to make sure that we have food and our head is covered.” The top priorities expressed by participants were food, rent and household essentials like toilet paper, diapers and feminine products. One participant explained that the things she pays first are the items
that could be repossessed (e.g. car, house), while others said food was the most essential expense.

As another woman explained, other bills were often bumped in this tradeoff negotiation. “But I gotta do it because we gotta eat. … Everything is – everything falls late. Because if I gotta go shopping, I gotta go shopping. So this bill gonna have to wait until next week or when I get some money to pay it. But gotta go shopping.” Payments on utility bills, cell phone bills and student loans were often delayed, skipped or made for the minimum amount necessary to keep the service from being shut off. Based on the average monthly self-reported income of $1552 (e.g. wages disability, child support, TANF and wages), compared to average recurring monthly expenses of $1230 (e.g. rent, utilities, transportation), participants were operating with very little margin of error in their finances. With little more than $300 in “extra” income, participants’ delayed management of bill-paying was an important technique for freeing up money with which to buy food and other necessities, particularly at the end-of-month or around expensive times of year like holidays and back-to-school.

SNAP-specific budgeting was also prevalent, with many women reporting that they would try to spend only a portion of their benefits at the first shopping trip and save the remainder for either a second big shopping trip or a series of smaller trips later in the month. Based on survey responses however, all participants went shopping for food within the first 3 days after receiving their SNAP benefits and 75% of them spent somewhere between half and all of their benefits on that first trip, meaning there would be little leftover for subsequent shopping trips. All of the participants reported running out of SNAP before the month ended with 83.3% reporting this happened by the end of the second week. Around holidays, several women said they would try to set aside SNAP to cover the cost of special meals (e.g. Thanksgiving, Christmas), however it was unclear what “setting aside” SNAP meant beyond mental calculating. Despite budgeting their SNAP, all the women reported supplementing their SNAP with cash for food purchases throughout the month, which sometimes posed challenges in having enough money available for other expenses.

The mental budgeting and self-control the women described was accompanied by a resolute determination to “make it work”. This resolve seemed to be the guiding tenet by which many of the mothers managed their financial instability. Sometimes this manifested as a self-mandate, as in the case of one mother who said she would not allow herself to feel discouraged. “It do. I don’t know how I do it, but I just do. I never say, never cry, never shed a tear. I just keep moving. Because crying ain’t going to fix it.” In other cases this resolve appeared more in the form of matter-of-fact acceptance of the situation, as in, “Because I make a way. I got two kids. I’ve got to. I make a way.”

Several women emphasized the impermanence of their present situation and spoke of the future as a source of their motivation or resolve. As one participant said, “…right now, we’re just going through a time and we’re gonna get through it. It’s gonna be good.” Not
wanting to depend on others or depend on SNAP provided inspiration for a change in the future, as well. “I don’t even wanna depend on SNAP. I don’t think anyone should want to depend on it. You just need the benefits sometimes just to get through a process until you get to that point where you can – but you need resources in order to help you get to that point.” In this situation, SNAP provided the resources necessary to change her current circumstance. Other sources of motivation the women discussed included religious faith, children and family. “Even when I’m in the house and I’m cooking, I’ll turn up the gospel music and – you know, just I mean, so many different things can inspire you to put yourself in a better situation. I have certain family members, not many, that were inspiring, like one or two. And my children.”

For a number of the women, the concept of a coping strategy for managing the end-of-month period did not resonate. Instead, they viewed the situation of running out of food or money to buy food as normal and something to which they were completely accustomed. When prompted to recall a particular event when they had skipped a meal, several mothers responded that it happened all the time and that they did not view it as a big deal.

The women consistently described feeding their children before and sometimes to the exclusion of feeding themselves. “When you – as a mom you just – you just worry about what you kids got. As long as they got, you cool. You don’t worry about nothing else. I learned that in life. As long as you kids cool, you cool. It don’t bother me. Some days, I might be eating noodles. They ain’t gonna last but so long in my stomach, but I also know I ain’t gonna be up too long. I’m gonna go to bed. But it don’t bother me. As long as they ate, I’m cool.” Even on days when money or food were tight, feeding their kids was top priority and the prospect failing to achieve this instilled a certain degree of stress. “Long as my kids eat, that’s my main concern. I don’t care about eating. I can hold out for a good minute, long as my kids is eating. It pains me if I wasn’t able to feed them.”

While all the mothers strove to protect their children from missing meals, some went even further by shielding the children from knowing about the financial situation in the household. To mask the food shortage, mothers described eating at a friend’s house, but treating it like a special occasion, rather than telling the children they had run out of food. One mother described hiding the fact that she couldn’t afford money for gas by parking her car several blocks away from home and getting a ride to work. Several of the mothers also expressed that it was important that their children not worry about whether there was enough food, but instead that they enjoy being children. “So I don’t want him to think that oh I can’t have that and then he’s skipping meals or skipping stuff because he thinking that we’re on a budget.” Alternatively, some mothers chose to talk with their children about SNAP and finances, particularly when the children were a little older. “So I try to tell them – I try to not tell them as much hurtful stuff as I could possibly do. But I did let her know the truth and I tell her more because it's real life. I don't want her to think it's all cake and candy when it's really not. And we have struggled.” This decision was
motivated by a desire to present real-world information to their children, as well as to instil in them an idea that there is something “better than this.”

**Adjustments to food shopping and eating**

Participants shared numerous, well-articulated food shopping and eating strategies for managing the end-of-month period. Many of the techniques the women described were used more as overall strategies for stretching their SNAP dollars throughout the month, however some strategies were used explicitly in the final days of the SNAP month, such as making creative meals based on what was left in the freezer or pantry (e.g. rice and gravy, pancakes) or leaving out more expensive ingredients like meat. When food and SNAP ran out, the women would frequently skip meals or eat less in order to make sure their children could eat. “The last I wanna say week and a half, two weeks, my husband and I don’t eat. If we do it’s like one meal a day, to make sure the kids have breakfast, lunch and dinner.” These end-of-month adjustments to shopping and eating, including skipping multiple meals or running out of food completely, were commonly framed as ordinary or regular experiences, even when they resulted in physical side effects such as fatigue and light-headedness. “I’m just used to it. You just do what you have to do. So if I get lightheaded or I get a little tired, I’ll just sit down. It’s just – I mean, it’s just the way it is so it’s no big struggle because we do it all the time. We have to.” This normalizing seemed to reflect a level of acceptance or even resignation about their situation, as well as a belief in the power and necessity of the individual to change their own circumstances.

Shopping techniques for stretching the SNAP dollars throughout the month included a number of methods aimed at limiting unnecessary spending, such as cooking meals at home, menu planning, shopping off of a grocery list, stocking up during sales, and using coupons and store circulars for selecting purchases. Buying in bulk and freezing items in a chest freezer was another frequently mentioned technique, although several women noted that they preferred to buy foods (especially meat) fresh, rather than storing items for a long time. Participants chose where to shop largely based on prices and frequently would visit more than one store or change stores each month to take advantage of different sales and promotions.

Participants articulated clear patterns and techniques for budgeting and spending of SNAP to maximize the benefits. This included delineation of trip type depending on when it occurred during the benefit cycle. For example, the first shopping trip after receiving SNAP benefits was typically used for stocking up on essential items, such as meats and proteins, fruits, vegetables and grains. For a number of participants, this first trip was the only big shopping trip in a month and often involved buying foods in bulk that could be frozen and stored for eating throughout the month. Several women reported splitting their SNAP between this first trip and another one roughly two weeks later. The subsequent shopping trips were often described as being fill-in or in-between trips and were sometimes made to smaller food stores like a meat market or a corner store. These smaller shopping trips included items like sides, sauces, condiments, “extras”, snacks, lunch foods and treats for the children. As one mother explained, “the next trip is usually
the sides, like the pasta, sauces, any extra vegetables. Yeah. That’s the second trip. And then the third trip, if we have enough, then I will get snacks for the kids. They like their granola bars and chips and ice cream.” Overall, participants articulated an approach of buying the “needs” first and if there were sufficient benefits leftover, then purchasing the “wants”. On average, participants reported 4.6 shopping trips per month at their primary food store. Fifty percent of participants reported spending less than $50 on a typical shopping trip.

Several participants reflected that getting their SNAP broken into smaller payments would change their shopping patterns resulting in fewer trips to corner stores and healthier grocery store purchases. “If they ever could change it, I really do believe that they should break the stamps down to bi-weekly for people. So that you can – because realistically, you shop better that way. Because in a month, you just grab everything. Most of it this, it ain’t healthy. It ain’t what you need. It's just stuff. Then you always think afterwards, damn. I wasted $100 on this when I should have got…I could have got… So if it's broken down, I think you can really see more of what you're doing.” As this mother reflected, she felt more frequent benefit payments would enable healthier purchasing.

While the women expressed an overall dissatisfaction with their ability to afford healthy food options on a SNAP budget, the necessity of purchasing inexpensive, less healthy items just to fill themselves up was particularly highlighted as an end-of-month coping strategy. One woman described her food purchasing decisions this way: “Well, usually the price. The price is the main factor. Trying to get things that are not processed. I try to stay away from the sausages and things like that. But when it gets towards the end of the month and that’s the cheapest thing to buy, then we end up buying the ramen noodles and the can goods and things like that.” Another woman described this scenario when SNAP runs out, “but for myself, yeah, I’ve had times where I didn’t eat for long periods of time, or I would just try to snack on something or anything. Or look for change. Because you wanna get something, and that’s when you probably eat something unhealthy because the change – and, if you don’t have gas to get to the store, you’re just gonna go to the corner store and get something that’ll just fill you up really, really fast. It’ll fill your belly.” The end-of-month period was marked by shifts in eating towards the least expensive option, which included “dollar burgers”, “dollar sandwiches”, and for one mother, trips to McDonald’s where she could get free meals from a friend who worked there.

Buying foods that were affordable and would “last” or “fill you up” was prioritized above purchasing healthier, more expensive items, despite many of the women expressing a desire during the interviews to eat healthier. According to the survey, only 50% of participants reported making an effort to purchase healthy foods, which participants described as including fruits, vegetables, cereals, balanced diets including “foods from every food group” and specialty food items for dietary restrictions (e.g. gluten- or nut-free alternatives). This finding may be explained, in part, by one mother’s comment that price and quantity are the biggest factors in food choices. “I decide on the quantity, is it
gonna be enough for all of us. I also decide on the – how much it’s gonna cost, is it gonna be too expensive and is it gonna be enough…” Another participant reflected that with the high cost of healthy food, SNAP benefits were not sufficiently large to make it possible to purchase foods for a healthful diet. “That it’s – sometimes you be wanting to eat healthy, but it’s very – food is expensive. Period. But it’s more expensive when you're trying to eat healthy. Healthy food is high. And you can’t eat healthy off of $169. So it’s like you gotta get what you can so you can get enough of it. That’s why I feel they should give out more stamps.” Participants explained that not being able to afford healthy foods meant sometimes relying on more energy-dense items that they described as unhealthy, such as ramen noodles, canned goods, sweets and carbohydrates.

Mothers also reported buying a limited variety of foods, either because they relied on a small selection of low-cost options or because they were reluctant to try new foods for fear that picky eating or food allergies among their children would result in wasted food and money in an already tight financial circumstance. “But sometimes it’s hard because [my daughter] is very picky. I might make a big meal. She might want something completely opposite. So it’s just okay, now that I pulled something else and now just the food that I made is wasted. So it’s kinda hard though. I try to save it for another meal but it’s just like basically, the food’s going down the drain.”

Use of other food assistance resources was common; the mothers reported their children ate breakfast and lunch at school (through the National School Meals Program) on average 3.3 and 3.8 days per week, respectively. While most of the participants had been to a pantry at some point in their lives, only one third reported having visited a food pantry in the past year and none of those women visited the pantries regularly. Overall, food pantries were places of last resort and were viewed skeptically, with many people saying the food they had received from pantries in the past was rotten or expired. “At one point, I did go to a food pantry. And it really wasn’t much that they really offered. I mean, I don’t – it was food that was offered, but some of it was expired food, and I really just didn’t use it. I didn’t use it because I didn’t trust it.” Additionally, several participants explained that they didn’t like when the pantries gave out pre-packed bags of food, as often the bags included foods they wouldn’t normally purchase. Participants explained that they preferred when they could select the foods at the pantry themselves. Participants also described waiting in long lines—often outdoors in the heat—or having to drive a far distance to get to a pantry that had acceptable food, which required budgeting for gas. Additional deterrents for using food pantries were needing a referral and feeling that other people needed the help more than they did. Participants often felt that these challenging aspects of charitable food resources were too great to make using them worthwhile.

