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Healthy Food Accessibility in Rural Mississippi and Potential for a Corner Store Intervention

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HEALTHY FOOD ACCESSIBILITY IN RURAL MISSISSIPPI AND POTENTIAL FOR A CORNER STORE INTERVENTION

by

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ABSTRACT

ANNA NICOLE CONNER: HEALTHY FOOD ACCESSIBILITY IN RURAL MISSISSIPPI AND POTENTIAL FOR A CORNER STORE INTERVENTION
(Under the direction of Dr. Georgianna Mann)

Some areas of the United States have poorer food environments than others. The Mississippi Delta has limited access to nutritious food, often relying on corner stores for sustenance. The impact of a poor diet can increase chronic disease prevalence, creating additional barriers to health and nutrition for Mississippians. The purpose of this study was to document and explore the rural food environment and discuss urban intervention studies in light of the current state of stores in the Delta. An adapted version of the Baltimore Healthy Kids survey and store impact questionnaire was used to record owner perceptions and food availability.

Findings suggest that there is a lack of adequate amounts and types of food needed for a nutritious diet in northwest Mississippi corner stores. Stores also faced challenges in selecting and stocking healthy foods, such as facing low customer demand and obtaining proper storage. The results of this study are similar to a pre-interventional status of Baltimore stores. They suggest a lack of nutritious options, making northwest Mississippi stores appropriate targets for intervention. A rural corner store intervention with modifications that address regional barriers to nutrition could be an effective method to improve access and consumption of a nutritious diet in the Delta.

PREFACE

My interest in food insecurity began with an experience volunteering at the Oxford Pregnancy Center, where clients would often ask for baby formula, or seeing peers struggle to obtain healthy foods. I had known people were food insecure and worked at food pantries before, but never had I seen my community struggling so much as I did in Mississippi. Food has had an important role in my health. Dealing with chronic illness and athletic pursuits both require adequate nutrition, which I quickly saw became expensive upon buying my groceries in college. How could others heal and live a healthy lifestyle while being food insecure, and often, lacking access to healthcare too?

My goal is to contribute something to the state that has given me both an education and a greater purpose. Soon, I begin medical school and hope to pursue either gastroenterology or primary care. Additionally, I plan to continue community research on food insecurity in rural areas and pursue nutrition education alongside my medical degree. People deserve a fighting chance at living their best, happiest, and healthiest lives. This starts with having the fuel to fight for those through proper nutrition. Thank you to Ole Miss for fostering a dream I did not know I had and giving me a higher purpose to which I will honor throughout my journey and medical career.

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LIST OF ABBREVIATIONS

BHCK	B'More Healthy Communities for Kids
BMI	Body Mass Index
GFYA	Good Food Youth Ambassadors
MDD	major depressive disorder
NEMS	Nutrition Environment Measurement Survey
SES	Socioeconomic status
SNAP	Supplemental Nutrition Assistance Program
WIC	Special Supplemental Nutrition Program for Women, Infants, and Children

INTRODUCTION

The Mississippi Delta is one of the most fertile, rural regions in the United States and is over an hour away from the nearest metropolitan area (47). Yet, its residents face numerous challenges in obtaining adequate nutrition and health care. Adequate healthcare and nutrition are needed given the high incidence of chronic disease (48). Quitman, Panola, and Lafayette counties rank high for diabetes, obesity, hypertension, and inactivity; they rank low for daily fruit and vegetable consumption and education levels (48). Rural food environments experience lower availability of fruit and vegetables, where corner stores are often the source for the majority of groceries (39). Poverty and reliance on government nutrition programs can make sustaining a consistent food source challenging. Geographic separation, food insecurity, lack of nutrition education, and cultural perceptions increase the difficulty of maintaining a nutritious diet.

A lack of healthy foods and an abundance of calorically dense, nutrient-poor foods can lead to obesity. Obesity causes serious, sometimes fatal, physical and mental health conditions and a large economic burden (36). Rural obesity rates are higher for adults than children, with a prevalence of 39.6% for rural adults (2). Rural environments often lack access to physical activity such as gyms, sidewalks, or public transportation and rely on private vehicles as their only mode of transportation (55). Short-term stressors brought on by factors like poverty, food insecurity, distance, and unemployment lead to less preventative medical care, which could

contribute to nutrition education and health monitoring among rural adults (4). Overall, the nutrition and health of Mississippi Delta residents face tangible barriers

Perceived barriers to consumers and store owners also exist. Traditional rural diets, geographical separation, taste preferences, regional foods, and lack of health education are cited by rural residents as barriers to nutrition. In previous research, corner store owners most notably referenced Supplemental Nutrition Assistance Program (SNAP) eligibility, especially for produce, as a barrier to stocking nutritious foods, but others such as customer preference and supplier unavailability also were challenges (19).

With the unique struggles rural areas, specifically, the Mississippi Delta, face in consistently finding and stocking nutritious foods, bringing supermarkets in may not be plausible. Even if they come, as some have in bigger Delta towns, many residents of small towns cannot access them. Working with the current infrastructure could both provide healthy foods and rely on the strong community relationships that corner stores have with their residents. Multiple corner store interventions have shown promising results in improving physical and perceived barriers to nutrition. This investigation serves to explore the current food availability in select counties of the Mississippi Delta and discuss its candidacy for a corner store intervention in the future. Provision of healthy foods from an intervention could improve the access to nutritious food for Mississippi Delta residents.

CHAPTER 1: LITERATURE REVIEW

1.1 Food Insecurity

Food insecurity is the inability to access food consistently due to lack of money or other resources. It can include not having enough food, but it also entails limiting food intake due to financial stressors as measured by the USDA (18). During 2019, 35 million people were food insecure, with a third limiting reducing their dietary variance and intake (54). Not all Americans are at the same risk for food insecurity. In 2019, over 5 million children lived in food-insecure households. Minority households face higher rates of food insecurity, with black households at 19.1% and Hispanic households at 15.6% compared to white households at 7.9%. Rural areas are disproportionately food insecure, making up 87% of food-insecure individual countries. Rural food deserts are defined differently, requiring a 10-mile distance from a grocery store to be considered compared to the urban counterpart of 1 mile (54). Mississippi is the most food insecure state in America. Fifty of eighty-two counties are in continual poverty, and 77% of the state having food desert areas where residents live twenty or more miles from a grocery store and lack transportation. The study's target counties of Lafayette, Panola, and Quitman are 21%, 24%, and 28% food insecure, respectively. While Lafayette county is not considered Mississippi Delta territory, it is included in the data. Issaquena County, 30% food insecure, sees 95% of SNAP transactions taking place in different counties (22).

There is a great prevalence of food insecurity in the Mississippi Delta. Of the three Delta region states (Mississippi, Louisiana, and Arkansas), Mississippi has the highest rate of food insecurity (53). Households earning $0-14,999 and $15,000-29,999 were 41.2% and 20.1% food insecure, respectively. Black Mississippi Delta households are three times more likely to face

food insecurity (53). Households with children have much higher rates of food insecurity. White households with children are 3.2% food insecure, and black households with children are 11.1% food insecure, compared to national averages of 0.3% and 1.6% respectively (53). The food environment of the Delta is one of agricultural abundance, but its people are disproportionately facing food insecurity. The intersectionality of geographical residence, poverty, race, and dependents all impact food security.

Food insecurity can negatively impact overall health. A meta-analysis of food insecurity and health outcomes in children showed that it poses increased risks for the following conditions: decreased cognition, depression and anxiety, suicide ideation, anemia, asthma, and tooth decay (18). Children from food-insecure households are two times more likely to experience behavioral issues (18). Food insecure adults are two times as likely to have diabetes and 3.31 times as likely to have poor oral health. They self-reported a 20% increased risk of hypertension (18). Other concerns include maternal depression, iron deficiency in pregnant women, and increased prevalence of hyperlipidemia (18). Causation cannot be determined, but there are relationships observed between dietary limitations and health issues. Rather, there is a complicated web of direct and indirect impacts that lead to food insecurity and/or poor health outcomes, not of which solely causes the other.

Covid-19 increased the burden of food insecurity nationwide. The University of Mississippi's Center for Population Studies joined two Delta organizations to address the food needs. They established the FEED Northwest Mississippi Fund to benefit local food pantries and nonprofits, and they meet monthly to discuss resources, barriers, and solutions to food insecurity in the Mississippi Delta, especially during the pandemic (56). Both these efforts are fueling the

future of a food secure Mississippi Delta, but with the existing infrastructure, corner stores serve as a staple source of food in the Mississippi Delta.

1.2 Obesity and Other Health Disparities

Obesity is a condition characterized by high body fat. Consumption of high calorie, unhealthy foods and/or a lack of physical activity can be contributing factors. It is measured using Body Mass Index (BMI), a ratio of an individual's height and weight (36). Obesity's most direct negative impact on an individual's health is the increased risk for many diseases. Obese individuals have a greater risk of the following conditions: hypertension, type 2 diabetes, high low-density lipoprotein cholesterol, coronary heart disease, stroke, gallbladder disease, osteoarthritis, sleep apnea, cancer, low quality of life, mental illness, body pains, and premature death (36). Obesity increases the risk of acute pancreatitis and nonalcoholic fatty liver disease (40). Cancer mortality increased 52% for men and 62% for women in comparison to normal BMI counterparts (40). Among over 1 million female participants, obese women face a higher prevalence of 10 out of 17 common cancers (40).

Obesity negatively impacts one's mental health. The National Epidemiologic Survey on Alcohol and Related Conditions found that obesity posed a 1.21-2.08 odds factor for major depressive disorder (MDD) among obese and extremely obese participants, respectively (40). The odds factors for lifetime MDD also confirm a strong relationship, with 1.53 for obese and 2.02 for extremely obese compared to normal-weight participants (40). The 2006 Behavioral Risk Factor Surveillance System replicated similar findings, recording a prevalence of MDD was 6.5% in normal BMI individuals compared to 25.9% in obese individuals (40). Obesity's impact on mental health can further its negative impact on overall health. Beyond the serious risk of

life-threatening illnesses, obesity also has financial implications. Its estimated treatment costs were $147 billion in 2008. Absenteeism costs range from $3.38 to-6.38 billion dollars, and 22.2 million Americans eligible for military service did not meet requirements for weight and body fat (36).

Rural populations suffer from a higher rate of chronic disease, which may be tied to the higher obesity rate. Rural Americans make up approximately 23% of the United States population. The rural prevalence of obesity is 39.6% compared to the urban prevalence of 33.4% (2). A higher percentage of caloric intake from dietary fats in rural residents. Controlling for socioeconomic, activity, and dietary differences, rural geographic location was a statistically significant determinant of obesity (2). The intersection between obesity and rural life exists throughout Mississippi among other factors. Mississippi is the most obese state in the United States. In 2015, 34.8% were overweight, 36.3% were obese, and 7.7% were extremely obese (33).

Obesity prevalence is higher in rural children. Through national BMI and survey analysis, researchers found that rural children are 25% more likely to be overweight or obese than urban children (29). The study found that rural location not only was a risk for overweight children but also that rural overweight children faced a higher risk of lack of medical care and poverty (29). Lastly, it proposed that a lack of access to fresh, healthy food and high prices of fruits and vegetables when available could be partial contributions to the obesogenic environment (29). Rural life may contribute to obesity initially and continue its cycle through barring access to necessary care. The prevalence of obesity in rural children may morph into lifelong rural adult obesity, furthering the cycle and connection between geography and obesity.

Some areas have unhealthy food available but lack varied, fresh, and nutritious food. These areas are considered food swamps: high concentrations of calorically dense food such as fast food and little to no nutrient-dense food. Additionally, the fresh food that may be available is expensive in comparison to nutrient-poor foods. Researchers found a connection between adult obesity rates and food swamps that are higher than obesity and food desert (7). Results found that food deserts have no significant correlation with obesity, while food swamps have a significantly positive correlation (7). The positive effect of food swamps also was higher in areas that did not utilize a vehicle or public transportation to commute to work; the lack of transportation may worsen the food swamp's obesogenic influence (7). When low SES, rural Mississippians are struggling to afford food, especially those with limited transportation, food nearby is likely to be residents' main source of nutrition. When these foods are unhealthy, it creates a struggle to feed oneself and do it nutritiously, with the former being priority.