While the majority of participants said they would like to have a more frequent benefit disbursement schedule (i.e. twice a month), several noted that even this would not fully address food insecurity at the end of the month. “I guess twice a month, but like I said, it still won’t stretch. Even when you get your food stamps, you’re not gonna be able to eat
two to three meals a day. You’re still going to have to eat one meal a day.” Four participants said they either preferred receiving SNAP in one disbursement or that the benefit system was “fine” the way it is – either because additional payments would not make a difference, they liked being able to do big shopping trips, or they preferred the freedom of getting all the money at one time.

Lastly, several participants noted that the inconsistency of distribution dates was particularly challenging. In Pennsylvania, SNAP participants receive their benefits based on the last digit of their SNAP identification number. A recipient with a final ID number of “5” would receive their benefits on the fifth business day of the month, however in the case of holidays or weekends the distribution date gets bumped forward to the following business day. A number of participants in this study found the irregularities in distribution dates of this administrative system challenging. “Like if it's on a Saturday, we've got to wait until Monday. And I don't like that because what if we don't have anything in the house and we've got to wait those extra days just to buy food.”

DISCUSSION
This study, one of the first of its kind to explore the dynamic coping strategies of SNAP households throughout the monthly benefit cycle, and the first to use qualitative methods to examine how those SNAP cycle coping techniques impact health, documents and reinforces the reliance of low-income families on informal strategies to manage food and financial insecurity. The combined survey and in-depth qualitative data provide a rich exploration of changes in coping strategies throughout the monthly benefit cycle and offer new evidence of the potentially negative impacts these coping strategies can have on health and wellbeing.

Social support and reciprocity
A key finding from this study is the heavy reliance by SNAP households in the final days and weeks of the benefit month on their extended social communities. As has been extensively covered in prior poverty literature, social networks are essential to the survival of low-income women and can play an important role in the management of food insecurity. The help participants in this study received from friends and family—in the form of money, food, emotional support during hard times and information about financial assistance resources—fits within the construct of social support. As was found in Schenk-Fontaine’s study, instrumental support, in the form of money and food, was a strategy participants in this study used particularly at the end of the month, when SNAP or other financial resources had become scarce.

Building on past studies demonstrating reliance on the instrumental (i.e. tangible resources) dimension of social support for food insecurity management, this study highlights the significance of both the emotional and informational dimensions. Even if the tangible resources received by attending an extended family meal were relatively small, the emotional benefit derived from being with family and being relieved of cooking-related duties (e.g. dishes, menu planning) were invaluable. Similarly, reliance
on friends or coworkers who were looking out and could provide information about assistance at the end of the month, such as food pantries or other mothers with extra SNAP, was an important mechanism households used for easing the stresses of the SNAP cycle. Informational and emotional support both had a less clear temporal pattern within the benefit month than did instrumental support, but still had impacts on the end-of-month experience. Notably, the social support, stressed in our interviews as being essential to participants’ survival, exemplifies a place where informal networks are filling in the gaps in formal social welfare systems and volatile financial structures.

Another key theme that emerged from the interviews was the reciprocity intrinsic to many of these social support systems. Trading food, money or SNAP back and forth between family members was common, especially among women in the family (e.g. sisters, mothers and daughters). In fact, the strength and quality of the social networks was often attributed to a shared responsibility for the welfare of those around you. As one woman noted, part of what made her support system strong was that she was not always the one asking for help. Several others noted that even though their family members themselves were struggling financially, they always tried to help in whatever ways they could. Several women noted, however, that they did not have extra with which they could repay or exchange with their social networks. These findings parallel the work of Joan Maya Mazelis. Her ethnographic research of women living in poverty in Philadelphia found that while social networks are an essential form of support for low-income families and often build social capital necessary for survival, some women find the social norms of reciprocity within these social networks overly burdensome. In this respect, while in our sample social support was buffering households against the financial and food insecurity of the SNAP cycle, the shared responsibility and reciprocity of social support systems within resource constrained communities may also be perpetuating financial instability.

**Financial and emotional coping strategies and cognitive burden**

The most striking financial strategy to emerge from the interviews was a self-imposed budgeting that largely took the form of self-control and avoidance of impulse shopping. “Budgeting” was described almost entirely as a mental accounting exercise and primarily meant not spending more than they had. The self-control necessary for this form of financial management was palpable; participants reiterated the need to refrain from purchasing “wants” and focus solely on essential items such as food, rent, utilities and school supplies. A mental fortitude or resilience—as in “I make a way” and “making it work”—were also essential components of this financial coping mechanism. The determination underlying this attitude was just as necessary to survival as was self-control in spending patterns. Participants noted, however, how challenging it was to maintain this constrained form of accounting within an inadequate financial context. Just as common as self-implicating statements about restraint and being smart about how you spend your money, were comments such as, “the system don’t give you enough,” emphasizing the insufficiency of SNAP resources and a sense of injustice about the way the benefits are allotted.
Following Bandura’s theory of *personal agency*, high self-efficacy is contrasted among participants here by low perceived control over environmental and financial factors.\(^{46}\) These dueling influences represent one critical element—*personal agency*—of behavioral intention. Despite strong self-efficacy and determination, the environmental conditions these women experienced presented often insurmountable barriers. For example, one mother explained that despite buying in bulk, budgeting, using an app to make food shopping lists, and avoiding impulse shopping, she still ran out of SNAP every month. She and her husband regularly skipped meals in the final two weeks of the month to ensure there was enough food for her children to eat.

Additionally, the mental energy required to navigate financial instability and exercise constant self-control is enormous. Using the well-understood psychological concept of “cognitive load”, behavioral economists have explored how the many stressors of poverty use up the brain’s capacity, or “bandwidth”, resulting in compromised cognitive function (i.e. problem solving, retaining information, logical reasoning) and executive control (i.e. planning, attention, impulse-control, initiating/inhibiting actions).\(^{47-51}\) As Mullainathan and Shafir explain, "scarcity directly reduces bandwidth - not a person's inherent capacity, but how much of that capacity is currently available for use". Overtaxed bandwidth can have serious implications for the brain, including forgetfulness, reduced ability to process new information, depleted resources for the exertion of self-control and erosion of sleep. For SNAP households who are struggling to make ends meet, trying to ration their benefits so as to avoid the insufficiency experienced at the end of the SNAP cycle, is a prime of example of the many ways in which poverty imposes increased cognitive load.

Interestingly, most participants preferred to get their benefits split into multiple disbursements over the month, as they thought this would help with budgeting. In articulating the advantages they saw in receiving multiple smaller payments, the women essentially discussed the challenge of rationing SNAP within a context of reduced bandwidth and seemed to be expressing that having some of that rationing done for them would provide relief on cognitive load. That said, the women emphasized the inadequacy of SNAP benefits, stressing that more frequent payments would not ultimately help with the shortages they experienced.

Thus, not only did our participants find their self-efficacy constrained by their environmental context, but the overtaxing of their mental bandwidth meant they had little additional reserves with which to do the things they felt were necessary to manage their financial and food instability, such as budget, search for new work, go to school or set aside money for a future financial shortfall. Notably, rather than blaming external, institutional forces for the heavy mental burdens of poverty, the women we met almost universally spoke of a resilience and self-determination that reflected a firm belief in the American value of individualism. They felt it was their own personal responsibility to maintain a positive outlook and work to improve their financial situation. Here the
women reflect the deep body of literature on the extent to which neoliberal poverty governance has valorized individual responsibility in the void of robust state and social forms of support.25,52

Tradeoffs between health and other things
As has been found in previous literature, women used a wide variety of food shopping and eating strategies to stretch their SNAP dollars and manage the monthly benefit cycle, including adjusting store choice based on sales, prioritizing meats and other proteins, and traveling farther distances to find acceptable food resources.37,53,54 Price and quantity were the primary determinants in food choice, with many participants emphasizing the necessity of buying foods that fill you up and will last. Healthfulness was not a primary driver of food choices even though a there was desire to eat healthfully.

This is the first study to qualitatively explore changes to shopping and eating throughout the SNAP cycle. While we know from prior literature that spending and calorie consumption decline over the monthly cycle, there is little understanding of the shopping patterns behind these patterns or of the decision-making process that drives them. Shopping trips had different functions depending on their timing within the SNAP cycle. Early trips, when SNAP benefits were plentiful prioritized staple foods (e.g. meat, grains, vegetables), while items like condiments and snack foods were often saved for later trips and purchased only if resources allowed. The first shopping trip would also sometimes include a “treat” item, such as a prepared sandwich from the deli case, to accompany the relief of finally having benefits again.

The modifications to shopping that occurred as benefits were depleted often included less healthy food purchasing later in the month, when the priority was having sufficient calories to stay full. The final weeks of the month, after the SNAP was exhausted, often featured foods like ramen, canned goods, and calorie-dense, nutrient poor items such as pancakes, packaged sweets or rice and gravy. There was a keen awareness among the women of the tradeoffs being made between having enough food, especially for their children, and having healthy foods. The food shopping decisions made in this context were rational survival responses to insufficient financial resources. This highlights how while SNAP cycle coping strategies, such as adjusting shopping and eating or skipping meals, buffer against food insecurity, they may not optimize nutrition. Within a resource constrained environment, where tradeoffs are a necessary, if not sufficient requisite for survival, health may be deprioritized.

This study has several limitations. First, the sample size was small and relatively homogenous (i.e. all African American women in Philadelphia), which limits generalizability to the broader SNAP population. Additionally, the survey of income and food shopping behaviors was self-reported and responses may have been subject to social desirability bias. Lastly, because of the eligibility requirements for the broader study, which restricted mothers who were pregnant, one-year post-partum or receiving WIC from participating, it was not possible to evaluate SNAP cycle coping strategies within
households with very young children or receiving in-kind food assistance benefits from multiple federal programs. Future research should explore how these coping strategies differ in quality or timing within other populations (e.g. elderly, single adults, households receiving WIC).

CONCLUSION
While the coping strategies for managing the SNAP cycle employed by SNAP households in the face of social welfare dissolution have short-term benefits (e.g. buffering against hunger and financial instability), they may not have long term positive health or financial impacts. To manage monthly income and social benefit volatility within this context, SNAP households adopt a number of coping strategies, some of which are not accessible to all people (e.g. social networks) and some of which are rife with their own challenges. These include making tradeoffs around health and feeling forced to adopt an attitude of individualism in the absence of other support systems that is mentally taxing. This research demonstrates the critical importance of a strong social safety net, particularly one that smooths the monthly volatility of SNAP benefits, to ensure that low-income households and communities are not left to fill in the gaps.
Table 5. Sample characteristics of cohort 1 (n=12)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mean or (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>34.8</td>
</tr>
<tr>
<td>Household Size</td>
<td>3.8</td>
</tr>
<tr>
<td>Number of Children Under 5</td>
<td>0.5</td>
</tr>
<tr>
<td>Number of Children 5-17</td>
<td>1.8</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
</tr>
<tr>
<td>Married (%)</td>
<td>16.7</td>
</tr>
<tr>
<td>Single (%)</td>
<td>66.7</td>
</tr>
<tr>
<td>Divorced/Separated (%)</td>
<td>16.7</td>
</tr>
<tr>
<td>Employment</td>
<td></td>
</tr>
<tr>
<td>Part-time (%)</td>
<td>50.0</td>
</tr>
<tr>
<td>Full-time (%)</td>
<td>16.7</td>
</tr>
<tr>
<td>Unemployed (%)</td>
<td>33.3</td>
</tr>
<tr>
<td>Education</td>
<td></td>
</tr>
<tr>
<td>Less than high school</td>
<td>8.3</td>
</tr>
<tr>
<td>High School Degree</td>
<td>33.3</td>
</tr>
<tr>
<td>Some College</td>
<td>33.3</td>
</tr>
<tr>
<td>College Degree</td>
<td>25.0</td>
</tr>
<tr>
<td>Has a drivable motor vehicle (%)</td>
<td>58.3</td>
</tr>
<tr>
<td>Monthly Income(^1) ($)</td>
<td>1552.25</td>
</tr>
<tr>
<td>Monthly Expenses(^2) ($)</td>
<td>1229.71</td>
</tr>
<tr>
<td>Monthly SNAP Benefit ($)</td>
<td>286.67</td>
</tr>
<tr>
<td>Child eats breakfast at school (no. days per week)</td>
<td>3.3</td>
</tr>
<tr>
<td>Child eats lunch at school (no. days per week)</td>
<td>3.8</td>
</tr>
<tr>
<td>Cooks/prepares meal from scratch (no. days per week)</td>
<td>4.2</td>
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<tr>
<td>Visited food pantry in last year (%)</td>
<td>33.3</td>
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<tr>
<td>Large/Unusual Expense in Last Month (%)</td>
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</tr>
<tr>
<td>Household Food Security Status</td>
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</tr>
<tr>
<td>Low food security (%)</td>
<td>33.3</td>
</tr>
<tr>
<td>Very low food security (%)</td>
<td>66.7</td>
</tr>
</tbody>
</table>

\(^1\) Self-reported monthly income from wages, tips, unemployment payments, disability payments, social security, retirement payments, cash welfare, child support (court mandated and informal), Subsidized Child Care Program, loans, gifts, and prizes.

\(^2\) Self-reported monthly expenses from rent/mortgage, homeowners/renters insurance, electricity, heating fuels, transportation (car payments, gas, parking tickets, public transit), telephone, cable, internet, child care, adult care, health insurance, medical copays, uninsured medical bills, and student loans.
REFERENCES


CHAPTER 4: Chronic Disease Management within the SNAP Cycle

INTRODUCTION
Food insecurity affects 12.3% of U.S. households—disproportionately low-income and racial/ethnic-minority households—and has serious implications for a number of chronic conditions, including diabetes, obesity, hypertension and heart disease. The largest federal program targeted at alleviating food insecurity is the Supplemental Nutrition Assistance Program (SNAP, formerly Food Stamps), which is an income-eligible program that reaches 1 in 7 Americans. Recent attention in the literature to the monthly SNAP benefit distribution schedule has found that increased time from SNAP distribution is associated with decreased diet quality, calorie restriction and higher likelihood of skipping meals——all of which can have detrimental impacts on diet-related chronic disease management.

Diabetes is a prime example of a chronic condition that may be impacted by changes in food consumption over the monthly SNAP benefit cycle. Risk of diabetes is higher among households who are food insecure and food insecurity within populations that have diabetes has been significantly associated with lower medication and diet adherence, poor glycemic control, increased outpatient visits, lower diabetes-specific self-efficacy, and higher emotional distress related to diabetes. In another study of a sample of food pantry clients, participants with very low food security (compared to low food security and food secure participants) had higher prevalence of severe hypoglycemic episodes, more challenges affording medication and more frequently reported making tradeoffs between food and medical or health supplies, suggesting that self-management of diabetes declines as food insecurity worsens. Among low-income patients, hospital admissions for hypoglycemia was found to increase by more than 25% by the end of the month compared to the beginning of the month, while no such pattern existed within higher-income patients.

Similar associations between income, food insecurity and disease risk and outcomes have been found for a number of other chronic conditions. Within the U.S., overall chronic disease rates for adults are higher among households with annual income below $35k. Compared to adults with no chronic conditions, an individual’s odds of food insecurity increases along with the number of chronic conditions they have. Food insecurity has been associated with higher risk of hypertension, hyperlipidemia, osteoporosis, coronary heart failure, congestive heart disease, and obesity. Studies have shown food insecurity is adversely associated with health behaviors, including poorer LDL cholesterol control, increased odds of HIV risk behaviors, poorer adherence to antiretroviral therapy and self-care among people with HIV, and cost-related medication underuse among those who are chronically ill, especially among individuals who were Hispanic, Black or suffered from multiple chronic conditions.

While the associations between income, food insecurity and chronic disease morbidity and mortality have been well documented, there is very little literature documenting...
disease risk or outcomes among SNAP participants compared to non-participants. One recent prospective study found cardiovascular disease mortality rates were higher among non-Hispanic White and non-Hispanic Black individuals receiving SNAP compared to both income-eligible and higher income non-SNAP participants. This study also found that SNAP participants across all races/ethnicities had higher diabetes mortality. Another study explored the relationship between SNAP and diabetes outcomes by linking Medicare data with the Health and Retirement study. This research showed no significant difference in Medicare spending, diabetes hospitalizations or blood sugar (HbA1c) levels (i.e. glycemic control) between SNAP recipients and income-eligible non-recipients. In addition, to our knowledge, no studies have been conducted examining the self-management of chronic diseases among SNAP participants or over the course of the monthly SNAP benefit cycle.

Diet-related chronic disease self-management and outcomes among SNAP participants are critically understudied areas, particularly in light of the lower overall diet quality that has been found among the SNAP population compared to non-participants. This study will add to the literature by using in-depth qualitative inquiry to uncover the particular challenges of chronic disease management within the context of SNAP benefit receipt and the volatility of the monthly SNAP benefit cycle.

**METHODS**

This paper presents data from two separate prospective, mixed-methods studies that took place in Philadelphia between May 2016 and October 2017. The studies were approved by the University of Pennsylvania Institutional Review Board. In this analysis, we focus on the combined qualitative and survey data from the two different study cohorts of adults (n=18) receiving SNAP benefits. To achieve the study sample, we recruited participants through word-of-mouth, the assistance of several nonprofit agencies in the Philadelphia area, and the Children’s Hospital of Philadelphia (CHOP) Recruitment Enhancement Core. While the two study samples were initially collected for different purposes, content emerging from the data showed remarkable concordance between participants in both samples around chronic disease management within the context of SNAP benefit receipt.

**Study components**

Eligibility for the study required that participants were the primary food shopper for their household, at least 18 years of age and currently receiving SNAP benefits. For the first cohort, study participants (n=12) also had to be African American mothers of young children. For the second cohort, we used purposive sampling to diversify the sample (n=6) to be more representative of the overall SNAP population in Philadelphia. Across both phases of the study, we screened 91 people, of whom 18 were eligible and consented to participate in the study. Participation lasted for one month and included a screening assessment at recruitment, followed by three study visits—one each within the beginning, middle and end of the SNAP month. Screening included a basic eligibility questionnaire and the US Household Food Security Module. Study visits took place both in a clinical
setting (Cohort 1) and at locations selected by the participants where they either prepared or acquired food (Cohort 2). Visit locations for Cohort 2 included participant homes as well as walk-along interviews at grocery stores, food pantries and soup kitchens. Visits included semi-structured interviews, health and income surveys and 24-hour dietary recalls. Participants were also instructed to collect their food shopping receipts for the one-month period. The interviews were typically 30-90 minutes in length and were audio recorded.

**Analysis of interview transcripts and food shopping surveys**

In this analysis, we focused on the in-depth interviews and survey data. Survey data were collected using a web-based platform (REDCap) and were analyzed using STATA version 14.2. Interview audio files were transcribed by a professional transcription service. Two members of the research team performed a line-by-line reading of a subset of transcripts to identify recurrent concepts. The transcripts were coded by both researchers using NVivo qualitative software version 11, with 93.3% agreement. Following coding of the transcripts, the researchers summarized the findings by code and these summaries were used to guide group discussion and iterative interpretation of the data by the research team to identify cross-cutting themes that integrated findings across codes.

**Description of study sample**

Table 6 describes the characteristics of the 18 participants combined from the two study cohorts. Per the eligibility requirements for the study, all participants were the primary shoppers for their household and were currently receiving SNAP benefits. The mean age was 37 and the majority (89%) of participants were female. Eighty-three percent were single (including divorced or separated) and the average household size was 3.3 people. The education level among the participants was mixed; 28% had a college degree or above, 44% had completed some college and 29% had a high school degree or less. Mean self-reported monthly household income (e.g. wages, disability payments, child support and cash welfare) was $1515, while routine average monthly expenses (e.g. utilities, rent, transportation, child care) were $1113. The mean monthly SNAP benefit among participants was $241. Among the sample, 56% of participants reported very low household food security, meaning that at times during the past year, the eating patterns of one or more household members were disrupted and food consumption declined because they lacked money or other resources with which to procure food. Nearly two thirds of participants (61%) reported having or caring for a household member with a diet-related chronic disease (e.g. diabetes, hypertension, food allergy, Crohn’s disease) and when including overweight/obesity, 100% of households had at least one member with either a chronic disease or chronic condition.

**RESULTS**

This study used in-depth qualitative methods to learn from SNAP participants about their experiences managing resources throughout the SNAP cycle, particularly around management of chronic disease. As has been explored at length in other studies,
participants reported numerous challenges and frustrations with SNAP including inadequate benefit levels, confusion about eligibility thresholds and fluctuations in benefit levels, challenges with the application and appeals process, desire to purchase nonfood items with benefits (e.g. toilet paper, soap), and running out of SNAP benefits before the end of the month. With respect to chronic disease management, a key theme to emerge from the data was the dual cognitive burden experienced by participants of chronic disease and poverty. In particular, participants highlighted the difficulty of affording the heterogeneous and expensive dietary needs of their specific chronic illnesses with SNAP resources. For many participants, formal support systems served a critical role in easing the cognitive burden associated with chronic disease management, but there were often limitations in the nutritional adequacy of the supplemental food assistance resources upon which participants relied. Lastly, the interviews highlighted the interplay experienced by low-income households with chronic diseases between health and financial shocks and the impact this can have on employment and income.

**Chronic disease, diet & the SNAP cycle**

While participants were not included in either study cohort specifically because of their experiences managing chronic diseases, all of them either suffered from or were managing within their family a diet-related chronic disease. Participants and their family members reported a range of chronic diseases and conditions – some explicitly diet-related and some with serious dietary implications. These included Type 1 and Type 2 diabetes, pre-diabetes, fibromyalgia, Crohn’s disease, high-risk hypertension, cardiovascular disease, Phenylketonuria (aka PKU), HIV, Alagille syndrome (a rare genetic disorder), ischemia, hypertension, overweight and obesity, lactose intolerance, severe food allergies, hypothyroidism, high cholesterol, and pancreatitis. *(See Table 7)*

Stemming from these chronic illnesses were a wide range of reported physical and emotional side effects and comorbidities such as pain, neuropathy, blindness, fatigue, depression and anxiety, hair loss, rapid weight loss, brain damage, liver and kidney problems, anaphylaxis, insomnia, skin rashes, fear and loneliness.

All participants mentioned dietary considerations for the management of their chronic diseases or conditions, whether it be avoiding dairy products because of lactose intolerance, counting carbs and monitoring of blood sugar levels for diabetes management, or attention to sufficient calorie consumption due to rapid weight loss associated with HIV. *(See Table 7)* For participants with diabetes, special sugar-free and low-carb food products were important staple items in their diet. As Eduardo,\(^e\) who has Type 1 diabetes explained, “I’ve just gotta be aware of my carbs, like […]– I gotta figure out how many carbs is in there. Like if I get – a half a banana would be, I think, maybe 50 carbs. I don’t know. But there are some bananas that are sweeter than others. Like it depends on the ripeness, I think.” Latasha and Candice, whose children both have wheat allergies, discussed searching for and purchasing gluten-free items. A number of

\(^e\) All participant names have been changed to protect confidentiality.
participants were overweight or obese and several were following specific diets to lose weight. For Kayla, who has PKU, a low-protein diet was critical for proper management of her illness.

The range of dietary requirements represented within our study sample illustrates the heterogeneity of food needs between SNAP households, but often these specialized diets necessitated the purchase and preparation of different foods within households as well. During a home visit, Carmen opened her refrigerator to display the three different kinds of milk she purchased to accommodate her family’s different dietary needs—coconut milk for herself (as part of a weight-loss program, almond milk for her children (because of lactose intolerance) and regular milk for her husband. For weight loss, one woman was on a highly restrictive low-carb diet that required preparation of separate meals from those she made for the rest of her family. For Latasha, who had six children, several of whom had different food allergies, she struggled to keep up with the expense and complication of purchasing different food items that were safe for each child.

The end-of-month period was highlighted by participants as being particularly difficult financially, which often had repercussions on diet and chronic disease management. The average SNAP benefit allotment per household within the sample was $241, and despite techniques for budgeting SNAP resources, all participants reported that their SNAP ran out before benefits were renewed – typically between the second and third week. Food insecurity and running out of food at the end of the SNAP month were of particular concern. Several participants noted skipping meals in the final weeks of the SNAP cycle, which sometimes resulted in low blood sugar. For Eduardo, who was managing his diabetes, the necessity of eating to avoid hypoglycemic incidents was paramount, which included trying to keep snacks and juice on hand at all times in case of an episode of low blood sugar. However, in order to do this he relied on monthly trips to the food pantry. For a number of participants, the end-of-the-month period was also accompanied by less healthy eating patterns, such as regular consumption of pancakes, ramen noodles, canned soup and hot dogs. Here again, Eduardo explained that a can of soup was his go-to meal when SNAP would run out, but described that this was having deleterious effects on his diabetes. “Chicken noodle. Yeah. Just 99 cents at ShopRite. The little can, Campbell? Yeah. Can of soup and bread. And you know like survive. You survive. But then on the other hand my health is not surviving.” For Eduardo, relying on low-cost, high-sodium foods like canned soup at the end of the benefit month were not good for his hypertension and also caused his blood sugar levels to get off-balance.

Cost of medically appropriate diets
Despite high awareness of their dietary needs for disease management, participants recounted difficulty with staying “on-diet” because of limited financial resources. For example, Scott was suffering from rapid weight loss associated with his HIV and had

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For more detailed analysis of SNAP cycle coping strategies, see Chapter 3.
been advised by his nutritionist to eat more calories, which he feared was not affordable given his limited financial means. “They want me to go on 3,600 calories a day. That's a lot. And that's expensive, so I don't know how that can happen. …They did not tell me how to pay for it, but they gave me a printout of what to buy. I'm like, who's gonna pay for that? That's not gonna happen.” In this case, Scott felt that his SNAP benefits were not sufficient to purchase the necessary quantity of foods needed to follow the recommendations he received from his medical provider and he did not have enough cash income to supplement.