Access to nutritious foods may be limited, and a diet heavy in nutrient-poor foods contributes to obesity and other chronic metabolic conditions. This effect can be seen in both rural and urban food environments. Obesity prevalence has been found to be increased within geographical proximity to small grocery stores, convenience stores, and fast food restaurants, but decreased near supermarkets, limited-service restaurants, and specialty food stores (34). In the Mississippi Delta, food insecurity is twice the national average, obesity is one and a half to two times the national average, and chronic illness rates are one and a half times the national average (52). In areas with high food insecurity, where there is an irregular food supply and eating patterns, residents over consumed cheaper, more energy-dense foods when available. Their diets had more refined grains, sweets, fats, and other energy-dense foods and less meat, fruits, and

vegetables (52). Poor, food-insecure Mississippi Delta residents are more likely to consume high-energy density diets associated with obesity and less likely to meet daily requirements of many vitamins, minerals, and macronutrients (5). Inability to access and consume healthy foods throughout the Mississippi Delta adversely impacts numerous health markers of its population.

1.3 The Environment of the Mississippi Delta

Fueled by the Mississippi river, both industries and immigrants have flocked to the Mississippi Delta for hundreds of years. Before the Civil War, the invention of the cotton gin, the favorable environment, and the use of slave labor made cotton the major agricultural output (21). The fertile farmlands attracted white farmers, who heavily relied on slaves to farm their crops and fueled the Mississippi economy. After the abolition of slavery, farming transitioned to tenant and sharecropping practices that produced cotton as well as sugar, soybeans, and rice. Sharecropping maintained the pervasive poverty that formed black farmers to be indebted to their former enslavers, renting land and equipment for high-interest rates (47). Both the Great Depression and the mechanization of farming hit the industry hard, taking many agricultural jobs from residents. Some left during World War II. Others remained, but the years after the economic success of the 1950s saw big corporations acquiring small farms and unweaving the Delta farming fabric (21). The increasing mechanization of farming stripped agriculturally-based river towns from their main source of jobs, leaving behind struggling modern economies. This poverty creates increased struggles for its rural residents, especially racial and ethnic minorities. Factors like the agricultural employment structure, migration patterns, lower educational attainment, and geographic isolation from urban areas contribute to the cycle of poverty found in the Delta. (11). The poverty in the Mississippi Delta is multifaceted, where inequities persist.

Health metrics in the Mississippi Delta compare poorly to other Mississippi counties. Deaths from heart disease by county show Quitman County as 2nd and Panola County as 5th in the state (48). Quitman County ranks 10th in Mississippi for deaths from diabetes, with the other counties clustered deeper within the Mississippi Delta. Obesity also impacts blacks disproportionately (48). While over one in three Mississippians is obese, black residents have a higher proportion of obesity, and black females have the highest risk of obesity (48). About half of Mississippi's adults consume only one fruit a day and two-thirds consume one vegetable, where consumption of fruits and vegetables can contribute to a healthy lifestyle (48). Mississippi's youth have a higher prevalence of obesity, low physical activity, and low consumption of fruits and vegetables (48). Black youth in Mississippi are at especially high risk. More black children are obese, watch three or more hours of television per day, and consume fewer vegetables than their white counterparts (48).

Mississippi's chronic disease prevalence is among the highest in the nation. It ranks 1st for cardiovascular disease and death, 2nd for adult diabetes prevalence among adults, and 2nd for obesity prevalence among adults (48). Researchers also examined the social determinants of health, especially among the 40% of black residents in the state, the highest percentage in the U.S. Social determinants fare worse for black Mississippians; 35.7% live under the federal poverty line, 29.2% have less than high school education, 17.1% are unemployed, and 20.8% live without health insurance (48).Fifty-six percent of African-American households in the Mississippi Delta fall below the federal poverty line. Mississippi Delta residents are more likely to lack health insurance and rate their health as poor. Twenty-five percent of African-American women aged 35-64 report having diabetes (45). Between the rural geography, low SES, and

inaccessibility to healthcare and nutritious foods, the Mississippi Delta has increased risk factors for disease and malnutrition

Quitman County, Mississippi is entirely rural and lacks both a grocery store and hospital. Its nearest grocery store is about twenty miles away in Batesville. The county seat of Marks is home to about fifteen hundred residents; of those, over 30% fall below the federal poverty line, and 20% have less than a high school education (1). The only grocery store in Quitman closed due to economic failure in 2017, and while the county board has been petitioning for a Save-A-Lot, the current closest grocery store is over twenty miles away in any direction. This leaves residents four options: Dollar General, Family Dollar, corner stores, or the food pantry. Most lack fresh fruits and vegetables, making it incredibly difficult for residents to have long-term, sustainable access to a well-balanced diet (1). As of fall 2020, promising ventures are emerging in Quitman County. A new produce store was added to the Marks Family Dollar in November 2020 (63). As of December 2020, Quitman County received a $200,000 grant to renovate and reopen Jeffcoat's Family Market as a full grocery store in the future (42).

1.4 Rural Food Environment

Poor nutrition has contributed to growing rates of chronic disease, so understanding the rural food environments is important to implementing preventative measures and improving community nutrition. In a rural food community with high obesity prevalence and low fruit and vegetable consumption, researchers found that only 32% of the 34 restaurants assessed sold at least one entree deemed healthy using the Nutrition Environment Measures Survey for Restaurants (NEMS-R) and Stores (NEMS-S). NEMS-S was used to examine grocery stores in the area; while all three had a range of healthy foods, the five convenience stores earned poor

scores for nutritious food availability, including fruits and vegetables (39). The intersection of restaurants, grocery stores, and convenience stores better characterize the food availability in rural areas. All three can be major sources of nourishment for rural residents who may lack access to a variety of dining options.

Food sources carrying healthy foods are sparse in rural spaces. A New York study surveyed stores over an 8400 square mile landmass and most were convenience stores. 43.2% of rural stores stocked fresh produce, and 36.6% of convenience stores sold fresh produce (12). 70.5% of food-insecure households reported convenience stores as the closest food source, and to reach a supermarket, 36% of respondents traveled at least ten miles (12). The rural food environment is not only sparse in the foods accessible but also the accessibility of stores themselves. Rural residents often must travel farther, as rural areas lack walkability and population density. Another group characterized the rural food environment by store type. The study found that supermarkets outscored corner stores on price, quantity, and availability. In comparison to urban corner stores, rural corner stores outperformed (41). While supermarkets performed highly on NEMS-S-Rev, the unavailability of supermarkets in rural areas shows that rural residents still face challenges in accessing healthy foods in their geographical proximity (41). Support and promotion of healthful foods within the existing infrastructure of convenience stores in rural areas could promote overall nutrition.

Rural focus group participants reported barriers to physical activity included lack of time, sedentary activities, social stigma, and geographic isolation or lack of facilities (44). Another in Iowa found that the local food environment, transportation, and community support lessened food insecurity. Many households shopped outside of the county, and some created food

insecurity for themselves by oversharing with other members (44). Rural focus groups provided barriers to healthy eating and mentioned a perceived lack of time, high costs, change in traditional diets, geographic isolation, and lack of healthy options at local venues like restaurants, schools, and churches (44). One unique aspect is the traditional diet of rural communities, which often consisted of calorically dense, carbohydrate and fat-rich foods to fuel farm workers after a long day in the fields. With the transition towards sedentary lifestyles and jobs, these calorically dense foods may not match the energy expenditure of modern workers (44). Mentioned facilitators to healthy eating were growing food or raising animals at home and using farmers' markets (44).

Rural food deserts are defined differently, requiring a 10-mile distance from a grocery store to be considered compared to the urban counterpart of 1 mile (54). The importance of adequate transportation for food security cannot be understated (13). Residents in the Mississippi Delta reported an average travel distance of 8-15 miles, but some went up to 60 miles. Many respondents reported using either family or friends or paying for a ride to obtain groceries (32). The inaccessibility to outdoor recreation and gym facilities is unique to rural communities. Residents must choose between exercise and dangerous situations, such as crossing a highway. Public transportation and sidewalks in the southern US are lacking in comparison to their urban counterparts (55). Gyms may be hard to find in rural areas, and the high temperature and humidity make outdoor exercise difficult (55).

1.5 Corner Stores

Corner stores serve as a nutritional source when a supermarket is not in close proximity or easily accessible. Respondents in New Orleans shopped at their local corner stores about

twelve times per month and walked to them. Over 40% used corner stores more often than supermarkets, often due to walkability and difficulty finding transportation (3). Researchers evaluated 108 corner stores in Baltimore, Philadelphia, Oakland, and Minneapolis of twenty-eight foods similar to Gittelsohn's Baltimore checklist. While there was huge variability between stores, only 50% had fresh fruit and vegetables, and 32% had skim milk (27). Another study analyzed the shelf space in 419 Los Angeles and New Orleans corner stores and found that between 5-10% of corner stores sold fresh fruit and vegetables. They suggested increasing the quality of food sold at existing stores (9).

Corner stores in New Orleans had a similar food environment: candy, snacks, beverages, and takeout were the most popular items, and only 3% of respondents purchased fruits while none purchased vegetables (3). Despite this and store owner perceptions, it did find that customers had a high demand for healthy items. Most said they would buy items like fruits and vegetables if they were available, and more customers preferred options like tomatoes, green beans, and oranges over hamburgers and potato chips (3). While most store owners were receptive to changes, interventions may not be profitable, as shelf space would be taken from high selling products like alcohol, tobacco, and snacks (3)

A few studies have investigated the Mississippi food environment, albeit not at a corner store specific level. One looked at yogurt availability, a generally healthy food, using NEMS-CS. It found that while 89% of supermarkets and 57% of grocery stores carried yogurt, 16% of corner stores had it (28). As of March 2020, a new measurement of the Mississippi Delta corner store food environment has come out. The Delta Food Outlets Survey was conducted in response to the results of the Delta Healthy Sprouts Project, which observed poor maternal dietary intakes.

It compared grocery stores, convenience stores, full-service restaurants, and fast-food restaurants to fully describe the Mississippi Delta food environment using NEMS-S, NEMS-CS, and NEMS-R. Grocery stores were ranked as the Mississippi Delta's healthiest nutrition environment at 54%, which is a failing score. They also were highest for item price and availability at 65% compared to convenience store's 30%. Out of eighty-six studied convenience stores, eight carried fresh produce (58).

Researchers classified the types of food available in the Mississippi Delta stores. Specifically, they sought out 38 core food basket items proposed by the Delta Nutrition Intervention Research Initiative (NIRI). These foods support both a healthful diet and are commonly used in the region. Categories included fruits and vegetables, bread and grains, meats, dairy, and baking, sweets, or fats (32). Thirty-two percent of these items were present in Mississippi Delta convenience stores. Less than 4% sold fruits and vegetables, 6% sold whole wheat bread, 18-36% sold cereal and/or high-fiber cereal, and less than 50% sold low-fat milk (32). Even if healthy food is available to rural residents, there can be additional barriers such as lack of transportation and poverty that limit their access to it. Yet, in areas lacking grocery stores, residents turn to convenience stores for nutrition, many of which do not stock foods to support proper nutrition and overall health.

1.6 Mississippi Delta Community Perceptions

Mississippi Delta residents face barriers to their overall health and nutrition. Barriers to community shopping were high prices and a lack of fresh fruits and vegetables (32) Time constraints are also a direct barrier, and the poor food environment had an indirect negative effect on diet (31). Like similar rural communities, participants discussed the long distance needed to

travel to a full-service grocery store and the lack of transportation options, sometimes bartering food for a ride (31). The food environment also had a weak negative effect on their physical and mental health (31). Mississippi Delta community members described their idea of a nutritious diet and mentioned a positive family influence on eating habits. Yet, healthy foods were tied to high prices, and participants discussed high prices and low income as barriers to a nutritious diet (32).

A study conducted by focus groups with sixty-four residents of the Mississippi Delta identified nine key barriers to healthcare: poverty, rurality, insurance restrictions, medical guidelines, racism, fear, low emphasis on disease prevention, gender, and medical distrust. All members of the group cited lack of insurance or underinsurance and transportation difficulties as structural barriers to care (6). The group also identified a focus on short-term stressors rather than long term health, citing familial care concerns as a reason to continue working if ill or avoid treatment. There are also deeper, interpersonal barriers. Men in the focus group perceived preventative care as feminine, while the community as a whole did not seek preventative care until old age or a health concern arose. Lastly, the vast health disparities of the majority African-American community throughout history and continuing today in the modern healthcare arena foster fear, distrust, and apprehension at receiving both preventative and acute care (6). The barriers to care in the Mississippi Delta are not causative of the food insecurity or inaccessibility of healthy food; yet, they compound the health equity barriers that Mississippi Delta residents face. Medical care, especially preventative, can improve personal and community health.

1.7 Store Owner Perceptions and SNAP

Store owner perceptions help understand barriers and facilitators to healthy food. Thirty-two rural store owners from six states gave their perceptions of stocking nutritious foods, specifically in regards to the Supplemental Nutrition Assistance Program (SNAP). To become SNAP-eligible retailers, stores must meet the following criteria: a constant stock of three stocking units of three varieties for each staple food (fruits or vegetables, dairy products, meat, poultry, or fish, and bread or cereals) and over 50% of sales from staple foods (59). However, typically ineligible stores can also become SNAP authorized if they are in an area with limited access for SNAP recipients (59). Owners struggle to follow SNAP rules like stocking 3 of 4 perishable staple food groups, increasing the number of low selling products, and including prepared foods in SNAP benefits. Owners also cited struggles in implementation such as supply chain management, storage space, and proper equipment, like a refrigerator or freezer for perishable foods (19). The barriers to implementing SNAP benefits and stocking healthier foods, such as perishable fruits and vegetables, among corner stores are a barrier to nutrition in rural areas.

Store owners also supplied potential facilitators to implement SNAP and stocking fresh foods. A common suggestion was price discounts to sell on par with supermarkets. Yet, owners also acknowledged that price discounts would be difficult to get. Additional suggestions included USDA support, promotional materials and training, and flexibility for rural corner stores in regards to SNAP rules. Store owners also shared their opinions on SNAP customer demands. Some commented about the unhealthy food purchases of SNAP recipients, while others mentioned an apparent lack of demand for healthy staple items among SNAP customers (19).

For rural residents reliant on SNAP, there can be more barriers than food affordability. The availability of fresh, healthy foods is also bottlenecked on the producer side, that is, of rural store owners. Both the current barriers to stocking and perceptions of SNAP recipients increase the difficulty for rural residents, specifically those with SNAP benefits, to receive proper nutrition.

In addition to SNAP, store owners also recognize a barrier of low supplier availability of healthy foods. An analysis of store owner perceptions of product availability within SNAP authorized stores found that generally store owners struggled to stock healthy items. 46% of respondents bought their fruits and/or vegetables at other retail stores (23). Store owners who live in rural areas and experience similar transportation barriers as their customers are faced with a difficult decision to stock products at the opportunity cost of price or distance with a risk of not selling it.

Not only did owners have physical barriers, but respondents' answers validated perceived barriers to food education. Store owners often listed foods they considered healthy that did not meet dietary guidelines standards; for example, dairy, wheat, and meat products did not meet low-fat, 100% whole grain, and lean classification, respectively (23). Respondents did not classify available products as healthy offerings: whole grain bread, low sugar cereal, oatmeal, low-fat cheese, peanut butter, sunflower seeds, frozen broccoli, corn, ground turkey, frozen shrimp, frozen salmon, sardines, and low sodium turkey and ham luncheon meats' (23). Positive food choices found in stores were also not included, like eggs, fruits and vegetables, chicken, and tuna (23). Another study asked owners to free list healthy foods; 42% and 47% of owners listed fruits and vegetables, but only 15% and 20% stocked each in store, respectively (17).

Storeowners' nutrition education can create a barrier for stocking, advertising, and consumer spending on healthy products, even when SNAP is available.

Before launching one of the first corner store intervention programs in Baltimore, a team investigated the barriers and facilitators of potential stores in stocking certain foods. Store owners said that the importance of taste and customer demands dictated what they stocked. They also discussed their clients' awareness of price changes, even when they shifted by a few cents. Owners perceived that shoppers seemed to have little to no interest in their health from their external interactions seeing many obese shoppers. Lastly, they recognized a supply chain management struggle, with wholesale prices controlling what they bought and healthier items, like low-sodium foods, often being unavailable or out of stock (25).

Owners also offered potential solutions. Some thought that their relationships with regular consumers could influence their purchasing decisions, while others believed that consumers used convenience stores for quick purchases, not their overall diet. They also believed in community service and overall wellbeing; some created delis with fresh vegetables, while others donated food and drinks to church or community events. All agreed that the promotion of healthier eating and products in-store could contribute to health education and long-term retention of more nutritious eating patterns (25). Store owners are aware of the challenges they face in stocking, but many are willing to change to improve their community's nutrition. Store owners face barriers of price, demand, and education for both making a profit and providing nutritious options for consumers.

There are other barriers to stocking nutritious food. Delocalization of management is a barrier, as local owners put in community-specific requests that may not be implemented by

corporate leaders (17). Owners are also aware of unhealthy snacks but keep them because of their high profits, compared to healthier choices that are more expensive and sell less. In the same study, some mentioned that children buy many of the unhealthy snacks, with parents too burdened by time and finances to worry about their unhealthy snack consumption or nutrition education. Community factors such as shoplifting, loitering, on-site prostitution, and drug trafficking increase store owner's expenses and decrease profits by turning other customers away (17).

1.8 Current Mississippi Delta Initiatives

While rooted in agriculture, residents in the Mississippi Delta often face insurmountable barriers to adequate nutrition. Currently, there is a focus on fostering community resilience and bringing resources that create long term sustainability. Community resilience is a key for communities to cope, utilize resources, and make positive change. The Bolivar County Good Food Revolution has taken a multifaceted approach to address food insecurity. The Delta Fresh Food Initiative brought together a team to investigate the food system of Bolivar County and neighboring communities. It began with recruiting twenty-three youth in community research data collection and certifying them as Good Food Youth Ambassadors (GFYAs). They used the Ohio State *Mapping the Food Environment* and USDA Food Security Survey Module to assess food insecurity and access in the region. Additionally, researchers and the GFYAs met with community stakeholders to identify needs and solutions. Eighty-nine percent of survey respondents desired a mobile market, 69% wanted food grown without chemicals, and 84% found it important to source locally grown food. While the previously recorded food insecurity is 29.5%, 43% of respondents reported food insecurity (22).

Once the needs were assessed, the team focused on local farms. The Alcorn Demonstration Farm in Mount Bayou increased production and began a youth farming initiative. The program began the North Bolivar County Farm to Table program in March 2018 to bring community members together and discuss the project, which included an announcement of a new mobile market that was piloted in June 2018. Eight community cooking classes were held during the 2018 summer. Overall, the usage of the mobile market decreased as the season progressed; community members met in October 2018 to address the usage of SNAP/EBT at the mobile market (22). The impact of the DFFI was positive, but it emphasizes the need for long-term investment into building sustainable food sources for the Mississippi Delta. Decreasing food insecurity in the region will take considerable time and community effort; yet, the collaboration and resilience that began in the DFFI are foundational components of growing a healthier Mississippi.

The work of the Dow Fellows out of the University of Michigan highlights the continued challenges that initiatives face. Their work addresses systemic inequalities and fights to create a place of racial diversity and equality. Fellows identified a perceived barrier from West Tallahatchie community members: “the black community does not feel comfortable” shopping at a farmer’s market run by white women. Additional barriers include the many burdens of poverty, which take time away from creating community engagement programs, and the exportation of homegrown Delta crops (46). Community efforts are present in the Delta, but more work is needed to improve the food security of Mississippi Delta residents.

Study Purpose

The corner store intervention takes root in urban Baltimore, where Johns Hopkins researchers have worked to establish a precedent for how to promote healthy foods and store owner attitudes in small retailers. It may improve access to a nutritious diet in rural corner stores and modify existing barriers that contribute to obesogenic food environments. This is an emerging intervention protocol, and the small amount of current literature has tested the process and calls for more work towards crafting a working model to serve corner stores globally. Baltimore Health Stores, a nutritional intervention program, provided financial incentives, educational materials, cultural training, and guidelines on food stocking for nine East Baltimore stores. The program resulted in increases in stocking and sales of promoted foods, but no change in store owner efficacy over the ten months (50). This thesis is modeled after methods used in BHCK research, and the store impact questionnaire was adapted with permission from the authors to fit the needs of rural Mississippi. The data collected represents baseline data for rural corner stores that are not yet involved in any intervention program. The purpose of this study was to assess healthy food availability and collect owner perceptions within northwest Mississippi corner stores for a possible intervention to improve nutritious food access.

CHAPTER 2: METHODS

2.1 Recruitment and Participation

The target population was residents of the Mississippi Delta, specifically in Quitman County, Mississippi. There were not enough willing food sources in the county seat of Marks. The area has few retailers, and many of the existing retailers are national chains that declined to participate. Therefore, we expanded into Panola and Lafayette counties. Participants were recruited in person. Inclusion criteria included that participants were over age 18 and spent a significant amount of time at their store. Participants must be well versed on store operations, specifically sales estimates, the buying process, and suppliers. Interviews were scheduled based on participant availability. Each interview was anonymous; personal information was collected solely for incentive purposes and removed from coded interviews. Numbers were used instead of names to maintain owner and store anonymity. Participants were given a $30 Amazon gift card for their time. Interviews were performed in-store and lasted 30-60 minutes. This study was approved by the University of Mississippi Institutional Review Board (Protocol #20x-276).

2.2 Procedure

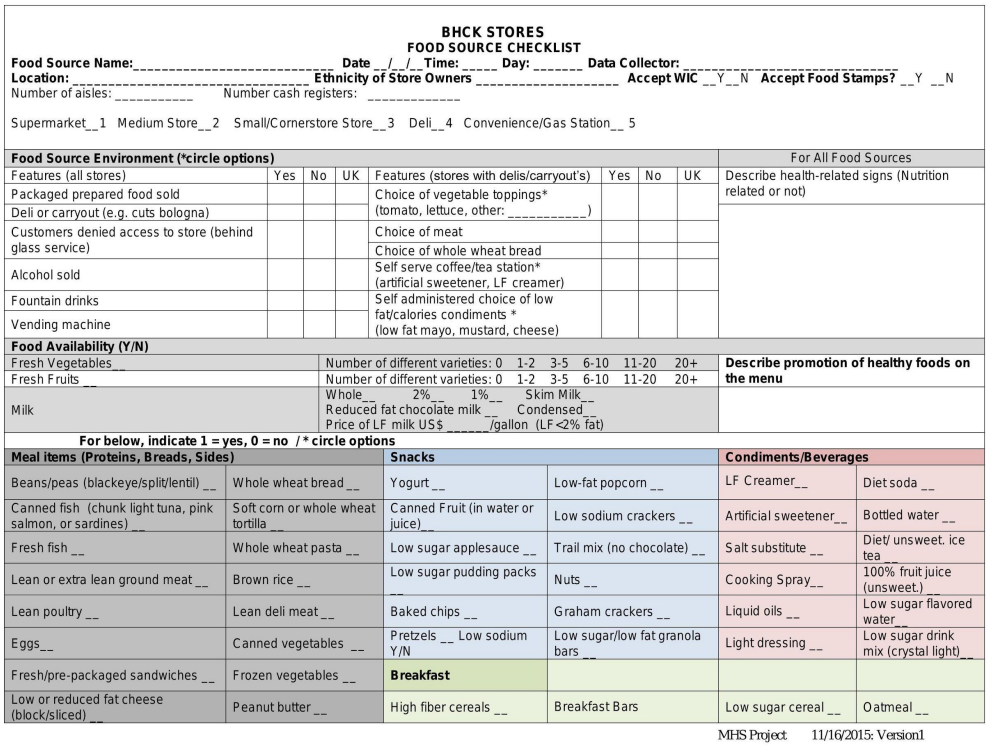
A variety of tools have been used to assess store offerings: NEMS-S-Rev, behavioral analysis, personal interviews, surveys, and focus groups. None of the current interventions had taken place in the Mississippi Delta, so choosing an instrument to best fit the region took the analysis of current tools and best judgment and revisions to fit the regional needs.

We chose a tool that could incorporate both store owner and manager feedback and an objective audit of the food environment. The questionnaire does both and could spur positive change. With permission from Dr. Gittelsohn, the B'More Healthy Community for Kids Store

Impact Questionnaire (BHCK) from the Maryland Healthy Stores project was adapted for this study (50). The integrity of the baseline evaluation was maintained by keeping sections about the business, stocking, and sales of promoted foods, outcome expectation of promoted food sales, and self-efficacy of stocking foods. It was important to maintain these to understand perceptions before a potential intervention. However, the questionnaire was created to also understand post-intervention perceptions. Because this had not been done in the region yet, these sections were removed from the adapted questionnaire. Removed sections were "Outcome Expectations: Impact of BHCK", "Intentions to Sustain BHCK promotions," and "Training Relation Knowledge." The latter referred to business training that did not pertain to the project. Psychosocial metrics were recorded on the same Likert scale used in the Baltimore study but only descriptive statistics were used (50).