Participants often talked about the extra expense of foods for specialized diets, like almond milk, “CarbSmart” desserts, or gluten-free products, compared to their regular alternatives. For some participants, spending more of their budget on food caused significant financial strain. Candice, whose daughter had severe food allergies from which she had recently been hospitalized, explained the financial burden of buying safe foods for her child. “She has a lot of allergies, but now we think that’s wheat and everything I look at, it has wheat, something like that. So I’m trying to figure out a way to get food for her and the gluten-free things which are so expensive.” Another mother, Latasha, who had a child with extensive food allergies, lamented that she was unable to shop at stores that provide a good selection of allergen-free foods because they were too cost-prohibitive. “And my son, he has multiple food allergies, so it’s like Whole Foods stores would be a great place for him and it’s, they’re expensive. I go in there, we probably will be struggling to eat for the rest of the month.” In addition to reporting that they could not afford special foods for medical conditions, many participants expressed a feeling of being unable to buy “healthy” foods like fruits and vegetables on a SNAP budget because those items cost more than less healthy options.

Another participant, Kayla, expressed frustration that she is not able to use her SNAP benefits to purchase the low-protein foods recommended for the management of her PKU because they are only available through online websites where SNAP cannot be used. As a result, she explained, she eats whatever foods she can, even if that means going off-diet, because she cannot afford to buy the medically-tailored foods with cash. “There's websites that I can order food from, special low-protein foods. It's just for people with my diet. But I can't afford it. I can't afford it, so someone like me would do better with money for that or a certificate for that rather than the food stamp money.” For Kayla, dependence on SNAP and the long-term consumption of foods misaligned with the medical recommendations for her PKU have resulted in pallor, underweight and hair loss and could eventually have even more serious consequences including brain damage.

**Cognitive burden of chronic disease management**

An essential component of managing chronic diseases described by participants was a near-constant vigilance and monitoring. For diet-related conditions, such as diabetes, hypertension and food allergies, this often took the form of regular consumption or avoidance of certain foods (e.g. sugar, salt, nuts, dairy, fruits and vegetables), as well as monitoring of nutrient intake (e.g. counting carbs) and tracking health vitals (e.g.
checking blood sugar levels). For Eduardo, diabetes management required careful reading of food labels for carbohydrate levels, as well as regular monitoring of his insulin pump. “I’m more conscious now. Yes. I’m more – taking care – better care to the diet now. […] And I try to talk to [my home health aide] and with my dietician and ask for a better diet or – and also look at my numbers, my cholesterols and stuff like that and try to change, modify that.” Eduardo explained that as his health has worsened, he has become more vigilant.

As Linda articulated, even though she was still pre-diabetic, she needed to be careful to keep some food in the house to be sure that her blood sugar did not get too low. “That's what I've started to do, to make sure that I have something. Cause I also have diabetes, borderline diabetes so I can't not eat.” For Linda, managing her food resources in this way was challenging, as her SNAP benefit was only $16, which meant that by the end of the month when she had no money left she resorted to creative strategies for obtaining food such as getting a slice of pizza on credit or having a yard sale with items from her apartment.

All participants described having regular medical appointments with health professionals, including dieticians, for assistance in managing their illness. These appointments were not only time-consuming and disruptive to their schedules, but often posed transportation challenges as not all households had a car with which they could drive to the doctor’s office. For Scott, who is HIV-positive, recent and rapid weight loss had resulted in nearly weekly visits to the dietician, where he would be weighed and measured, they would review his dietary consumption through the use of 24-hour diet recalls and the dietician would offer recommendations of ways Scott could modify his diet. A trip to the dietician was more than 1-hour each way on the bus and was only one of several regular medical appointments Scott included as part of his disease-management.

A number of participants complained of the burden (physical, financial and psychological) of taking numerous medications. Several were not regularly adhering to their medication regimen and one participant said she had stopped taking several medications to save money. Regular doctor’s visits were a necessity, as was avoidance of physical environments or activities that exacerbated the condition (e.g. heat, sun, heavy lifting, cigarette smoke). Based on participants’ keen awareness of their body and medical symptoms, it was clear that self-management of chronic disease was a large and consuming part of their everyday life, even though their financial and environmental circumstances did not always facilitate this.

Participants also expressed frustration from interactions with others about their chronic disease, stating that people often did not understand. A feeling of being discriminated against was evident among participants who had been asked why they didn’t just get a job or had been told that they were “feeding off the government”. As Linda, who used to work full-time as a social worker before she got sick said, “there's no explaining it to people. ‘Cause they look at me, they think I look like I can like, take the world on, but it's
not true. And especially it's really bad for people who know you from before. So [my friend]'s thing is like, ‘You should get a job.’ ” Scott felt that doctors and nutritionists he visited didn’t understand the realities of poverty or of depending on SNAP benefits to buy food and therefore didn’t make feasible or useful suggestions for diet management. “I don't think a lot of people understand living on benefits, so I don't think they would know what to recommend.” Eduardo, who had lost his eyesight as a result of his diabetes, noted that on more than one occasion the agency that provided his home health aide had neglected to send someone to his house. He felt that service providers often didn’t understand the serious impact on his life of an interruption in service. “…It’s not right because they don’t know what can happen to me when I don’t have the service.”

In another example, Candice, who had gone back to school for a nursing certificate, was forced to drop a class because the professor was unwilling to give her an extension on a major assignment after her daughter was admitted to the hospital for four days due to a severe anaphylactic food allergy incident. These experiences related to chronic disease burden were compounded by the stress and frustration participants described as a result of unstable income and dependence on inadequate SNAP and social welfare benefits.

**Relationships with formal support systems**

To aid in chronic disease management and fill in the gaps throughout the SNAP benefit month, participants utilized a variety of local community organizations, resource centers and healthcare experts. The two older participants with whom we spoke enjoyed visiting local senior centers, not just for hot meals, but also for the programming and social outlet. All participants consulted regularly with some form of medical or social service provider, be it a nutritionist, doctor or social worker. Several participants had established strong relationships with more comprehensive community resource centers targeted at specific vulnerable populations. For example, Scott received a range of services from a local non-profit dedicated to serving the HIV-positive community, including medical care, food assistance, legal aid, post-incarceration resources and job training. For Kayla, who had formerly been homeless and frequently had unstable housing arrangements, a homeless resource center was instrumental in her survival, providing not just meals, but clothing, basic body care supplies (e.g. toothbrushes, soap), health screenings and even a steady address at which she could receive her mail, which was essential for the maintenance of her SNAP benefits. As she explained, “this is my favorite place. After five years, even when I wasn't on the streets, I still was coming here. I'm not on the streets now, but I still come here. Because they offer ... They got personal care. They got [subway fares] for people who need it. The lady who doesn't work here no more, she helped me apply to [community college]. They help you. They actually want to see you succeed as long as you want yourself to.”

As illustrated by Kayla’s experience with the more comprehensive and holistic homeless services center she frequented, these formal support structures our participants used played an integral role in their lives, not just by providing instrumental resources, but also by lessening some of the cognitive burden of managing poverty, food insecurity and
chronic disease. For example, Eduardo had daily home health aides, provided through his insurance, who were involved in every aspect of his diabetes management, from grocery shopping and tracking his SNAP balance, to cooking meals, changing his insulin pump and driving him to and from doctor’s appointments. On the weekends when Eduardo did not always have a home aide, his diet was much less healthy because his illness prevented him from cooking for himself. “And so I told [my home aide] well just leave me – let’s buy six cans of Campbell’s. So on the weekends all I have to do is boil them and eat them with bread or crackers. But now I have the service to Saturday to Sunday. So I have like this past weekend, she was sick and I didn’t have no service here. So I have Campbell and […] eat it with bread.” Interruptions in Eduardo’s home aide service also resulted in changes to his diet. When Carmen had newly arrived in Philadelphia, a move she made from Puerto Rico for her son’s medical care, a social worker helped her navigate the city and found temporary housing for Carmen and her family until a space became available in a public housing facility.

A critical way that local social welfare resource providers supported participants was through individualized care. When Eduardo was struggling financially, his social worker came by his house with several bags of food and put his name on a waitlist for a health-focused food pantry. “Matter of fact, my social worker was the one who signed me up for it. I didn’t even know. But one time she came to visit me here and she noticed that my food stamps, they failed to send me my food stamps. So she came here with a gentleman and she brought me three bags from a pantry and I’m oh, God bless you. And then she said I’m gonna sign you up for this place I found out. I looked it up and then suddenly the pantry called me. I said no, I didn’t sign up for nothing and they said ‘free this, free grocery shopping.’ ” Linda, who lives alone and survives off her social security benefits, recounted how an employee at the medically-tailored meals delivery program her son received pulled some strings to extend the service beyond the typical three month period. Participants emphasized how critical the personalized attention they received was in helping them maintain a positive mental outlook, “get back on their feet” and manage their chronic disease. The experiences of households within the study samples highlight the degree to which SNAP households with chronic diseases need help navigating not only food resource systems, but also the healthcare and social services worlds.

**Constraints of depending on the charitable food sector**

In addition to receiving SNAP, more than half our participants frequented locations providing food assistance such as food pantries or congregate meal sites (e.g. soup kitchens, churches, senior centers). One family received home-delivered meals weekly at their home by an organization that supports individuals living with chronic disease. Among households who did not use community-based food assistance resources, many noted their appreciation for the free meals their children received as part of the National School Lunch Program and the National Summer Meals Program.
The usage patterns of community food assistance varied, with some participants incorporating these resources into their regular weekly or monthly food acquisition strategies, while others relied on these programs particularly at the end of the month when SNAP had run out. Participants who used community food assistance felt these resources were critical in ensuring that they were able to eat in the final days and weeks of the benefit cycle. As Kayla explained, “only time I eat less or skip meals when it comes to the churches is when I’m too lazy to get up and go, but because I’m always here, I do sometimes have stuff at home, but if I, in the winter, tend to get lazy and just want to eat in the house, by the second week, almost close to the third, I run out. So then I have no choice but to come here or starve.” Others described using food assistance resources regularly throughout the month, not just at the end, to stretch their SNAP benefits. As Scott explained, “Well, even before [SNAP] runs out I try and supplement with the food pantry.” When asked if he normally ran out of SNAP by the end of the second week of the benefit month, Eduardo replied, “sometimes earlier. I’d say, yes, because we have stuff from the pantry. So that helps us. When we don’t get the pantry, we run out quicker than the 18th, yes.” Kayla, who had formerly been homeless, ate nearly daily—sometimes multiple meals a day—at local churches and homeless resource centers. “We tend to go to all the places that they feed during the day, throughout the day. We know where to go on a Monday, where to go on a Tuesday. We know all the days of the week where to go.” For many of those households who used community food assistance resources, these places were not just last resorts during an emergency, but rather had become regular components of their food procurement strategies.

While community food assistance facilities were vital resources in managing food insecurity throughout the benefit month, participants felt they did not always offer nutritionally adequate items, and this often had serious implications for chronic disease management. During one of our visits together at a resource center for the HIV-positive community, Scott complained that the food pantries he visited largely offered only canned or processed foods, which were high in sodium and did not meet the standards recommended to him by a nutritionist for management of his hypertension. Scott also recounted being offered cake for breakfast at a local soup kitchen, as well as fast food vouchers and Hungry Man meals. Several participants felt that they had no choice but to eat the foods they were offered, even if those foods did not meet the dietary guidelines for management of their chronic disease. As Kayla described of the meals she received at free meal sites, “I have a genetic disorder called PKU, so I'm not supposed to eat meat. [If I eat it] my phenylalanine goes up, my levels, my blood. Little symptoms, little things start happening. Then long-term is brain damage. I don't stay away from it because I'm not supposed to be eating that or that, but I'm going to eat it anyway, because I'm hungry. It's really all that I have.” By virtue of depending on these community resources as regular and vital sources of their monthly food supply, participants often lacked control over the foods they were eating.
A common critique among participants was that foods received from the food pantry were rotten or expired, while others expressed uncertainty about the ability to get culturally appropriate foods from community food assistance sites. Kayla, who had been intermittently homeless, said that food pantry offerings were often unusable, as there were no cooking facilities on the street or in the shelters where she would sleep. “Where I was living, we couldn't cook, so the pastas and everything really didn't come in handy. Then there was one that actually gave us a lot of meats, but we couldn't cook.” For these reasons, many participants said they avoided going to food pantries altogether. In Kayla’s case, congregate meal sites where the food was already prepared were preferable given her lack of kitchen facilities.

The quantity of food offered was insufficient in some charitable food assistance locations, with participants saying the size of meals was small, they were unable to get seconds or the bags of food did not contain sufficient items to make visiting a given location worthwhile. Linda described a church food pantry she used to visit this way. “Maybe tomorrow morning I'll go over to [church] on Prince Street. So I told you today it's really bare bones stuff ... Or maybe they have something different now. It's usually really really ... It's not really worth the trouble.” Some resource centers restricted the number of visits (e.g. once a month) or had time limits on how long people could receive services. Others had waitlists or required standing in long lines, often outside in the heat or bad weather. Weekends and holidays were challenging, as food assistance centers were often closed.