The other portion of the BHCK project was the food source checklist. This evaluates the food source environment, meal items, comments about products, and general comments about the store. The food source environment detailed ways to get food, such as vending machines or delis, choices of food like toppings or vegetables, and available items, like alcohol or milk. The meal items were a list of proteins, bread, and sides. If the store had the item, it received a 1. If it did not, it received a 0. Scores were compared among stores to obtain a general overview of the meal item availability in target stores. Lastly, the comments section observed the condition and

quality of produce, refrigerator storage, cleanliness, and shelf space.



BHCK STORES
FOOD SOURCE CHECKLIST

Food Source Name:_____ **Date** __/__/__ **Time:** _____ **Day:** _____ **Data Collector:** _____
Location: _____ **Ethnicity of Store Owners** _____ **Accept WIC** __Y __N **Accept Food Stamps?** __Y __N
Number of aisles: _____ Number cash registers: _____

Supermarket__1 Medium Store__2 Small/Cornerstore Store__3 Deli__4 Convenience/Gas Station__ 5

Food Source Environment (*circle options)								For All Food Sources
Features (all stores)	Yes	No	UK	Features (stores with delis/carryout's)	Yes	No	UK	Describe health-related signs (Nutrition related or not)
Packaged prepared food sold				Choice of vegetable toppings* (tomato, lettuce, other: _____)				
Deli or carryout (e.g. cuts bologna)								
Customers denied access to store (behind glass service)				Choice of meat				
				Choice of whole wheat bread				
Alcohol sold				Self serve coffee/tea station* (artificial sweetener, LF creamer)				
Fountain drinks				Self administered choice of low fat/calories condiments * (low fat mayo, mustard, cheese)				
Vending machine								

Food Availability (Y/N)		
Fresh Vegetables__	Number of different varieties: 0 1-2 3-5 6-10 11-20 20+	**Describe promotion of healthy foods on the menu**
Fresh Fruits __	Number of different varieties: 0 1-2 3-5 6-10 11-20 20+	
Milk	Whole__ 2%__ 1%__ Skim Milk__ Reduced fat chocolate milk __ Condensed__ Price of LF milk US$ _____/gallon (LF <2% fat)	

For below, indicate 1 = yes, 0 = no /* circle options

Meal items (Proteins, Breads, Sides)		**Snacks**		**Condiments/Beverages**	
Beans/peas (blackeye/split/lentil) __	Whole wheat bread __	Yogurt __	Low-fat popcorn __	LF Creamer__	Diet soda __
Canned fish (chunk light tuna, pink salmon, or sardines) __	Soft corn or whole wheat tortilla __	Canned Fruit (in water or juice)__	Low sodium crackers __	Artificial sweetener__	Bottled water __
Fresh fish __	Whole wheat pasta __	Low sugar applesauce __	Trail mix (no chocolate) __	Salt substitute __	Diet/ unsweet. ice tea __
Lean or extra lean ground meat __	Brown rice __	Low sugar pudding packs __	Nuts __	Cooking Spray__	100% fruit juice (unsweet.) __
Lean poultry __	Lean deli meat __	Baked chips __	Graham crackers __	Liquid oils __	Low sugar flavored water__
Eggs__	Canned vegetables __	Pretzels __ Low sodium Y/N	Low sugar/low fat granola bars __	Light dressing __	Low sugar drink mix (crystal light)__
Fresh/pre-packaged sandwiches __	Frozen vegetables __	**Breakfast**			
Low or reduced fat cheese (block/sliced) __	Peanut butter __	High fiber cereals __	Breakfast Bars	Low sugar cereal __	Oatmeal __

MHS Project 11/16/2015: Version1

Figure 1: B'more Healthy Communities for Kids Food Source Checklist

The creation of this framework aimed to change perceptions and nutrition knowledge within stores to increase overall healthy food sales. The foods listed on the BHCK were chosen through community involvement; the team asked members of unhealthy foods with high sugar, fat, or calories and then healthier alternatives (50). No regional Baltimore foods were included in the list. Likewise, no additional Mississippi regional foods were added to the list to maintain the integrity of the original survey. Involvement of Mississippi Delta stakeholders in future investigation could identify regional unhealthy foods that are not included in this study.

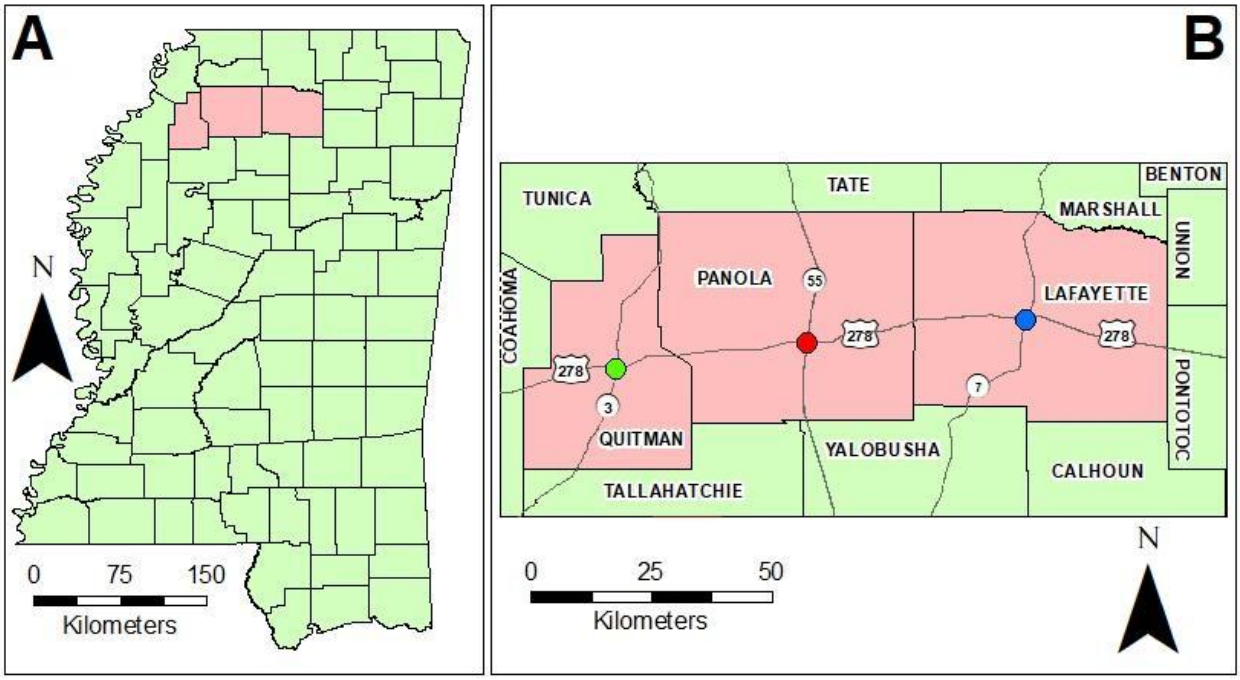


Figure 2 Map of Survey Region. Towns include Marks (green), Batesville (red) and Oxford (blue).

Two interviewers conducted each session: the primary investigator, and a trained graduate student. Interviews took place in stores and were recorded. Most took place at the register or in a dining area, while some occurred in a break room. Participants often preferred to fill out the stocking questionnaire themselves. Investigators assisted them with an explanation of any questions they did not clearly understand. After the interview, stores were audited. Select nutritious foods were recorded: zero if not present and one if present using the food source checklist (50). Stores were also examined for any promotional materials on healthy foods and general upkeep of the store. The freshness of perishable foods was evaluated if they were present. The interviews were transcribed.

2.3 Data Analysis

Store owner/manager perceptions were analyzed descriptively and include anecdotes given in the interviews. Qualitative feedback was compared to see similarities and differences in owner stocking perceptions. The food source checklist quantified the availability of thirty-eight food staples used in Song et al (2009) (49).

CHAPTER 3: RESULTS

The survey was used to evaluate current selections of and barriers to nutritious foods offered within rural Mississippi stores. There were a total of seven store owners/managers interviewed for this study. Of the seven respondents, six were white and one was black. Most stores did not accept the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) or SNAP. Owners and managers were asked about store patrons and their rules. The busiest times were lunch or in the late evening, depending on the day. Most stores also had one or more additional names that community members used. The most frequent shopper was middle aged followed by older adults. One store had rules for children in the store: no backpacks. All stated they had either a very good or an excellent community presence. Store owners were asked how they selected the types and quantities of food they stocked, where most mentioned that customer demand and space were the largest drivers. Customer demand and price were ranked highest for the quantities of food. The most frequent suppliers were Sysco, Coke, Budweiser, Frito Lay, and Pepsi. Some discussed purchasing products from local stores such as other convenience stores, or large retailers like Walmart, or Piggly Wiggly. Owners/managers mentioned customer requests (6), item sales (3), price (3), promotion (2), shelf life (2), and space (5) as primary drivers of food quantity selection. Of those, space was cited as the top priority (out of three). When asked about how they selected the number of foods, owners/managers

discussed customer requests (6), item sales (4), price (3), profit (1), promotion (1), refrigerator space (2), space (3), and supplier availability (1). Customer requests and space were designated as a top priority (out of three) for two respondents each.

The revised BHCK survey included questions about stocking particular items (50). Some store owners/managers were unsure if products would sell well in their stores, such as brand name items or nice foods. Some did not think that certain foods would sell well in their store, including fresh fruit, fruit in light syrup, canned fruit in 100% fruit juice, low-fat block cheese, low-fat string cheese, low sugar cereal, frozen vegetables, low sodium canned vegetables, low sodium beans, whole-wheat pasta, brown rice, cooking spray, and low-fat butter. Additionally, store owners/managers were asked about their capability to regularly stock certain products. Some thought sugar free drink mix and low-fat butter were difficult to stock. A few mentioned the following items as difficult to stock: low sugar fruit drinks, 25% lower sugar Capri Suns, Capri Suns Roarin Waters, fresh fruit, baked chips, low-fat microwaveable popcorn, low fat bagged popcorn, low sugar cereal, low sodium beans, whole grain tortillas, and brown rice. No stores had trouble stocking soda, water, fruit juice, nuts and seeds, and lean lunch meat. However, the lean lunch meat was incorporated into the deli service of meals rather than stocked for individual sale for some stores.

Psychosocial metrics were recorded on the same Likert scale as Song et. al used in the Baltimore study. Their baseline and post-intervention self-efficacy, knowledge, and outcome expectations were not statistically significant (50). This thesis conducted a baseline assessment for twenty-three foods (Appendix A). These can contribute to a healthy, well-balanced diet. The majority of stores did not sell brown rice. Most stores did not stock the following items:

sugar-free drink mix, low sugar fruit drinks, Capri Sun Roarin Waters, canned fruit in light syrup, low-fat yogurt, low-fat block cheese, low-fat string cheese, low sugar cereal, low sodium canned vegetables, low sodium beans, whole wheat pasta, cooking spray, and lean lunch meat. Some stores also did not stock: 25% lower sugar Capri Suns, fresh fruit, raisins, applesauce, fruit cups, canned fruit in 100% fruit juice, low-fat low sugar granola bars, low-fat microwaveable popcorn, low fat bagged popcorn, low sugar low-fat yogurt, frozen vegetables, fresh vegetables, 1% or skim milk, 100% whole wheat bread, and whole-grain tortillas. Most stores had less than 50% of the food source checklist items available. [1]

Store owners also face difficulty in stocking certain products. They responded to the statement, "I can stock X in my store." This referred to various challenges they may face in product availability, from vendors to regional limitations to storage issues. Some disagreed that they could stock sugar-free drink mix, frozen vegetables, or low sodium canned vegetables. A few disagreed for low sugar fruit drinks, 25% lower sugar Capri Suns, Capri Sun Roarin Waters, fresh fruit, baked chips, low-fat microwaveable popcorn, low fat bagged popcorn, low sugar cereal, low sodium beans, fresh vegetables, 1% or skim milk, whole grain tortillas, and brown rice. When asked the question, one store owner responded, "For the most part, you can get everything. But it doesn't make life easier, huh?" One store, the largest in the study, answered "Agree" or "Strongly agree" to stocking efficacy for every listed food. However, the owner did clarify: "Some of those it's a little hard because we got 47-48,000 skews in store. When I strongly agree, it's relative to my thoughts. Someone else may come in and say oh we don't have enough shelf space for this and that."

[1] See appendix for graph of individual product unavailability

One item that consistently was not frequently purchased and/or stocked was sugar-free water and drinks. Most stores lacked sugar-free drinks other than diet soda. A respondent said the following in regards to sugar content in his store; “I never really focus on the sugar amount. Mostly the vendors do that for us. They say you need this and that...These are tough questions for me. I don’t know.” At a nearby store, the owner offered researchers a zero-sweetener flavored water, casually stating that none had sold and that he would soon clear space for other products. Yet another vendor said in regards to sugar-free flavored water, “That wasn’t doing too good when I sold it.”

Chapter 4: Discussion

Corner stores are critical sources of nutrition in rural communities. This project describes some of the rural corner store food environment and could be the starting point for an intervention like in Baltimore (50). Most stores did not accept WIC or SNAP. This is surprising considering that at least 20% of the population in each county in the study were food insecure (22). This could be a barrier for low-income Mississippians to purchase healthy food, even in stores where it is available. Some stores did not accept SNAP according to the interviewees, but were listed as SNAP-authorized retailers by the Mississippi Department of Human Services as of January 2021 (60). A possible explanation for responses, other than being recently certified, is the USDA approval of SNAP benefit usage online. Prior to July, only Walmart and Amazon had been authorized (60). This is unlikely for small corner stores, but the event could have led to ambiguity in the question and/or response. Mississippi is transitioning to electronic food benefits, and one participant mentioned a delay in the transition. Stores in target counties will begin full use as early as January 2021, but most will not be implemented until late spring. In fall 2020,

thirteen WIC centers closed throughout the state, leaving participants in a difficult situation in the months between (20).

The ethnic demographic of owners does not mirror the counties'. Of the 524 firms owned in Quitman County, 50.7% are owned by minorities compared to the 74% countywide population of minorities (62). Panola County's demographics are nearly 50% African-American, yet only twelve of its 591 businesses are listed as minority owned according to the Mississippi Minority Business registration (37). Of the 4,197 firms in Lafayette county, 843 are minority-owned, which is 20.8% compared to about 25% minority population (61). There could be a disconnect in the specific needs of the largely black community with mainly white store owners. While some managers mentioned being from the community, they mentioned owners that lived in and/or traveled from the Memphis area. This geographic divide creates further separation between community needs and store supply if managers' purchasing decisions do not align with the goals of the owners. One way to improve the efficacy of programmatic interventions is to include storeowners in a culturally appropriate manner. Methods such as using a Korean doctoral student and working with the Korean American chapter in Baltimore to recruit helped provide store-specific measures to improve the efficacy of intervention programs (50). In the Mississippi Delta, employing students and government and working with associations like the Mississippi Retail and Grocers Association could improve the efficacy of potential intervention. Interventions can work with community members to increase community investment in the project and long-term outcomes.

Most store owners had operated for at least four years within the target counties, consistently interacted with their customer bases, and observed their purchasing habits. The

long-term relationships and community involvement could be a foundation of trust that would improve the efficacy of an intervention. Providing and encouraging health options at these high-traffic corner stores may help improve lifestyle behaviors and prevent chronic disease. Intervening with this group could prevent or lessen the chance of further health complications in old age. Upon responses and observation, all respondents had a strong relationship with community members; every store had an official name as well as a community known, "slang" name. The sources of food are an integral part of a community. Store owners knew their customers, often by name, and could describe the most popular and wanted items. Most had control over what foods were stocked.

Most stores prioritized customer demand in stocking and cited shelving or storage as a deciding factor in what they stock. Considering the small size of most stores, this may be a limiting factor for stocking perishable goods or more healthy foods. Some owners discussed price; with the high price of fresh fruits and vegetables, it is difficult for owners to consistently stock these foods. In order to turn a profit, they have to mark up fruits and vegetables. Price, demand, supplier availability, and proper stocking are commonly noted barriers in other pre-interventions (23,25).

Government benefits that would enable purchasers to purchase healthier foods do not apply if they are not SNAP-authorized. Additionally, stores that are not SNAP-authorized are unable to serve many food-insecure customers. A program like Double Up that matches SNAP/EBT for fruits and vegetables in farmers markets could incentivize consumers to purchase more fruits and vegetables in corner stores (14). At farmers' markets, SNAP recipients had an increased fruit and vegetable amount and type at home and reported the double bucks program as

very important in their food purchasing habits (10). Not only were fruit and vegetable purchases up, but SNAP recipients spent more on other market foods, like meat, eggs, and dairy (10). A similar corner store program could lower barriers for SNAP recipients and increase overall sales and traffic within stores. This would be mutually beneficial to store owners/managers and could provide enough of a profit margin to consistently stock fruits and vegetables.

Furthermore, space is a barrier to stocking a sufficient quantity of healthy foods. Even if customer demand was increased via education and promotion, store owners would struggle to stock the proper quantity to meet community needs. A grant or intervention giving additional shelving and refrigeration, as well as education on better store layouts, would encourage regular availability of an increased quantity of healthy foods. Accessibility to food both in stocking and display could be improved. Some store owners expressed going to other larger stores for healthier foods like fruits and vegetables because their primary supplier did not sell them, which is more expensive and time-consuming for owners/managers. Suppliers may be a barrier to stocking, especially in areas where bigger stores are over 20 miles away. In store, consumers face layout and accessibility barriers. In urban corner stores, stores averaged a 4.5 out of 8 on a layout openness score (49). Seventy-seven percent of stores had counters with Plexiglas barriers, 38.5% had limited entry into the store, and 30.8% did not display food or drinks prior to purchase (49). Creating a more open environment and layout during an intervention could improve accessibility of more nutritious options.

The store questionnaire and surveys detailed an environment lacking many foods that contribute to a nutritious diet. Store owners provided comments that hint to why such a lack exists. In regards to whole wheat pasta, one respondent said, “I don't know anybody that would

eat this." Purchases of healthier alternatives are multifaceted, but food insecurity is a component. According to a 2018 Food and Health survey, 50% of respondents purchased a less healthy food or drink because they did not have enough money for the more expensive, healthier option (24). Additionally, the top drivers of food purchases were taste, price, familiarity, and access (24). Other store owners did not believe healthier alternatives would sell well in their store. Although the reasons are unclear, the demand and customer preference for certain nutritious foods is not there. For stores that cited customer demand as a key driver for the types and quantity of foods stocked, it makes sense not to stock products that sell poorly.

Anecdotally, fruit-flavored drinks were sold at a higher volume than zero-sweetener flavored water. One store sold at least fifty a day and up to seven hundred per week in a rural area. Among SNAP recipient adults, sugar sweetened beverages (SSBs) made up 12% of daily calories consumed compared to SNAP eligible nonparticipants (9%) and SNAP ineligible nonparticipants (6%) (35). SSB consumption has been found to be 60% higher in rural areas with health disparities, of which 36% were food-insecure (8). Some of these had up to 200 calories per bottle and 50g of sugar, but consumers may consider them an alternative to water. Students were 9% more likely to consider daily consumption of fruit-flavored drinks as healthy and 67% less likely to associate SSBs with an increased risk of diabetes compared to soda (43). From both the survey and owner feedback, some products are not stocked because customer preference and demand for them does not exist, whether or not they contribute to a healthy diet. Stores must stock based on supply and demand. Addition of promotional material and health education for SSB alternatives could increase consumer demand and decrease potential adverse health effects of daily SSB consumption.

A meta-analysis on nonnutritive sweeteners found that while their use in diet soda has been associated with observational poor health outcomes, they have been effective in weight loss and/or management trials, reducing sugar and overall caloric intake (57). Diet soda had no observed association to increased prediabetes risk, compared to a 46% increase of prediabetes in participants who consumed SSB's more than 3 times per week (30). While generalizable results are hard to come by, a few human studies observed that replacing SSBs with artificially sweetened beverages lessened weight gain over time (38). Since all stores were able to stock soda, water, fruit juice, nuts and seeds, and lean lunch meat, SSB alternatives could be a start for promoting healthy foods. Nuts/seeds and lean lunch meat would also be viable candidates. Using the existing infrastructure and taking small steps towards change could set the groundwork for potential future interventions that will not pose barriers to store owners and managers.

The overall food environment lacks adequate amounts and types of food and drink for a well-balanced diet. Both the low abundance of nutritious food and the high abundance of unhealthy food are present within the Mississippi Delta's often most accessible food source: corner stores. Stores face numerous barriers to nutrition, including proper storage/shelving/refrigeration, low customer demand, high prices, and inconsistent supplier availability. A corner store intervention that addresses physical and social barriers to nutrition may be effective in improving both customers' nutrition and store owner efficacy in providing healthy foods to their communities. Echoing the sentiments of Thomson et al, efforts to improve behaviors and nutrition education of people within the Mississippi Delta may not be effective if the food environment is suboptimal, either with no supermarkets, failing grade supermarkets, or failing grade convenience stores (58). This work supports that convenience stores do lack certain

foods and should be considered a key element in improving the diets and health of Mississippi Delta residents.

Past corner store interventions have shown promising results in changing the food environment within corner stores. A Philadelphia intervention observed an increased availability of low-fat milk, low-fat baked goods, and some fruits and vegetables. Yet, many of the nutritious foods had no significant increase. Researchers suggested long-term financial and educational investment to see sustained change. A strength of the study was working with a local food supplier, which coordinated proper foods, quantities, and prices for a corner store to stock (4). Most of the Mississippi Delta stores used the same national suppliers. Despite the minimal changes in stocking in Philadelphia, working with local Mississippi food suppliers provides a viable option for improving healthy food accessibility. A long term partnership with local suppliers, perhaps fueled by grants or subsidies, could lower the barrier for Mississippi Delta convenience stores to stock healthy foods.

The methods have been piloted in most urban locations. One of these was the Maryland Healthy Stores project, which provided 4 months of increased healthy foods and promotion in 8 rural corner stores. The purpose was to observe both the change in resources and perceptions on consumer purchasing. Stores designated as intervention stores showed an increase in stocking fruits and vegetables, whole wheat bread, low-fat milk, cooking spray, and canned fruit in comparison to the start and other non-intervention stores that only increased fresh fruit and cooking spray (51). This trial was one of the first to make direct changes in corner stores, the existing structure for food and drink in many rural areas. Items like fruit and vegetables, whole wheat bread, low-fat milk, cooking spray, and canned fruit were all absent in some Mississippi

Delta corner stores. Increased quantities and promotion of these and other nutritious foods may improve Mississippi Delta stocking as well.

Another intervention was run in the Marshall Islands because of its high chronic disease prevalence and reliance on corner stores. Residents were surveyed on topics like diabetes knowledge, cooking and purchasing habits, self-efficacy, and internal and external exposure through stores and media. The intervention was the first that sought to change both thoughts and actions of consumers. It resulted in increased awareness of diabetes risk, improved label reading skills, and increased healthy food purchases (15). As one of the first studies to create a multifaceted approach to availability, education, and skills, the corner store intervention shows potential to lower the obesogenic environment and its associated risks. While this thesis does not capture customer perspectives, its target region also has high chronic disease prevalence and utilization of corner stores. Further research exploring the impact of corner store customer intervention is needed but may provide another method of improving Mississippi Delta health and nutrition.

A meta-analysis was conducted of sixteen intervention trials that promoted stocking nutritious food and increasing product availability and promotion. The most impactful interventions included: advertising materials for healthy foods, community involvement, lowering prices with coupons or vouchers, and educating store owners. Most collected both qualitative and quantitative data, including pre and post-intervention evaluations and behavioral and psychosocial impacts. All saw an increase in choice, promoted healthy food availability and sales compared to baseline (16). Another meta-analysis found key themes of: working with existing stores, improving healthy food stock, and providing marketing and nutrition education

(26). Similar intervention in the Mississippi Delta could improve healthy food availability. Providing owners advertising materials, nutrition education, subsidies or grants, and coupons or vouchers may all support the continuous stocking of certain foods. Despite its infancy, corner store interventions may be a key player in improving the food environment of urban and rural communities alike. Its success comes through plans that address the health, economic, and social needs of customers. Using promotion, pricing, availability, and education will all contribute to healthier food choices.

Limitations

These results come with possible limitations including small sample size, restricted access to data, lack of consumer perspective, and the COVID-19 pandemic. There is a limited number of grocery stores and/or corner stores in the Mississippi Delta region included in this investigation. This required searches outside of the county, one of which is classified as a supermarket. Therefore, this respondent had answers that may not be indicative of the food availability in the Mississippi Delta. Additionally, the number of stores in the region declined to participate in the study. Of these, most were nationally owned chains, some of which may stock healthier items like fruits and vegetables. Because of their absence, the food environment may have not been fully evaluated.