Despite some noted inadequacies, charitable food assistance sites often played an integral role in the chronic disease management of participants. Several participants regularly visited one particular food pantry in North Philadelphia that followed nutritional guidelines for the foods it offered (often called a “Green Light Pantry”), including an emphasis on fresh fruits and vegetables, whole grains and low sodium items. Carmen, who visited this pantry each month, was grateful that the food offerings aligned with the dietary requirements for her son’s chronic illness. When grocery shopping, Carmen often selected the same brands or products at the store, demonstrating her approval of the foods offered at the food pantry. Carmen also used a meal delivery program that provided a full week of pre-made meals tailored specifically to the medical needs of her son, which freed up money in the household budget for other expenses.

**Interplay between health and financial instability**
Participants for whom the chronic disease developed as adults often framed their experiences around life before and after the illness. Living with a chronic disease was often marked by a transition period and required adjustment to new routines. For some, this meant moving to a new city (or in the case of Carmen and her family – moving from Puerto Rico to Philadelphia) to access better medical care or social service resources. Participants suffering from physical impairment as a result of their chronic disease (e.g. blindness, difficulty walking) expressed missing the physical independence they used to have. After Eduardo’s eyesight deteriorated, he explained, “I had to give up my car.
Couldn’t drive anymore. And that’s what got me depressed and everything, too. I was an active person, doing a lot things. And now, all of sudden – I mean, I got to be grateful, right, that people will come over and help me out, but I wanna do more. I wanna be able to do it myself.” These transitions and sometimes drastic changes in lifestyle caused many participants to feel lonely, frustrated and depressed.

Living with a chronic disease was also marked by a high degree of instability and unpredictability. Unexpected health complications came up frequently, oftentimes imposing unanticipated expenses such as medical bills (e.g. uninsured ambulance rides) or special post-surgery foods. The unpredictable nature of chronic illness also made it difficult for participants to plan, travel or hold down regular work. Linda, an older woman suffering from fibromyalgia, recounted frequently canceling or rescheduling appointments and social obligations because of flare-ups in her pain or fatigue. “My fibromyalgia is really bad in the winter and my arthritis is really bad in the winter. I have about 50% less energy. So it's this unpredictability which is why I couldn't get up at seven o'clock in the morning and have to be at work at nine. I could never do it. I have to cancel stuff all the time, especially in the winter. I'll plan things and then I wake up that morning and I feel like shit. You just can't do it.” The unpredictability of Linda’s illness exacerbated her financial instability, as it made keeping regular commitments, such as a job, nearly impossible.

Like Linda, several participants had quit their jobs either because their illness made working too challenging or because managing their child’s illness was causing them to miss too many days of work. As Carmen explained, she was forced to leave her job at a pharmacy after using all her vacation and sick days on taking her ill child to the doctor. “But [my son was] born, I finish my work because he’s born very sick. I stay in the hospital for two weeks, for one month. My boss, she say, I need you in the pharmacy. Finish your day, vacation day, sick days. Then I finished my job. […] I go to the court and to the – in Spanish it’s – bankrupt. Yes, bankrupt. […] I returned my car. Yes, my credit go to the floor.” In Carmen’s situation, not only did managing her son’s chronic disease cause her to lose her job, but she was also forced to file for bankruptcy to manage the medical bills. Several mothers in the study had children with severe asthma, which while not a diet-related chronic illness, posed significant financial challenges that impacted household food security. For example, Latasha was forced to resign from her nursing job after missing too many shifts due to her son’s asthma landing him in the emergency room. After losing her job, she fell behind on bills and the family was eventually evicted from their home. The time burden of managing chronic illness created financial instability in the lives of many participants, which only compounded the end-of-month deficits they experienced as part of the SNAP cycle.

Lastly, a number of participants, including Latasha, remarked on the psychological challenge of no longer being able to work; they missed the financial independence of having a full-time job, as well as the routine, social interactions and mental stimulation. “So I wanna go back to work. I wanna live a normal life again. It felt really, really good
doing it, getting up in the morning, going to go get hot tea and a bagel and going to work. That was – people need that.” This theme that emerged from participants of an active desire to be working that was often thwarted by their chronic disease management stands in contrast to the common conservative narrative of social welfare benefit recipients as “lazy” and “living off the government”.

DISCUSSION
This is the first study, to our knowledge, to explore self-management of diet-related chronic disease within the context of SNAP benefit receipt and the monthly SNAP cycle. Pulling from nearly 50 hours of in-depth qualitative interviews with SNAP participants, the study highlights the dual cognitive burden of poverty and chronic disease and elucidates the particular challenges of food procurement and maintenance of diet quality throughout the benefit month faced by SNAP households with diet-related chronic diseases.

Affording chronic disease dietary needs with SNAP
A key finding from this study is the inadequacy of SNAP benefits, either in lasting for the full duration of the monthly benefit cycle or for consistently purchasing healthy foods. While this finding is consistent with prior SNAP literature, this study highlights the particular challenges faced by households managing diet-related chronic diseases as a result of the insufficiency of SNAP benefits. In our interviews, participants highlighted multiple ways in which relying on SNAP constrained or challenged their ability to purchase foods that supported healthy disease management, including not being able to afford more expensive, specialized diet foods (e.g. gluten free alternatives) and struggling to purchase adequate calories for weight or blood sugar maintenance. Running out of SNAP at the end of the month also impacted self-management of chronic disease, as the emphasis in those final weeks of the benefit month was frequently on sufficient consumption, rather than the healthfulness of foods consumed, which highlighted the degree to which participants were surviving, and not thriving, in times of financial shortfall.

Extensive prior literature around the differential cost of healthy and unhealthy foods supports the challenges of affordability our participants expressed. Energy-dense foods, such as those including refined grains, added sugars and fats have been found to be less expensive than recommended, nutrient-dense foods including fresh fruits, vegetables and lean meats. Furthermore, while several studies have found that some nutrient-dense foods are available at lower a price-point, these items are not always socially acceptable or palatable to low-income shoppers. In addition, studies have found that foods for specialized medical diets, such as gluten-free foods, are both less available and more expensive than their conventional alternatives. For households who are managing diet-related chronic illnesses, the regular consumption of healthy diets high in fruits, vegetables and whole grains and low in added sugar, salt and fat is essential for positive disease outcomes. Along with the findings from our participants, these studies emphasize how SNAP households managing chronic illnesses are hard-pressed to adhere to
recommended dietary guidelines throughout the month and particularly in the final days of the benefit cycle. This challenge is heightened by the higher costs of healthy foods and specialty diet food items.

**Food is Medicine**
Given the disparities by income and race in chronic disease prevalence within the U.S., as well as the higher mortality rates among SNAP participants for cardiovascular disease and diabetes, critical attention to disease-specific diet quality within this population is essential. Recent literature has highlighted how important food is for health—a concept sometimes referred to as “food is medicine”—including a study from 2017 demonstrating that SNAP enrollment was associated with lower estimated annual healthcare expenditures. Several recent food interventions among populations with HIV and/or diabetes have found significant improvements in medication adherence, glycemic control, fruit and vegetable intake and self-efficacy. Additionally, studies evaluating healthy food subsidies or incentives within the SNAP population have shown significant increases in fruit and vegetable consumption. Targeting improvements in chronic disease outcomes, a recent study using stochastic modeling showed that expanding a SNAP fruit and vegetable subsidy nationwide would be expected to reduce Type 2 diabetes incidence by 1.7% and myocardial infarction by 1.4%. The model also predicted significant societal cost savings from long-term reductions in diabetes and CVD. This research suggests that subsidizing or incentivizing the purchase of certain disease-specific healthy foods (e.g. fruits, vegetables, low sodium foods) may improve the chronic disease self-management and outcomes of SNAP participants.

**SNAP, chronic disease and cognitive burden**
The struggles participants described in making ends meet, running out of SNAP and affording the foods and other resources they needed for maintaining their health highlights the dual psychological burden of poverty and chronic illness they experienced. Literature in the behavioral economics field has employed a well-understood psychological concept of “cognitive load”—referring to the total amount of mental effort being used in the brain’s working memory—to explore the psychological impact of poverty and financial instability. The brain can only manage so many competing distractions and core mental abilities such as attention span, cognitive function and executive control are all compromised when our brains are overloaded.

Financial scarcity imposes numerous mechanisms of increased cognitive load, as people living in poverty are required to make constant tradeoffs and juggle many competing demands without the financial cushion that higher-income individuals have. As a result, the constant focus needed to manage poverty consumes mental resources that can in turn affect attention and short-term memory and result in decision-making that is both rational and hyper-focused on immediate needs—paying an overdue bill, getting food for dinner—and puts less attention towards issues in the future, which can ultimately have implications for health or long-lasting financial outcomes. A perceived lack of control over the management of chronic illnesses, given the constraints of poverty, SNAP and the
charitable food sector was also palpable among a number of participants. Similar to cognitive load, lack of control over one’s situation has been theorized as leading to poorer health outcomes through a variety of causal pathways including overloading of stressors, low self-efficacy and chronic stress responses.52

Among participants in our study, the chronic pain, constant vigilance and monitoring of managing a chronic disease added even more stress on top of the already mentally taxing challenges of financial scarcity and volatility they experienced. Several studies have found that chronic pain and certain chronic conditions, including fibromyalgia, can impair cognitive function.53,54 Given what we know about how our mental bandwidth is reduced by multiple competing distractions, it stands to reason that adding the management of a chronic illness on top of unstable income, fluctuating social welfare benefits and other challenges to financial stability would put further psychosocial burden on SNAP households and make management of all the simultaneous challenges incredibly difficult.

To address this within SNAP design, as well as other social safety net programs, it is imperative that the hurdles required for enrollment and continued participation are minimized. Current policy discussions pushing SNAP and other social welfare programs towards increased work requirements and burdensome eligibility checks will only add to the stress and mental burden of low-income families, and will ultimately lead to poor long-term health and financial outcomes.

**Formal assistance, individualized care and scalability**
As a coping strategy to fill in the gaps after benefits had run out, SNAP participants in our study turned to a constellation of other, largely community-based resources many of which, while instrumental in their food, financial and disease management assistance, had limitations of their own. The resources participants relied on for food and financial support (e.g. food pantries, soup kitchens) often could not provide adequate or appropriate foods for proper disease management. The low nutritional quality and insufficient supply described by our participants of the foods at many food assistance programs, aligns with findings from previous studies.55–59 These perceived inadequacies resulted in many participants feeling that they could not rely on these resources to alleviate food insecurity or supply the necessary foods for their chronic disease management.

That said, those households who did rely regularly on formal community assistance programs generally expressed gratitude for the services they provided, even if the foods households received were not always aligned with their particular needs. Most notably, the flexibility and individualized care of community-based resources was highly valued by participants, particularly in contrast to the rigidity of federal welfare programs. This individualized care that participants described as being so instrumental in their survival—home health aides tracking SNAP benefits, social workers putting their name on the waitlist for a food pantry—reduced some of the ongoing stress and juggling of multiple
priorities participants experienced. Ultimately, this care may have positive impacts on their SNAP cycle and chronic disease self-management.

The participant accounts of individualized care, however, point to a broader problem within our society and social safety net. The social programs we have in place—Medicaid, SNAP, Social Security Disability—are incredibly challenging to navigate and in the case of the SNAP households in this study, often required assistance from highly individualized formal support systems. This type of targeted and high-touch care has become necessary for the survival and wellbeing of many low-income Americans, particularly as income volatility has increased and the social safety net has been dismantled through funding cuts, punitive work requirements and political ill-will towards the poor. Not everyone has access to these highly individualized resources, however, and this model of care is not scalable or sustainable within our current political context.

Limitations
Our study has several limitations. The small, convenience sample, located entirely within Philadelphia, is not generalizable for the national SNAP population. Given the interview format of data collection and the sensitive nature of the topic matter, participants responses may have been influenced by social desirability bias. Additionally, responses about chronic disease incidence and self-management were self-reported. Future research with a larger and more representative SNAP population is needed to better understand the challenges and implications of chronic disease self-management among SNAP recipients.

CONCLUSION
The prevalence and severity of challenges managing diet-related chronic disease among SNAP participants demonstrated by our study draws attention to a critically understudied topic within the SNAP literature. More research is needed to uncover the relationship between SNAP and the self-management and outcomes for chronic disease within this population. The recent studies demonstrating the effectiveness of subsidizing certain foods on both healthy food consumption and chronic disease management suggest that evaluations of further interventions are warranted.
Table 6. Sample characteristics of both SNAP cycle study cohorts (n=18)

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<tbody>
<tr>
<td>Age</td>
<td>36.5</td>
</tr>
<tr>
<td>Household Size</td>
<td>3.3</td>
</tr>
<tr>
<td>Number of Children Under 5</td>
<td>0.4</td>
</tr>
<tr>
<td>Number of Children 5-17</td>
<td>1.3</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
</tr>
<tr>
<td>White (%)</td>
<td>5.6</td>
</tr>
<tr>
<td>Black (%)</td>
<td>61.1</td>
</tr>
<tr>
<td>Latino/Hispanic (%)</td>
<td>16.7</td>
</tr>
<tr>
<td>Multi-racial or Other (%)</td>
<td>16.7</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
</tr>
<tr>
<td>Married (%)</td>
<td>16.7</td>
</tr>
<tr>
<td>Single (%)</td>
<td>66.7</td>
</tr>
<tr>
<td>Divorced/Separated (%)</td>
<td>16.7</td>
</tr>
<tr>
<td>Employment</td>
<td></td>
</tr>
<tr>
<td>Part-time (%)</td>
<td>33.3</td>
</tr>
<tr>
<td>Full-time (%)</td>
<td>16.7</td>
</tr>
<tr>
<td>Not currently working(^a) (%)</td>
<td>50.0</td>
</tr>
<tr>
<td>Education</td>
<td></td>
</tr>
<tr>
<td>Less than high school</td>
<td>5.6</td>
</tr>
<tr>
<td>High School Degree</td>
<td>22.2</td>
</tr>
<tr>
<td>Some College</td>
<td>44.4</td>
</tr>
<tr>
<td>College Degree or Above</td>
<td>27.8</td>
</tr>
<tr>
<td>Has a drivable motor vehicle (%)</td>
<td>55.6</td>
</tr>
<tr>
<td>Monthly Income(^b) ($)</td>
<td>1514.61</td>
</tr>
<tr>
<td>Monthly Expenses(^c) ($)</td>
<td>1112.53</td>
</tr>
<tr>
<td>Monthly SNAP Benefit ($)</td>
<td>241.22</td>
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<tr>
<td>Visited food pantry in last year (%)</td>
<td>50.0</td>
</tr>
<tr>
<td>Large/Unusual Expense in Last Month (%)</td>
<td>33.3</td>
</tr>
<tr>
<td>Household Food Security Status</td>
<td></td>
</tr>
<tr>
<td>Food secure (%)</td>
<td>5.6</td>
</tr>
<tr>
<td>Low food security (%)</td>
<td>38.9</td>
</tr>
<tr>
<td>Very low food security (%)</td>
<td>55.6</td>
</tr>
</tbody>
</table>

\(^a\) This includes individuals who do not work, are currently searching for work, unable to work because of a disability and unable to work because of a felony conviction.

\(^b\) Self-reported monthly income from wages, tips, unemployment payments, disability payments, social security, retirement payments, cash welfare, child support (court mandated and informal), Subsidized Child Care Program, loans, gifts, and prizes.

\(^c\) Self-reported monthly expenses from rent/mortgage, homeowners/renters insurance, electricity, heating fuels, transportation (car payments, gas, parking tickets, public transit), telephone, cable, internet, child care, adult care, health insurance, medical copays, uninsured medical bills, and student loans.
### Table 7. Diet-related chronic diseases, management & consequences within the pooled study sample

<table>
<thead>
<tr>
<th>Participant</th>
<th>Chronic Disease(s)</th>
<th>Dietary Specifications of Disease</th>
<th>Disease Coping Strategies</th>
<th>Unresolved Challenges</th>
</tr>
</thead>
</table>
| **Eduardo,** 57yo divorced Puerto Rican man, former nurse, lives alone | • Type 1 diabetes  
• Cardiovascular disease  
• Hypertension | Low-sugar, low-salt, high intake of fruits and vegetables, regular caloric consumption to avoid hypoglycemia | Food pantry, home health aides, medical professionals, regular self-monitoring, diet tradeoffs (i.e. calories over nutritional quality) | • Difficulty controlling blood sugar  
• Impaired mobility |
| **Scott,** 31yo single Black man, formerly incarcerated, currently unemployed and living with his mother | • HIV  
• High-risk hypertension | Low-sugar, low-salt, extra calories for weight management | Food pantry, soup kitchen, medical professionals, HIV-specific resource center, diet tradeoffs, sharing food with neighbors, lives with mother | • Rapid weight loss  
• Not taking medications  
• Very low food security |
| **Linda,** 66yo single White woman, former social worker, lives alone in subsidized senior housing | • Fibromyalgia  
• Pre-diabetes | Low-sugar, regular caloric consumption to avoid hypoglycemia | Food pantry, senior meals site, selling household items, borrowing money, skipping meals, diet tradeoffs | • Not taking medications  
• Very low food security |
| **Carmen,** 33yo married mother of 2, born in Puerto Rico and moved to Philadelphia for her son’s medical care | • Son: Alagille Syndrome (rare genetic disorder that affects the liver, heart, kidneys, skeleton and eyes)  
• Overweight | No gluten, avoid certain fats, low-carb diet for weight-loss | Food pantry, medically-tailored meals service, sharing food with friends | • Meal service ending  
• Ongoing health complications |
| **Tracie,** 28yo single Black mother of 2, works full-time and is a student part-time, lives with her mother and brother | • Lactose intolerance  
• Mom: Crohn’s Disease | No dairy | Borrowing money, childcare support from friends and family, lives with mother | • Overweight  
• Digestive upset |
### Table 7, continued

<table>
<thead>
<tr>
<th>Participant</th>
<th>Chronic Disease(s)</th>
<th>Dietary Specifications of Disease</th>
<th>Disease Coping Strategies</th>
<th>Unresolved Challenges</th>
</tr>
</thead>
</table>
| Kayla, 25yo single White-Hispanic woman, formerly homeless, currently living with her great-grandmother | • PKU  
• Bipolar disorder  | Low-protein diet  | Soup kitchen, homeless-specific resource center, borrowing money, informal economy, diet tradeoffs, lives with grandmother  | • Not adhering to diet  
• Weight loss, palor, hair loss  
• Not taking medications |
| Candice, 39yo married Black mother of 4, unemployed and in school | • Obesity  
• Daughter: severe food allergies  
• Husband: cancer  | No wheat, nuts, soy, coconut, palm oil  | Borrowing food and money from friends and family, diet tradeoffs, skipping meals  | • Cannot afford allergen-safe foods  
• Obesity  
• Unemployed  
• Very low food security |
| Latasha, 39yo married Black mother of 6, unemployed, living in unstable housing | • Obesity  
• Children: severe food allergies, asthma  
• Husband: paranoid schizophrenia  | No dairy, nuts, soy, wheat, fish  | Borrowing food and money from friends and family, diet tradeoffs, skipping meals  | • Cannot afford allergen-safe foods  
• Obesity  
• Uncontrolled asthma  
• Unemployed  
• Very low food security |
| Taylor, 27yo single Black mother of 1, works part-time, lives with her mother | • Overweight  
• Daughter: food allergies  | Unknown allergens  | Borrowing food and money from family  | • Unknown allergens  
• Overweight |
Figure 4. One month on SNAP: Carmen’s story

**ONE MONTH ON SNAP**

**APRIL 7**  
CARMEN RECEIVES & RUNS OUT OF SNAP ON THE SAME DAY  
Carmen and her family receive $138 in SNAP on the 5th business day of each month. She goes food shopping that same day and spends all her SNAP buying food for her family of 4. She makes all her food purchases after this point in the month with cash, debit or credit card.

**APRIL 11**  
FOOD PANTRY VISIT
Carmen’s 4 year-old son receives weekly deliveries of medically tailored meals from MANNA.

**APRIL 18-19**  
4 FOOD SHOPPING TRIPS
- $10 at ShopRite
- $13 at Cousin’s
- $2 at Save-a-Lot
- $7 at Acme

**APRIL 21-24**  
3 FOOD SHOPPING TRIPS
- $14 at Save-a-Lot
- $50 at Aldi
- $2 at Cousin’s

**APRIL 27-29**  
2 FOOD SHOPPING TRIPS
- $21 at Save-a-Lot
- $20 at Save-a-Lot

**MAY 1**  
3 FOOD SHOPPING TRIPS
- $38 at Aldi’s
- $2 at Cousin’s
- $5 at Save-a-Lot
REFERENCES


CHAPTER 5: Conclusion

EDUARDO

Eduardo’s house is a five-mile drive from City Center – past the Connors Food Pantry that he visits regularly and where he saw the flyer for my study – and then straight on for another 15 minutes. As I kept driving north, the city lost all its height and became just two-story row homes as far as the eye could see. A few blocks before Eduardo’s house there was a busy commercial strip with lots of Hispanic stores and a brightly painted and fresh-looking community center with a front wall made entirely out of glass. I missed the house at first and had to drive around the block once before finding a parking spot just down the street. I opened my car door to the sound of loud music and the smell of slow-cooked meat. Across the street from his apartment, at the corner of a busy, six-way intersection, was a hoagie stand called The Pork Shack.

As Eduardo had instructed me, I called him once outside the building and his home health aide, Jimena, came down to let me through the gate on the side of the house. We walked through a narrow, enclosed alley the length of the house – what Eduardo called “the tunnel”. Inside and upstairs, I found Eduardo wearing dark glasses and seated at a small dining table enjoying a sandwich. He quickly rose and greeted me with a welcoming smile and handshake. In future visits, he would declare, “there she is!” when I walked in the door, as if he had been eagerly awaiting my arrival. From the dining table, I could see straight into the small galley kitchen, just big enough for one person at a time. Out the window, in the distance beyond a semi-industrial landscape, was the elevated train line.

Eduardo, who is 57, was born in Puerto Rico, but has lived in Philadelphia off-and-on since he was a teenager. Here he worked as a nurse, first in hospitals and then at an elementary school, until his diabetes became too acute several years ago and he lost his vision. He now lives alone, subsists off Social Security Disability, SNAP and Medicaid, and is visited by home health aides seven days a week who cook all his meals and take him to his many doctor’s appointments. Eduardo’s face lit up when he talked about his prior career as a nurse and the satisfaction he gained from helping other people. Now that he is unable to work and can no longer drive, he feels isolated, alone and often down. His family, including his daughter and granddaughter, are all in Puerto Rico and he has no friends who look after him in Philadelphia. Jimena and the other home aides are an essential source of support in Eduardo’s life, not only because of their cooking, cleaning and transportation, but also for the companionship and emotional connection they provide. When the home aide service gets interrupted – or prior to being approved for service on the weekends – Eduardo said he is restricted to the house, which has deleterious effects on his mental and physical health.

Eduardo was diagnosed with Type 1 diabetes when he was 16. While he was aware of the illness for many years, it wasn’t until more recently when his health started to decline that he really became interested in and attentive to monitoring his condition. “Well, I wasn’t conscious – I wasn’t – up until now that I started my insulin pump. I’m getting more
information about it so we’re searching more, learning more, asking more questions when I go visit Jennifer [dietician] and she kind of points me on the right track.” He now sees many medical providers, including an ophthalmologist and a dietician. He also receives care from an endocrinologist, who oversees the dosage levels on his insulin pump. He has had multiple surgeries for glaucoma and diabetic retinopathy in his eyes. A few months before I met him he fell in his apartment and broke several ribs, which he attributed to the neuropathy (numbness) he gets in his feet, which is just one of many common comorbidities of diabetes.

In the time I spent with Eduardo, his attention to the management of his chronic illness was palpable. As I sat with him at the dining table, he recounted in precise detail the quantity – “4 ounces of 2% milk” – and nutritional content – “5 grams of carbohydrates” – of all the foods he had eaten in the prior 24-hours. He regularly checked in with his dietician to learn new recipes and confirm that the meals Jimena was preparing for him were good for his blood sugar levels. “Yeah, I try to take care of myself. I try to – that’s what my dietician told me. I don’t know how you do it but keep on doing it.” Buying the low-carb foods, high protein shakes, and fresh fruits and vegetables suggested by his dietician was expensive, though, and the store that had a better stock of his diet-specific foods was far from his house and had higher prices. As a result, Eduardo said he typically ran out of SNAP by the end of the second week of the benefit month, if not before. At these times – when he was out of SNAP and trying to spend as little money as possible – he would eat cans of soup. This was also his go-to meal before the home health aide service was extended to the weekend because his glaucoma made it difficult for him to cook, as his eyes were sensitive to the heat from the stove. He knew the cans of soup were not good for his health – they were high in sodium, potentially causing high blood pressure and causing his sugar levels to be uncontrolled. But to make sure he had something in his system, he ate 99-cent Campbell’s chicken noodle soup and as he put it, “…you know like survive. You survive. But then on the other hand my health is not surviving.”

The second time I visited Eduardo, two weeks since he had gotten his SNAP benefits, he was sitting in his recliner with his back to the door as I walked in. He told me that his blood sugar had dipped very low a little before I arrived and that he was feeling sort of shaky. Hypoglycemia, a common side effect of diabetes that can cause lightheadedness, mental confusion and heart palpitations, is something Eduardo is accustomed to. It is brought on when he skips meals, either at the end of the month when he is out of SNAP or when he is feeling too depressed to eat.