A large contributing factor to the small sample size was the COVID-19 pandemic. Fieldwork began in January 2020 and was halted in early March 2020 to follow CDC regulations. It was in the best interest of both participants and researchers to maintain social distance and not endanger anyone in the research process. Participants were recruited using in-person outreach, so conducting virtual interviews was not a realistic option. Also, while the

corner store baseline and intervention are not a new concept, it has not been implemented in the Mississippi Delta prior.

A final limitation is the qualitative nature of the study. Researchers did not have access to quantitative sales and stock data. Additionally, there was no standard to which stocking numbers could be compared. Respondent bias may be present due to the subjective nature of questions. For those items that were available, there may have not been enough to meet community needs, but this metric was not captured.

Future research can improve the score of the study by increasing the sample size deeper into the Mississippi Delta in countries like Tallahatchie, Sunflower, and Bolivar counties, Mississippi. This would allow a more inclusive scope of corner stores and prevent large store data from skewing results. It could also provide qualitative measures to address proper levels of food availability, perhaps by adding a section to the revised BHCK survey and store questionnaire. A final consideration is an addition to address customer perspectives, as this seems to be a major factor in decision making on what to stock.

CONCLUSION

This thesis sought to identify potential barriers to nutrition through collecting store owner perceptions and food availability in Mississippi Delta stores. It investigated the nature of rural food environments and how they present additional barriers to food security and nutrition, which contributes to physical and mental health issues alike, most notably obesity and diabetes. The methodology captured the presence of healthy foods and store owner demographics, but further investigation proposed two new questions. First, a measure to scale the amount of available food, especially in proportion to the population, would be useful in determining the true food availability. Also, the documentation of unhealthy foods was not recorded quantitatively; a study that determines and documents the obesogenic nature of rural Mississippi Delta corner stores would provide further support for an intervention.

Overall, the findings suggest that some healthy foods are missing from Mississippi Delta corner stores. These foods are essential to supporting a nutritious diet, and without their presence, leave customers with limited options. Yet, the food environment is more complex than simply the absence of healthy foods. Store owners face multiple barriers to stocking foods, one of which is a lack of customer demand. Even with proper storage and distribution, the demand must exist for healthy foods to be present.

A corner store intervention would address the nutrition gaps in a few ways. First, it would provide funding for store owners to properly obtain, store, and display nutritious foods as well as make a profit. It would also provide educational materials for store owners and consumers alike, including displays to attract customer attention. Educational materials and community outreach could improve health and nutritional knowledge and, in turn, increase sales of healthy foods. It

may increase store owners' self-efficacy and perception of their stocking abilities and nutrition education. Most importantly, an intervention may provide the necessary food and nutrition education to properly feed all Mississippians and promote a healthy lifestyle. This impact is a short term investment into the long term health and wellbeing of Mississippi Delta residents for generations to come.

Further research in the area can provide more support for a corner store intervention in the Mississippi Delta. Access to computer records of store owners to assess sales, interviews of local customers, interviews with national food suppliers, investigation of SNAP policies, and further characterization of the unhealthy food environment are potential avenues to pursue. The current food environment is not as robust as it must be to adequately feed Mississippians. Corner store interventions are a route to improving healthy food accessibility, nutrition, and health in the Mississippi Delta.

REFERENCES

1. Agbrewer. (2020, April 16). *How Quitman Co. Residents Survive Without A Grocery Store*. http://feedingmississippi.thedmarchives.com/2020/04/16/how-quitman-co-residents-survive-without-a-grocery-store/.

2. Befort, C. A., Nazir, N., & Perri, M. G. (2012). Prevalence of obesity among adults from rural and urban areas of the United States: findings from NHANES (2005-2008). The Journal of rural health: official journal of the American Rural Health Association and the National Rural Health Care Association, 28(4), 392–397. https://doi.org/10.1111/j.1748-0361.2012.00411.x

3. Bodor, J. N., Ulmer, V. M., Dunaway, L. F., Farley, T. A., & Rose, D. (2010). The rationale behind small food store interventions in low-income urban neighborhoods: insights from New Orleans. *The Journal of nutrition*, *140*(6), 1185–1188. https://doi.org/10.3945/jn.109.113266

4. Cavanaugh, E., Green, S.L., Mallya, G., Tierney, A., Brensinger, C., & Glanz, K. (2014). Changes in food and beverage environments after an urban corner store intervention. Preventive medicine, 65, 7-12.

5. Champagne, C. M., Casey, P. H., Connell, C. L., Stuff, J. E., Gossett, J. M., Harsha, D. W., ... & Lower Mississippi Delta Nutrition Intervention Research Initiative. (2007). Poverty and food intake in rural America: diet quality is lower in food insecure adults in the Mississippi Delta. *Journal of the American Dietetic Association*, *107*(11), 1886-1894.

6. Connell, C. L., Wang, S. C., Crook, L., & Yadrick, K. (2019). Barriers to Healthcare Seeking and Provision Among African American Adults in the Rural Mississippi Delta Region: Community and Provider Perspectives. *Journal of community health*, *44*(4), 636–645. https://doi.org/10.1007/s10900-019-00620-1
7. Cooksey-Stowers, K., Schwartz, M. B., & Brownell, K. D. (2017). Food swamps predict obesity rates better than food deserts in the United States. *International journal of environmental research and public health*, *14*(11), 1366.
8. Davy, B. M., Zoellner, J. M., Waters, C. N., Bailey, A. N., & Hill, J. L. (2015). Associations among chronic disease status, participation in federal nutrition programs, food insecurity, and sugar-sweetened beverage and water intake among residents of a health-disparate region. *Journal of nutrition education and behavior*, *47*(3), 196-205.
9. Farley, T. A., Rice, J., Bodor, J. N., Cohen, D. A., Bluthenthal, R. N., & Rose, D. (2009). Measuring the food environment: shelf space of fruits, vegetables, and snack foods in stores. Journal of urban health: bulletin of the New York Academy of Medicine, 86(5), 672–682. https://doi.org/10.1007/s11524-009-9390-3
10. Farmer, J. R., Babb, A., Minard, S., & Veldman, M. (2019). Accessing local foods: Households using SNAP double bucks and financial incentives at a Midwestern farmers market. *Journal of Agriculture, Food Systems, and Community Development*, *8*(4), 153-178.
11. Fontenot, K., Singelmann, J., Slack, T., Siordia, C., Poston Jr, D. L., & Saenz, R. (2010). Understanding falling poverty in the poorest places: An examination of the experience of

the Texas Borderland and Lower Mississippi Delta, 1990–2000. *Journal of Poverty*, *14*(2), 216-236.

12. Gantner, L.A., Olson, C. M., Frongillo, E. A., & Wells, N. M. (2011). Prevalence of nontraditional food stores and distance to healthy foods in a rural food environment. *Journal of Hunger & Environmental Nutrition*, *6*(3), 279-293.
13. Garasky, S., Morton, L. W., & Greder, K. A. (2006). The effects of the local food environment and social support on rural food insecurity. *Journal of Hunger & Environmental Nutrition*, *1*(1), 83-103.
14. Get twice the fruits and veggies with double up FOOD Bucks: DUFB. (2021, January 21). Retrieved February 06, 2021, from https://doubleupamerica.org/#how_it_works
15. Gittelsohn, J., Dyckman, W., Frick, K. D., Boggs, M. K., Haberle, H., Alfred, J., ... & Palafox, N. (2007). A pilot food store intervention in the Republic of the Marshall Islands. *Pac Health Dialog*, *14*(2), 43-53.
16. Gittelsohn, J., Rowan, M., & Gadhoke, P. (2012). Interventions in small food stores to change the food environment, improve diet, and reduce risk of chronic disease. Preventing chronic disease, 9, E59.
17. Gravlee, C. C., Boston, P. Q., Mitchell, M. M., Schultz, A. F., & Betterley, C. (2014). Food store owners' and managers' perspectives on the food environment: an exploratory mixed-methods study. *BMC Public Health*, *14*(1), 1-14.
18. Gundersen, C., & Ziliak, J. P. (2015). Food Insecurity And Health Outcomes. *Health affairs (Project Hope)*, *34*(11), 1830–1839. https://doi.org/10.1377/hlthaff.2015.0645

19. Haynes-Maslow, L., Osborne, I., Pitts, S. J., Sitaker, M., Byker-Shanks, C., Leone, L., ... & Ammerman, A. (2018). Rural corner store owners' perceptions of stocking healthier foods in response to proposed SNAP retailer rule changes. *Food Policy*, *81*, 58-66.

20. Health, M. (2020, August 12). Transition to eWIC Card Continues: Making WIC More Convenient for Participants. Retrieved February 02, 2021, from http://www.msdh.state.ms.us/msdhsite/_static/23,22319,341.html

21. "History and Culture of the Mississippi Delta Region." *National Parks Service*, U.S. Department of the Interior, www.nps.gov/locations/lowermsdeltaregion/history-and-culture-of-the-mississippi-delta-region.htm.

22. Hossfeld, L. H., & Mendez, G. R. (2018). Looking For Food. Family & Community Health, 41(p), S7–S14. DOI: 10.1097/fch.0000000000000182

23. Houghtaling, B., Serrano, E., Dobson, L., Kraak, V. I., Harden, S. M., Davis, G. C., & Misyak, S. (2020). Perceptions of Rural SNAP-Authorized Food Store Owners and Managers About Healthy Product Availability. *Journal of nutrition education and behavior*, *52*(2), 171–179. https://doi.org/10.1016/j.jneb.2019.09.023

24. Insight, F. (2020, October 07). 2018 Food and Health Survey. Retrieved February 02, 2021, from https://foodinsight.org/2018-food-and-health-survey/

25. Kim, M., Budd, N., Batorsky, B., Krubiner, C., Manchikanti, S., Waldrop, G., ... & Gittelsohn, J. (2017). Barriers to and facilitators of stocking healthy food options: viewpoints of Baltimore City small storeowners. *Ecology of food and nutrition*, *56*(1), 17-30.

26. Langellier, B. A., Garza, J. R., Prelip, M. L., Glik, D., Brookmeyer, R., & Ortega, A. N. (2013). Corner Store Inventories, Purchases, and Strategies for Intervention: A Review of the Literature. Californian Journal of health promotion, 11(3), 1–13.

27. Laska, M. N., Borradaile, K. E., Tester, J., Foster, G. D., & Gittelsohn, J. (2010). Healthy food availability in small urban food stores: a comparison of four US cities. Public health nutrition, 13(7), 1031–1035. https://doi.org/10.1017/S1368980009992771

28. Leiner, H., Gregory, T. M., & Byrd, S. H. (2019). P106 Availability and Affordability of Yogurt in SNAP-Authorized Convenience Stores in Mississippi. Journal of Nutrition Education and Behavior, 51(7S), S80. doi: 10.1097/FCH.0000000000000182

29. Lutfiyya, M. N., Lipsky, M. S., Wisdom-Behounek, J., & Inpanbutr-Martinkus, M. (2007). Is rural residency a risk factor for overweight and obesity for U.S. children?. *Obesity (Silver Spring, Mississippi Delta.)*, *15*(9), 2348–2356. https://doi.org/10.1038/oby.2007.278

30. Ma, J., Jacques, P. F., Meigs, J. B., Fox, C. S., Rogers, G. T., Smith, C. E., ... & McKeown, N. M. (2016). Sugar-sweetened beverage but not diet soda consumption is positively associated with progression of insulin resistance and prediabetes. *The Journal of nutrition*, *146*(12), 2544-2550.

31. Mann, G., Cafer, A., Kaiser, K., & Gordon, K. (2020). Community resilience in a rural food system: documenting pathways to nutrition solutions. *Public Health*, *186*, 157-163.

32. McGee, B. B., Johnson, G. S., Yadrick, M. K., Richardson, V., Simpson, P. M., Gossett, J. M., ... & Bogle, M. L. (2011). Food shopping perceptions, behaviors, and ability to

purchase healthful food items in the lower Mississippi delta. *Journal of Nutrition Education and Behavior*, *43*(5), 339-348.