Eduardo found the Connors Food Pantry through his social worker, who put him on the long waitlist for the pantry without his knowing. One day the pantry called. “I said ‘no, I didn’t sign up for nothing’ and they said ‘free this, free grocery shopping.’ I said ‘what?’ I said ‘Jimena, let’s go.’ And that’s when I started.” The Connors Food Pantry follows a newer model in emergency food provision that emphasizes healthy foods (e.g. fresh fruits and vegetables, items low in sodium or added sugars) and allows pantry clients to select
their own foods, somewhat akin to a grocery store. Eduardo was very appreciative of the pantry; before being connected to it he regularly ran out of food before the end of the month and now with his monthly visits there he says his SNAP lasts longer. The Connors Pantry emphasis on nutrition meant that the foods Eduardo received there mostly worked well for his diabetes management, but even still some of the items were not ideal, particularly the high-fat and spiced frozen meats, which he said aggravated his diabetes and were difficult for him to tolerate after having had his gallbladder removed. Eduardo was reluctant to visit soup kitchens or receive home-delivered meals, fearing that the foods would not be suitable for his illness.

The last time I went to Eduardo’s house – two days before he would get his SNAP benefits again – he shared with me his grocery shopping receipts. Jimena, who was tracking his SNAP levels by regularly calling the Pennsylvania SNAP hotline, told me he had been completely out of benefits for 10 days. Eduardo and Jimena had still made multiple small trips to the store in that time, though he told me he was more mindful of the cost now that he was paying with cash, as his rent would be due soon, as would his electricity bill. But Eduardo said this accounting was largely in his head. “I have so much things health-wise and so many things to worry about, that I used to be more organized and maybe I feel myself like I’m trapped. Like I don’t – I’m very unorganized.” The last time he completely ran out of money at the end of the month was before he started visiting the food pantry. “Ever since that […] it’s been better,” he said.

EXPERIENCES OF THE SNAP CYCLE
Eduardo’s story is illustrative of the experiences of the SNAP cycle depicted in Chapters 2-4 of this dissertation. His benefits are insufficient to last for the full SNAP benefit month, especially given the high cost of some of the specialty foods he buys to manage his diabetes. To survive the end-of-month period he relies on a variety of coping strategies, including adjusting his shopping and eating later in the month, and using formal community-based resources like food pantries and community centers.

As Chapter 2 demonstrates, like many SNAP households nationwide, the quality of Eduardo’s diet declines late in the month when he turns to inexpensive, less healthy items like canned soup to keep something in his belly. Using a national sample, this chapter demonstrated that overall diet quality is lower among SNAP participants than non-participants, regardless of eligibility for the program, although diet quality is low among all Americans. As in past SNAP cycle literature, food spending and calorie acquisition decreased as the time from SNAP increased. Diet quality also decreased a small, but significant amount in the final 10 days of the SNAP cycle – a change that was largely attributable to a decline in the proportion of purchases comprised of fruits and vegetables. The low diet quality found throughout the SNAP cycle in this study suggests that changing benefit timing would likely not significantly change diet, unless paired with an increase in benefit size.
In the following two chapters, in-depth qualitative data were used to explore the individual experiences and coping strategies of SNAP participants during the SNAP cycle. Chapter 3 illustrated the variety and timing of management techniques SNAP participants used in the end-of-month period, most notably: 1) social support, 2) mental accounting and emotional resilience, and 3) adjustments to shopping and eating. Instrumental support, in the form of food and money from friends and family, was relied on more heavily at the end of the month and the strength of these social networks was often dependent on a high degree of reciprocity. SNAP benefits were typically divided among several different trips (e.g. a big first trip for staple foods, smaller trips later in the month for fill-in items). Budgeting largely took the form of mental accounting, which put a high tax on the mental and emotional bandwidth of already financially stressed households. Skipping meals or restricting the size of meals happened more at the end of the month. Participants also described buying foods to fill themselves up when SNAP ran out, even though they knew those foods were not healthy. This pattern was also evident for Eduardo, who despite a keen awareness of his health and a hyper vigilance around diet to ensure that his glucose levels remained stable, felt that the inadequacy of his SNAP benefits and his financial situation often forced him to make choices that prioritized having any food over having healthy food. Skipping meals – a common SNAP cycle management strategy – has serious implications for Eduardo’s health, often resulting in a hypoglycemic state that requires medical intervention.

Lastly, Chapter 4 illustrated the difficulty of proper chronic disease management while on SNAP and particularly at the end of the SNAP cycle when resources are scarce. Staying “on-diet” required a vigilance that was often undermined by participants’ perceived lack of control with regard to their finances and their food sources. The end-of-month period was particularly challenging, either because they had run out of food or because they had spent more money to buy the proper foods earlier in the month and were now switching to less healthy, more affordable options. SNAP participants often filled in the gaps at the end of the month (or throughout the month) with other food assistance programs, however foods from formal assistance programs were not always appropriate or sufficient for chronic disease management. Here again, Eduardo’s story is illustrative. His team of home healthcare workers, social workers, dieticians and doctors, were valuable and active partners in his navigation of both the healthcare and the food worlds, however these formal support systems were often limited in the amount and nutritional adequacy of food and food resources they supplied. Overall, the data from all three chapters made evident that managing the SNAP cycle often requires making tradeoffs that do not favor health.

Using a mixed-methods approach, this dissertation explored how food acquisition, diet quality, chronic disease management and food security are influenced by factors at the sociopolitical, organizational, interpersonal and individual level, as well as their variations over time. By investigating the associations between program administration and the health and wellbeing of SNAP recipients at the policy, community and household level, this research illustrates how food access and food insecurity are situated within a
relational, ecological model of health behaviors and outcomes. The research also provides a much broader and more in-depth picture of the SNAP cycle than has been previously understood.

One key finding at the policy level from the research was the decline in diet quality of household food purchases in the final 10 days of the benefit cycle. This finding confirmed my hypothesis, that along with food spending and calorie consumption, diet quality decreases as time from SNAP benefit distribution increases. In-depth interviews elucidated the timing and nature of various coping strategies for managing the SNAP cycle at the individual, interpersonal and neighborhood levels, including social support, mental accounting and adjustments to food shopping and eating patterns. Lastly, management of diet-related chronic disease is a significant challenge for SNAP households and the end-of-month scarcity and dependence on emergency food resources (at the community and institutional level) associated with the SNAP cycle can have negative repercussions for both food security and self-management of disease.

The more nuanced understanding of the complicated and changing dynamics experienced by households throughout the SNAP month presented in this dissertation provide evidence both for future research and for the design of more effective policy, programming and educational interventions to alleviate hunger and improve health outcomes. Additionally, this dissertation provides in-depth exploration of the numerous ways in which low-income households are filling in the gaps around a weakened social safety net. The survival strategies households are using speak to the valorization of individual responsibility within U.S. society and a lack of political will to address the underlying problem of food insecurity and health disparities: namely poverty. This research is timely and speaks to the critical need within our political system for the preservation and enhancement of social support systems designed to reduce poverty and inequality.

POLICY IMPLICATIONS
The findings from this research, which demonstrate associations between the SNAP cycle and diet quality, poverty coping strategies and chronic disease self-management, have a number of potential policy implications. Given the relationship between SNAP benefit administration and diet quality, changes to SNAP policies regarding benefit distribution schedules and mechanisms for improving the nutrition of SNAP recipient diets should be considered. The high prevalence of chronic disease within the study sample, as well as the SNAP population more broadly, point to the need to consider program and policy interventions through other food assistance channels as well, such as food pantries, medically-tailored meal programs and vegetable prescription interventions. These policy implications and the evidence supporting them are outlined below.

SNAP distribution
While SNAP is a federally funded program, states are responsible for administering the benefits to eligible participants. As a result, the benefit distribution schedule varies by
state. For example, in Pennsylvania, SNAP benefits are distributed within the first 10 business days of the month, depending on the last digit of the participant’s case identification number, while in South Dakota all SNAP participants receive their benefits on the 10th of the month. In an effort to smooth the influx of money to grocery retailers over the month, several states that use a schedule similar to South Dakota have moved in recent years to a staggered issuance system (as in Pennsylvania) which spreads the benefit disbursement over more days of the month. However, there are no states where individual recipients get benefits added to their EBT card more than once per month.

Several prior studies on the SNAP cycle have posited that increasing SNAP benefit distribution to a semi-monthly issuance schedule may help smooth the cycle of spending and food consumption.\(^1\)\(^-\)\(^4\) Although this theory has not been tested with an experimental design, the hypothesis follows an economics logic of short-term impatience, whereby individuals spend money on items that favor the present self without taking into consideration the needs of the future self.\(^3\)\(^,\)\(^5\) Spending on these items, sometimes called “temptation goods”, can pose disproportionate burden on low-income individuals whose mental resources are already heavily taxed by many competing challenges and concerns.\(^6\) With less available cognitive “bandwidth”, economists posit that low-income families may have fewer mental resources available for budgeting or willpower.\(^6\) In a study in Peru evaluating a policy change around the distribution of cash welfare as a monthly or semi-monthly benefit, researchers found that larger, less frequent benefit payments increased the proportion of expenditures that recipients made on temptation goods (in this case, alcohol and sweets).\(^7\)

This argument, however does not take into account the possibility that benefit levels may be insufficient to last the entire month or facilitate purchase of healthy foods no matter the amount of budgeting for future needs. The low diet quality found throughout the SNAP cycle in this study suggests that while more frequent disbursement may smooth purchasing, it would be unlikely to appreciably improve diet quality unless also accompanied by an increase in the benefit size. Given the higher cost of nutrient-dense, healthier foods such as fruits, vegetables and whole grains compared to energy-dense foods that contain refined grains, added sugars and added fats, SNAP benefit levels may simply not be adequate to facilitate the regular purchase and consumption of nutritious foods throughout the month.\(^8\)\(^-\)\(^10\)

That said, there may be other advantages to changing the SNAP distribution schedule, including a participant preference for more frequent benefit disbursement, which is something that was explored qualitatively as part of this study. During the interviews, a little more than half the participants said they would prefer if their SNAP benefits were distributed more frequently – either twice a month or weekly. This finding was consistent in survey responses as well, where 50% reported that getting their benefits broken up into several smaller payments during the month would make their lives easier and 44.4% reported that multiple payments would reduce stress related to finding money for food. Throughout the interviews, participants provided several reasons for preferring more
frequent benefit disbursement, including that it would 1) help with budgeting, 2) more realistically reflect the way people shop (e.g. “because nobody keeps food in their house for a month”), and 3) ease strain from the SNAP cycle by making “the end of the month [less] harsh”.

Budgeting was a major plus according to many participants; getting multiple SNAP allotments per month would decrease the chance of splurging or overspending on the first trip and make it more possible to plan for unanticipated financial needs later in the month. As one mother explained, “because I have it now, I’m gonna let my son go get this candy or these chips or whatever, and before you know it, all those trips and just spending it because you’re excited because you finally got the money to get the food. So you tend to, I guess, a little over-spend what you normally would do if you didn’t have – you only had like a hundred bucks for it. But if they split it up and give it you every two weeks, when you get that first money – that first deposit, you’re like okay, I’m gonna get this and this and this is gonna hold me over until I get it in two weeks again and then this will have – you can budget better. You can manage. But you can – it’ll be a whole different – I think it’d be a lot better.” As another participant noted, she spends the money when she has it, so it would be helpful to have less of it at a time. “I'm spending five, six dollars three times a day, that's fifteen dollars. So by the end of the second week, I have no food stamps left. It would be easier for me if I just ... if a week ran out or something, and then the following week another week would be in. Then the following week another week could be in. It would help.”

While half of the participants said they would like to see a change in benefit disbursement schedules, many noted that this would not fully address food insecurity at the end of the month. As one participant said of more frequent disbursement, “I guess twice a month, but like I said, it still won’t stretch. Even when you get your food stamps, you’re not gonna be able to eat two to three meals a day. You’re still going to have to eat one meal a day.” Another noted that benefit levels are just too low, stating, “but the money that I do get, even if I [budget], it still doesn’t last a month.” One participant noted that he was already required to do so much planning of his medical condition and his finances, and that additional payments would be an added planning burden. Nine participants said they either preferred receiving SNAP in one disbursement or that the benefit system was “fine” the way it is – either because additional payments would not make a difference, they liked being able to do big shopping trips, or they preferred the freedom of getting all the money at one time.