33. Mendy, Vincent L et al. “Overweight, Obesity, and Extreme Obesity Among Mississippi Adults, 2001-2010 and 2011-2015.” *Preventing chronic disease* vol. 14 E49. 22 Jun. 2017, doi:10.5888/pcd14.160554
34. Morland, K. B., & Evenson, K. R. (2009). Obesity prevalence and the local food environment. Health & place, 15(2), 491–495. doi:10.1016/j.healthplace.2008.09.004
35. Nguyen, B. T., & Powell, L. M. (2015). Supplemental nutrition assistance program participation and sugar-sweetened beverage consumption, overall and by source. *Preventive medicine*, *81*, 82-86.
36. *Overweight & Obesity*. (2020, October 29). https://www.cdc.gov/obesity/index.html.
37. Panola County, ms. (n.d.). Retrieved February 04, 2021, from https://datausa.io/profile/geo/panola-county-ms#demographics
38. Pereira, M. A. (2013). Diet beverages and the risk of obesity, diabetes, and cardiovascular disease: a review of the evidence. *Nutrition reviews*, *71*(7), 433-440.
39. Pereira, R. F., Sidebottom, A. C., Boucher, J. L., Lindberg, R., & Werner, R. (2014). Assessing the food environment of a rural community: baseline findings from the heart of New Ulm project, Minnesota, 2010-2011. Preventing chronic disease, 11, E36. https://doi.org/10.5888/pcd11.130291
40. Pi-Sunyer, Xavier. “The medical risks of obesity.” *Postgraduate medicine* vol. 121,6 (2009): 21-33. doi:10.3810/pgm.2009.11.2074

41. Pitts, S. B. J., Bringolf, K. R., Lloyd, C. L., McGuirt, J. T., Lawton, K. K., & Morgan, J. (2013). Peer reviewed: Formative evaluation for a healthy corner store initiative in pitt county, North Carolina: Engaging stakeholders for a healthy corner store initiative, part 2. *Preventing chronic disease*, *10*.

42. Rankin, K. (2020, December 18). *County at heart of Local 24 News' "The Mule Train" documentary to get a new grocery store*. localmemphis.com. https://www.localmemphis.com/article/money/business/marks-quitman-mississippi-local-24-news-the-mule-train-documentary-new-grocery-store-update/522-b0b730da-764a-4b72-9243-a2779bab8e41.

43. Roberts, E., Solar, S., & Falbe, J. (2019). Sugar-Sweetened Beverages Perceived as Healthier Than Soda Among Young Adults and Groups at Risk for Misperceptions (P04-186-19). *Current developments in nutrition*, *3*(Supplement_1), nzz051-P04.

44. Seguin R, Connor L, Nelson M, LaCroix A, Eldridge G. Understanding barriers and facilitators to healthy eating and active living in rural communities. J. Nutr. Metab. 2014;2014:146502

45. Seligman, H. K., Bindman, A. B., Vittinghoff, E., Kanaya, A. M., & Kushel, M. B. (2007). Food insecurity is associated with diabetes mellitus: results from the National Health Examination and Nutrition Examination Survey (NHANES) 1999–2002. *Journal of general internal medicine*, *22*(7), 1018-1023.

46. *Shaping the Future of Food in the Mississippi Delta*. The Graham Sustainability Institute University of Michigan. (2017, March). http://sustainability.umich.edu/media/files/dow/DowTallahatchie-final.pdf.

47. Sharecropping in Mississippi. (n.d.). Retrieved January 02, 2021, from https://www.pbs.org/wgbh/americanexperience/features/emmett-sharecropping-mississippi/

48. Short, Vanessa. "Report of the Burden of Chronic Diseases in Mississippi, 2014." Mississippi State Department of Health. Sept. 2014. https://msdh.ms.gov/msdhsite/_static/resources/4775.pdf.

49. Song, H. J., Gittelsohn, J., Anliker, J., Sharma, S., Suratkar, S., Mattingly, M., & Kim, M. T. (2012). Understanding a key feature of urban food stores to develop nutrition intervention. *Journal of Hunger & Environmental Nutrition*, *7*(1), 77-90.

50. Song, H. J., Gittelsohn, J., Kim, M., Suratkar, S., Sharma, S., & Anliker, J. (2009). A corner store intervention in a low-income urban community is associated with increased availability and sales of some healthy foods. Public health nutrition, 12(11), 2060–2067. doi:10.1017/S1368980009005242

51. Steeves, E. A., Penniston, E., Rowan, M., Steeves, J., & Gittelsohn, J. (2015). A rural small food store pilot intervention creates trends toward improved healthy food availability. *Journal of Hunger & Environmental Nutrition*, *10*(2), 259-270.

52. Stuff, J. E., Casey, P. H., Connell, C. L., Champagne, C. M., Gossett, J. M., Harsha, D., ... & Bogle, M. L. (2007). Household food insecurity and obesity, chronic disease, and chronic disease risk factors. *Journal of hunger & environmental nutrition*, *1*(2), 43-62.

53. Stuff, J. E., Horton, J. A., Bogle, M. L., Connell, C., Ryan, D., Zaghloul, S., Thornton, A., Simpson, P., Gossett, J., Szeto, K., & Lower Mississippi Delta Nutrition Intervention Research Consortium (2004). High prevalence of food insecurity and hunger in

households in the rural Lower Mississippi Delta. *The Journal of rural health: official journal of the American Rural Health Association and the National Rural Health Care Association*, *20*(2), 173–180. https://doi.org/10.1111/j.1748-0361.2004.tb00025.x

54. Silva, C. (2020, September 27). Food Insecurity In The U.S. By The Numbers. Retrieved January 26, 2021, from https://www.npr.org/2020/09/27/912486921/food-insecurity-in-the-u-s-by-the-numbers
55. Suddath, C. (2009). Why are southerners so fat? Time. *TIME. com*.
56. Sweeney, E. (2020, December 1). *Center for Population Studies and Partners Host Hunger Summit*. https://news.olemiss.edu/center-for-population-studies-and-partners-host-hunger-summit/?fbclid=IwAR3mVJ1aQ16WEwSKj4t945Jyo5UbpgEwyQqiKL7JyldU_kR1e1Ro-m2mawM.
57. Sylvetsky, A. C., & Rother, K. I. (2018). Nonnutritive sweeteners in weight management and chronic disease: a review. *Obesity*, *26*(4), 635-640.
58. Thomson, J. L., Goodman, M. H., & Landry, A. S. (2020). Measurement of Nutrition Environments in Grocery Stores, Convenience Stores, and Restaurants in the Lower Mississippi Delta. Preventing Chronic Disease, 17http://dx.doi.org.umiss.idm.oclc.org/10.5888/pcd17.190293
59. USDA. (2020, December 8). Is My Store Eligible? Retrieved January 24, 2021, from https://www.fns.usda.gov/snap/retailer/eligible
60. USDA approves Mississippi for Online Food Purchase Program for SNAP recipients. (2020, June 12). Retrieved January 28, 2021, from https://www.Mississippi

Deltahs.ms.gov/usda-approves-mississippi-for-online-food-purchase-program-for-snap-recipients/

61. U.S. Census Bureau QuickFacts: Lafayette County, Mississippi. (n.d.). Retrieved February 6, 2021, from https://data.census.gov/cedsci/profile?g=0500000US28071
62. U.S. Census Bureau QuickFacts: Quitman County, Mississippi. (n.d.). Retrieved January 24, 2021, from https://www.census.gov/quickfacts/fact/table/quitmancountymississippi/PST045219
63. YES Fresh Produce in Quitman County. *Facebook*, 14 Nov. 2020, https://www.facebook.com/markstoday/posts/1076556342778503. Accessed 8 Jan. 2021.

APPENDICES

Appendix A: Full Table for Individual Products

Table 1. Responses to "[Item] will sell well in my store"

Item	Disagree	Agree	Undecided
Sugar-free drink mix	2	4	1
Low sugar fruit drinks	1	4	2
25% lower sugar capri suns	1	5	1
Capri sun roarin water	1	5	1

100% fruit juice	0	7	0
bottled water	1	6	0
flavored water zero	1	6	0
low calorie sports drinks	1	6	0
low sugar soda	1	5	1
diet soda	1	5	1
fresh fruit	2	4	1
raisins	2	4	1
applesauce	1	3	3
baked chips	1	5	1
pretzels	1	6	0
fruit cups	1	5	1
canned fruit 100% juice	2	4	1
canned fruit in light syrup	2	4	1
low fat low sugar granola bars	1	4	2
low fat microwaveable popcorn	0	6	1
Low fat bagged popcorn	0	6	1
Sunflower seeds	1	6	0
Other nuts and seeds	0	6	1
Low fat low sugar yogurt	1	3	3
Low fat block cheese	2	1	4
Low fat string cheese	2	4	1

Low sugar cereal	2	3	2
Frozen vegetables	2	5	0
Low sodium canned vegetables	2	4	1
Low sodium beans	2	4	1
1% or skim milk	1	6	0
100% whole wheat bread	1	5	1
Whole grain tortillas	2	4	1
Whole wheat pasta	2	4	1
Brown rice	2	4	1
Cooking spray	2	4	1
Mustard	1	6	0
Low fat butter	2	5	0
Lean lunch meat	1	6	0

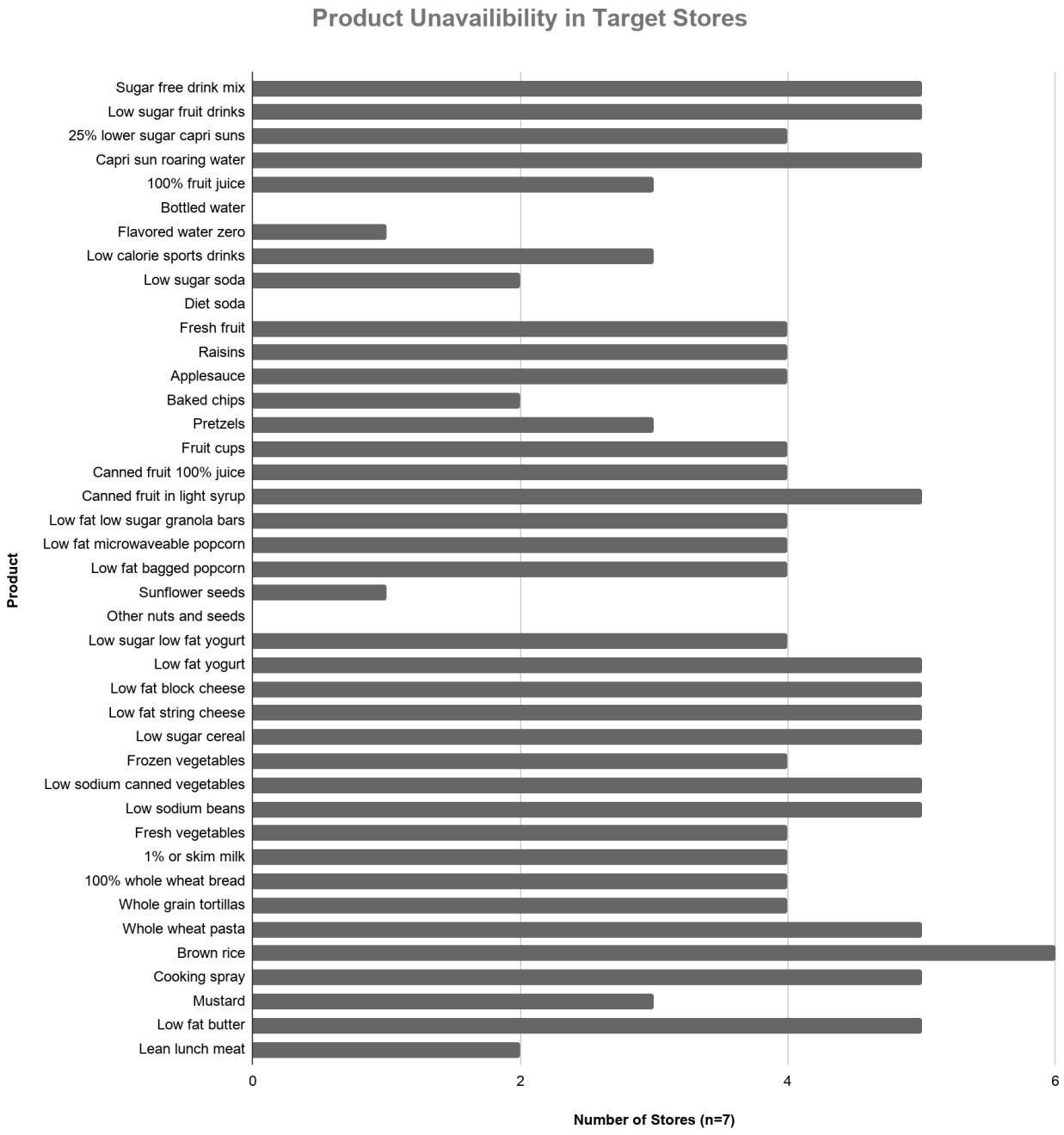
Table 2. Responses to " I can stock [Item] in my store"