There are several barriers to a wide-scale policy change such as this, not the least of which is political will to make a significant change to the program. SNAP benefits are already distributed electronically onto EBT cards, thus while there would be an initial administrative cost for switching to a twice-monthly system, the overall costs associated with such a change are unlikely to be substantial in the long-term. To accurately assess the impact of changing the benefit distribution schedule, either a state would need to change the administration policy, thereby enabling a natural experiment, or a pilot
experiment would need to be tested. In the case of a pilot, current regulations would require a waiver from the USDA to test a policy change, which historically the agency has not readily granted. Ultimately, it may be that the best solution for SNAP households is to provide an option for semi-monthly disbursement, rather than making it mandatory. Having an option for a different distribution schedule would provide SNAP participants with the greatest agency in determining how best to budget and distribute their resources.

**SNAP dietary restrictions & incentives**

Given the findings from the national scan in Chapter 2, showing that diet quality is low throughout the SNAP cycle, policy interventions that can work to address nutritional adequacy at all times of the SNAP month are essential. At its inception, SNAP (then called Food Stamps) was designed as a food relief measure primarily intended to alleviate hunger. In the 2008 Farm Bill, when the program’s name was changed to the Supplemental Nutrition Assistance Program, Congress specified that the intention of the program was to “permit low-income households to obtain a more nutritious diet”.

Changing the name to include the word “nutrition”, was an intentional decision to highlight the program’s purpose of improving diet quality. However, unlike a number of the other federal food assistance programs (e.g. WIC, National School Lunch Program), SNAP is an in-kind transfer program with relatively few restrictions on the items that may be purchased. Alcohol, dietary supplements and hot or prepared food items (e.g. restaurant foods, deli items) are excluded, but all other foods, including sugar-sweetened beverages (SSBs) and candy are eligible. Contrast this against WIC, or the Special Supplemental Nutrition Program for Women, Infants and Children, where eligible individuals (low-income women who are pregnant, breastfeeding or postpartum and infants or children under 5) receive vouchers for specified food packages that include nutritionally approved items such as eggs, fruits, vegetables, low-fat dairy and whole grains.

The lack of nutritional guidelines within SNAP has sparked much debate in both the policy and research domains about what foods should be eligible. Some argue that taxpayers should not subsidize the purchasing of unhealthy foods like soda and candy, while public health circles have advocated for item restrictions on sugar-sweetened beverages as a mechanism for improving health and reducing obesity and diabetes rates. In recent years, several states have applied to the USDA for waivers permitting them to test the impact of item restrictions. These waivers have all been denied, however, as the USDA, along with anti-hunger advocates, contends that excluding items from SNAP stigmatizes the poor and restricts the agency of low-income shoppers. The USDA has also argued that excluding items would be administratively challenging.

The research in this dissertation, like many studies that have come before it, has highlighted the low diet quality of SNAP recipients and the challenges SNAP households face in affording nutritious foods. One mechanism for improving the diet quality and
ultimately the health of SNAP households is to change the benefit rules around eligible foods. While excluding certain food items is the policy change that is most often discussed, there are at least four mechanisms through which changes could be made: 1) excluding certain unhealthy foods from eligibility, 2) incentivizing the purchase of designated healthy foods, 3) combined restrictions and incentives, and 4) targeted nutrition packages (similar to WIC).

Because waivers to test item restriction have not been approved by the USDA, the evidence supporting excluding less healthful items from SNAP purchases is limited and is largely based on simulations. Researchers in two different studies used nationally representative data to model the effect of excluding SSBs from SNAP and estimated that this policy change would significantly reduce chronic disease prevalence and mortality rates and lower healthcare costs for obesity, diabetes and cardiovascular disease. The researchers noted, however, that they were unable to predict how such a policy change may influence enrollment in the program and what this would ultimately do to national food insecurity rates. Additionally, the evidence suggesting that such restrictions would actually reduce consumption of unhealthy items is not strong. One study from a large, regional supermarket chain showed higher spending on unhealthy foods (including SSBs, red meat, and convenience foods) with SNAP than with other forms of payment. However, several other studies, including one produced by researchers at USDA’s Economic Research Service, have shown little difference in the purchasing between SNAP and non-SNAP participants, which suggests that restrictions may do little to improve diet quality, especially as SNAP participants may substitute cash for SNAP when buying excluded items.

As part of the 2014 Farm Bill, Congress did authorize spending for programs that incentivize healthy food purchasing within SNAP. One such authorized pilot, the Healthy Incentives Pilot (HIP), used a randomized study design and offered a 30-cent incentive for each dollar of targeted fruits and vegetables purchased. Compared to SNAP participants who did not receive the incentive, HIP recipients had a 26% increase in targeted fruit and vegetable consumption. Harnack et al. used a randomized-control trial that simulated SNAP to test whether incentives on fruits and vegetables, restrictions on SSBs and other foods with high added sugars, or a combined incentives and restrictions model would be most effective in improving the diet of recipients. Compared to the control group, participants in the combined restrictions and incentives group had the most significant improvements in diet quality, however participants in the incentives-only group also had significant reductions in SSB consumption and improvements in fruit consumption, comparable to those found in the HIP study. Bleich et al. proposed a combined incentives and restrictions option, whereby SNAP recipients could choose between the current benefits or a modified benefit where SSBs would not be allowable, but the benefit level would be higher. While evidence for the effectiveness of incentivizing healthy purchasing is robust, and many have argued for the expansion of these programs, the most significant challenge to this approach is finding the political will to create sustainable sources of funding.
Lastly, another change to SNAP policy that may improve nutritional quality would be to add a targeted nutrition package to SNAP benefits, similar to the WIC packages. This could be structured either as an opt-in program where, instead of regular in-kind benefits, recipients would receive slightly higher benefit levels through an item-specific package, or as an opt-in feature that could complement existing EBT benefits. The WIC program is largely considered a successful example of a nutritionally-targeted food assistance program; diet quality has been shown to be higher among WIC recipients than income-eligible non-participants and the 2009 revisions to WIC packages, which made improvements in fruits, vegetables and whole grains, showed a nearly 4% increase in the purchasing of healthy foods among recipients. Implementing this kind of drastic policy change to SNAP is likely to be politically unpopular, as SNAP is a much larger federal program than is WIC, however pilot studies (which would require a waiver from the USDA) to examine the potential impact of such a change could be influential in swaying public and political discourse.

The findings from this dissertation, particularly the decline in diet quality at the end of the SNAP cycle as a result of decreased spending on fruits and vegetables, highlight the fact that the cost of nutrient-dense, healthy food items is prohibitive for many SNAP households. SNAP policy changes that work to address this cost barrier, such as incentives and targeted food packages that could supplement traditional EBT benefits, are a promising direction for improving the diet quality of SNAP purchases that should be evaluated more in future studies.

SUPPLEMENTAL FOOD PROGRAMS, FOOD IS MEDICINE
Of course, SNAP is not the only source of food assistance families use; as with many of the participants in the qualitative portions of this study, SNAP households often rely on supplemental sources of food relief such as soup kitchens and food pantries, especially at the end of the month when SNAP resources have been depleted. Additionally, as was demonstrated in Chapter 4, diet-related chronic disease is a significant challenge for SNAP households and properly managing chronic illnesses is particularly difficult at times when resources are scarce or when households are dependent on free or emergency food sources. This means interventions that target nutritional improvements within community-based food programs are critical. These types of interventions are relatively understudied and underfunded, however, and should be given more critical attention by Congress and federal health agencies.

Emergency food programs
Participants in the qualitative portion of this study often stressed the importance of community-based emergency food programs in filling in the gaps at the end of the benefit month. While several SNAP households in the study were frequent visitors of a food pantry with nutritional guidelines, many of the families with whom I spoke complained that the foods they found at emergency food sites were nutritionally inadequate, rotten, insufficient or inappropriate for their chronic disease management. While many food
banks and food pantries around the country have started to acknowledge the importance for the health of their clients of setting nutritional standards.\textsuperscript{26,27} These changes are expensive and often require additional infrastructure, which can be financially difficult for charitable and volunteer-run organizations.

While this newer model of emergency food resources is relatively nascent in its development, several evaluations of these changes have demonstrated positive outcomes. In one study, researchers targeted food pantries for diabetes interventions aimed at improving disease self-management, as food insecurity is a known risk factor for poor diabetes control.\textsuperscript{28} This study enrolled pantry clients with diabetes at three different pantry sites around the country and the intervention provided diabetes-appropriate foods, blood sugar monitoring, primary care referrals and support for self-management. Pre-post analysis found improvements in glycemic control, consumption of fruits and vegetables, medication adherence and self-efficacy. Another recent study examined the impact of an intervention called “Freshplace”, which included visits to a client-choice pantry (meaning clients could choose the foods they wanted from an assortment of options), monthly motivational interviewing and referrals to community services.\textsuperscript{29} After one year of the intervention, compared to the control group who visited a traditional food pantry (where they received a bag of food), the intervention group was less than half as likely to report very low food security and had significantly increased consumption of fruits and vegetables.

Both these studies highlight the potential impacts on food security, diet quality and chronic disease management that improved emergency food resources can have on low-income households. If pantries altered food allocations to include more healthy items such as fruits and vegetables, this could also help to address the nutritional challenges faced by SNAP consumers, particularly at the end of the month. Further evaluation of nutritional guidelines within emergency food programs is needed. As future changes and interventions are designed, it is critical that researchers and food site coordinators engage with participants to design programs that best preserve the dignity, health and social inclusion of the communities being served.\textsuperscript{30}

\textbf{Food is Medicine}

For those SNAP households who are managing diet-related chronic diseases, the nutritional quality of the foods they eat is especially important. In an attempt to address the specific and varied nutritional needs of individuals with chronic conditions, there is a growing movement throughout the country of interventions using medically targeted food and nutritional counseling to treat chronic disease, sometimes referred to as “food is medicine”.\textsuperscript{31} This concept has developed some recent increased attention in the literature, but seems to have originated in early HIV/AIDS treatment programs, specifically the Ryan White Program, which provided funding for “Medical Nutrition Therapy” as a core medical service.\textsuperscript{32} Among the interventions that the food is medicine concept can include are food prescription programs in clinical settings, medically-tailored home delivered meals and medically-tailored food packages or grocery bags.\textsuperscript{33}
Even though food is medicine is not a new concept, there have been very few studies examining the impacts of food-specific interventions on diet-related disease outcomes. An ongoing study in Chicago is evaluating impacts of a Food Rx prescription program for healthy foods. A similar program, called Veggie Rx, provided fruit and vegetable prescriptions for low-income patients at a medical clinic who had been diagnosed with Type 2 diabetes, hypertension or obesity. Over an average 18-month time frame, participants in the intervention had significant decreases in BMI compared to a matched control group. Lastly, an evaluation of a medically-tailored meal program for people with HIV and/or Type 2 diabetes found that participants receiving the 6-month intervention (including meals and snacks for 100% of daily energy and nutritional guidelines) had significant declines in very low food security, decreased consumption of fats and increased consumption of fruits and vegetables compared to baseline measurements. Perhaps even more notable, among those with HIV, 95% adherence to antiretroviral therapy increased and among those with diabetes, disease-related stress and perceived self-management improved. Results of these early studies are promising, but much more research is needed to adequately assess the potential role and impact of food interventions such as medically-tailored meals and fruit and vegetable prescription programs. If effective, medically-tailored food packages or grocery bags could potentially supplement current SNAP benefits for those households managing chronic illnesses.

CONCLUSION

“The food stamp program responds to the absurdity of hunger in a land of excess food...Food stamps are not what most people have in mind when they talk about ‘welfare,’ and almost no one proposes to abolish public spending on food for the deserving poor. Food stamps escape the taint of welfare because, first, their benefits extend to the working poor and the elderly. Although it is not universal, it is targeted less narrowly than AFDC or TANF. Second, its benefits are paid in kind, not in cash.”

-Michael Katz in *The Price of Citizenship*

SNAP and other food and hunger relief policies and programs have been more successful – in terms of longevity, scope and size of impact – than many of the other poverty and welfare policies in the U.S. As other scholars have argued, SNAP’s success is due partly to its connection to the Farm Bill and agricultural industry. Food assistance also captures deeply rooted American values of sharing in the agricultural abundance that formed such an integral part of our founding and of our continued self-image as a nation. While over the course of its long history as a social safety net program, SNAP has never been entirely safe from partisan politics, the program is under particularly virulent attack today. The above assertion by the late Michael Katz—that SNAP has been protected from the level of attack on other forms of welfare by nature of its extension to the working poor and its in-kind benefit structure—sounds almost antiquated in our current political climate. SNAP is being threatened from all sides by the current Trump administration,
which has suggested overhauls to the program, including transition to a Block Grant structure, $214 billion dollars in cuts over 10 years, and implementation of a “food box” benefit package.

In light of this political climate, there is likely little political will for implementing the policy recommendations I outlined above for reducing the impact of the SNAP cycle and improving the nutrition, chronic-disease management and overall health of SNAP recipients. Unfortunately, rather than building upon a social safety net program that serves a vital role in what little social safety net our country does provide, the current focus of public health and anti-hunger advocates is on keeping the program alive. However, it is important that we not lose sight of the larger goal to improve this integral safety net program, eliminate poverty and improve the health of all Americans.
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