Item	Disagree	Agree	Undecided
Sugar-free drink mix	3	4	0
Low sugar fruit drinks	2	5	0
25% lower sugar capri suns	2	5	0
Capri sun roarin water	2	5	0
100% fruit juice	0	7	0
bottled water	0	7	0
flavored water zero	0	7	0

low calorie sports drinks	0	7	0
low sugar soda	0	7	0
diet soda	0	7	0
fresh fruit	2	5	0
raisins	1	6	0
applesauce	1	6	0
baked chips	2	5	0
pretzels	1	6	0
fruit cups	0	7	0
canned fruit 100% juice	1	6	0
canned fruit in light syrup	1	6	0
low-fat low sugar granola bars	1	6	0
low-fat microwaveable popcorn	2	5	0
Low fat bagged popcorn	2	5	0
Sunflower seeds	1	6	0
Other nuts and seeds	0	7	0
Low-fat low sugar yogurt	1	6	0
Low-fat block cheese	1	6	0
Low-fat string cheese	1	6	0
Low sugar cereal	2	5	0
Frozen vegetables	3	4	0
Low sodium canned vegetables	3	4	0

Low sodium beans	2	5	0
Fresh vegetables	2	5	0
1% or skim milk	2	5	0
100% whole wheat bread	1	6	0
Whole-grain tortillas	2	5	0
Whole wheat pasta	1	6	0
Brown rice	2	5	0
Cooking spray	1	6	0
Mustard	1	6	0
Low-fat butter	3	4	0
Lean lunch meat	0	7	0

Appendix B: Graph of Product Unavailability in Target Stores



Appendix C: Consent Agreement

Interview Information Sheet

Investigator
Anna Conner
Department of Nutrition and Hospitality
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The University of Mississippi
618-409-2288

Investigator
Georgianna Mann, Ph.D.
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INCLUDE THE FOLLOWING ONLY IF YOU ARE COLLECTING DATA EXCLUSIVELY FROM ADULTS
☐ *By checking this box I certify that I am 18 years of age or older.*

Description

The purpose of this research project is to determine the availability of fresh and healthy food for residents of Quitman County, Mississippi. We would like to have a recorded interview with you about your store. You will not be asked for you name or any other identifying information.

Cost and Pavments

It will take you approximately 30 minutes to one hour to complete this interview. You will receive a
$30 giftcard for completing the interview.

Risks and Benefits

You may feel uncomfortable with some of the questions about your personal and professional life, but
the interview questions may provide opportunities for self-reflection and personal growth. You will also receive a $30 gift card for participating.

Confidentiality

No identifiable information will be recorded, therefore you can be identified from this study. Your audio file is secure on a computer, and all audio files are numbered instead of named.

Right to Withdraw

You are not obligated to take part or complete this study. You may stop participation at any time. If you start the study and decide that you do not want to finish, all you have to do is to tell Ms. Grant or an interviewer on site. You may skip any questions you prefer not to answer.

IRB Approval

This study has been reviewed by The University of Mississippi's Institutional Review Board (IRB). If you have any questions, concerns, or reports regarding your rights as a participant of research, please contact the IRB at (662) 915-7482 or irb@olemiss.edu.

Statement of Consent

I have read and understand the above information. By completing the survey/interview I consent to participate in the study.

THE UNIVERSITY OF MISSISSIPPI

RELEASE

For valuable consideration, I do hereby authorize The University of Mississippi, its assignees, agents, employees, designees, and those acting pursuant to its authority ("UM") to:

a. Record my participation and appearance on video tape, audio tape, film, photograph or any other medium ("Recordings").
b. Use my name, likeness, voice and biographical material in connection with these recordings.
c. Exhibit, copy, reproduce, perform, display or distribute such Recordings (and to create derivative works from them) in whole or in part without restrictions or limitation in any format or medium for any purpose which The University of Mississippi, and those acting pursuant to its authority, deem appropriate.
d. I release UM from any and all claims and demands arising out of or in connection with the use of such Recordings including any claims for defamation, invasion of privacy, rights of publicity, or copyright.

Name: _____

Address:_____

Phone No.:_____

Signature:_____

Parent/Guardian Signature (if under 18):_____

Appendix D: Quitman County Recruitment Script

Phone call, in person, or written email--

Hi ____,

We're interested in learning more about healthy food options in Mississippi. We would like to ask you a few questions regarding your store operations. We request your time of 30 minutes for one interview for a $30 giftcard. We will schedule your interview for whenever works best for you, so the timing is flexible! If you're eligible we would be thrilled if you choose to participate. If not, please pass this information to other local store owners or managers that would be interested. You can email me at Anna Conner anconne1@go.olemiss.edu or my advisor Dr. Georgianna Mann grmann@olemiss.edu. We look forward to hearing back from you and scheduling a time for your interview.

Thank you so much!!

Appendix E: Store Impact Questionnaire

Attached

Appendix F: BHCK Food Source Checklist

BHCK STORES
FOOD SOURCE CHECKLIST

Food Source Name:_____ **Date** __/__/__**Time:** _____ **Day:** _____ **Data Collector:** _____
Location: _____ **Ethnicity of Store Owners** _____ **Accept WIC** __Y__N **Accept Food Stamps?** __Y __N
Number of aisles: _____ Number cash registers: _____

Supermarket__1 Medium Store__2 Small/Cornerstore Store__3 Deli__4 Convenience/Gas Station__ 5

Food Source Environment (*circle options)								For All Food Sources
Features (all stores)	Yes	No	UK	Features (stores with delis/carryout's)	Yes	No	UK	Describe health-related signs (Nutrition related or not)
Packaged prepared food sold				Choice of vegetable toppings* (tomato, lettuce, other: _____)				
Deli or carryout (e.g. cuts bologna)								
Customers denied access to store (behind glass service)				Choice of meat				
				Choice of whole wheat bread				
Alcohol sold				Self serve coffee/tea station* (artificial sweetener, LF creamer)				
Fountain drinks				Self administered choice of low fat/calories condiments * (low fat mayo, mustard, cheese)				
Vending machine								

Food Availability (Y/N)		
Fresh Vegetables__	Number of different varieties: 0 1-2 3-5 6-10 11-20 20+	**Describe promotion of healthy foods on the menu**
Fresh Fruits __	Number of different varieties: 0 1-2 3-5 6-10 11-20 20+	
Milk	Whole__ 2%__ 1%__ Skim Milk__ Reduced fat chocolate milk __ Condensed__ Price of LF milk US$ _____/gallon (LF <2% fat)	

For below, indicate 1 = yes, 0 = no /* circle options

Meal items (Proteins, Breads, Sides)		**Snacks**		**Condiments/Beverages**	
Beans/peas (blackeye/split/lentil) __	Whole wheat bread __	Yogurt __	Low-fat popcorn __	LF Creamer__	Diet soda __
Canned fish (chunk light tuna, pink salmon, or sardines) __	Soft corn or whole wheat tortilla __	Canned Fruit (in water or juice)__	Low sodium crackers __	Artificial sweetener__	Bottled water __
Fresh fish __	Whole wheat pasta __	Low sugar applesauce __	Trail mix (no chocolate) __	Salt substitute __	Diet/ unsweet. ice tea __
Lean or extra lean ground meat __	Brown rice __	Low sugar pudding packs __	Nuts __	Cooking Spray__	100% fruit juice (unsweet.) __
Lean poultry __	Lean deli meat __	Baked chips __	Graham crackers __	Liquid oils __	Low sugar flavored water__
Eggs__	Canned vegetables __	Pretzels __ Low sodium Y/N	Low sugar/low fat granola bars __	Light dressing __	Low sugar drink mix (crystal light)__
Fresh/pre-packaged sandwiches __	Frozen vegetables __	**Breakfast**			
Low or reduced fat cheese (block/sliced) __	Peanut butter __	High fiber cereals __	Breakfast Bars	Low sugar cereal __	Oatmeal __

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Comments about produce: (e.g. Are refrigerators used for storage? What is the size of systems? Is any produce unrefrigerated (which ones)? What is the condition/quality of the produce? Describe.

_____
_____
_____
_____

General comments: (e.g. relevant items that are not listed on the checklist, quality of foods, whatever assumptions were made while checking the list, etc)

_____
_____
_____

Appendix G: Gift Card Receipt

Store ID:_____

GIFT CARD RECEIPT

I received a $ 30 gift card for a grocery store from data collector

(Name: _____)

as a gift for completing this interview.

Interview Date: _____/_____/_____
MM DD YY

Respondent phone #: _____

Print Respondent's Name: _____

Respondent's Signature: _____

Appendix H: IRB Approval

Georgianna Mann

From: irb@olemiss.edu
Sent: Wednesday, December 18, 2019 5:55 PM
To: Georgianna Mann
Subject: IRB Exempt Approval of 20x-276

PI:

This is to inform you that your application to conduct research with human participants, "Quitman County Corner Store Interview" (Protocol #20x-276), has been approved as Exempt under 45 CFR 46.101(b)(#2).

Please remember that all of The University of Mississippi's human participant research activities, regardless of whether the research is subject to federal regulations, must be guided by the ethical principles in The Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research.

It is especially important for you to keep these points in mind:

- You must protect the rights and welfare of human research participants.
- Any changes to your approved protocol must be reviewed and approved before initiating those changes.
- You must report promptly to the IRB any injuries or other unanticipated problems involving risks to participants or others.
- If research is to be conducted during class, the PI must email the instructor and ask if they wish to see the protocol materials (surveys, interview questions, etc) prior to research beginning.

If you have any questions, please feel free to contact the IRB at irb@olemiss.edu.

Please Note: The University will close for the holidays at the end of the day Friday, December 20 and reopen on Thursday, January 2. Please expect longer than normal turnaround times for items submitted after December 13. Thank you for your understanding.

Miranda L. Core
Research Compliance Specialist, Research Integrity and Compliance
Office of Research and Sponsored Programs
The University of Mississippi
100 Barr Hall
University, MS 38677-1848
+1-662-915-7482
irb@olemiss.edu | www.olemiss.edu

REMINDER: YOU CANNOT HAVE CONTACT WITH RESEARCH SUBJECTS UNTIL YOU RECEIVE THE FORMAL IRB PROTOCOL APPROVAL LETTER OR EMAIL

Appendix I: Addition to IRB

The University of Mississippi
Office of Research and Sponsored Programs
Division of Research Integrity and Compliance – Institutional Review Board
100 Barr Hall – University, MS 38677
irb@olemiss.edu 662-915-7482

Screening / Abbreviated IRB Application

Purpose: Many studies qualify for an abbreviated review, according to the federal regulations and university policy.

- **Part I of this form screens for a brief review.**
- **Part II of this form completes the abbreviated IRB application.**
- **Part III of this form gives instructions for obtaining the required assurances.**
- **The IRB makes the final determination on whether you must fill out a full application.**

Always download the most recent version of this form: http://www.research.olemiss.edu/irb/protocol/forms.
Prepare and send application form as a **Word** document. **E-mail the completed form and attachments (and forwarded email assurance if PI is a student)** to irb@olemiss.edu.

Note: Some class project studies may qualify for a classroom waiver of IRB Application. Instructors: see form here.

PART I — Screening

1. Do any of the following apply to your study?

Research Methods:

Clinical Treatment study	☐ Yes	☑ No
Exercise	☐ Yes	☑ No
X-rays	☐ Yes	☑ No
Collection of blood, urine, other bodily fluids, or tissues	☐ Yes	☑ No
Use of blood, urine, other bodily fluids, or tissues with identifiers	☐ Yes	☑ No
Use of drugs, biological products, or medical devices	☐ Yes	☑ No
Use of drugs, biological products, or medical devices	☐ Yes	☑ No
Use of data collected in the European Economic Area (EEA)*	☐ Yes	☑ No

Targeted Subjects:

Prisoners	☐ Yes	☑ No

Elements of Deception:

The study uses surreptitious videotaping	☐ Yes	☑ No
The study gives subjects deceptive feedback, whether positive or negative	☐ Yes	☑ No
The study uses a research confederate (i.e., an actor playing the part of subject)	☐ Yes	☑ No

If you checked Yes to any of the above, STOP HERE and fill out the FULL IRB APPLICATION FORM.

***Anonymous or Confidential?** Anonymous means (1) the recorded data cannot associate a subject with his/her data, and (2) the data cannot identify a subject. *Examples:* surveys with no names but with demographic data that can identify a subject (e.g., the only African-American in a class) are not anonymous.
***Sensitive Information?** Sensitive information includes but is not limited to (1) information that risks damage to a subject's reputation; (2) information that involves criminal or civil liability; (3) information that can affect a subject's employability; and (4) information involving a person's financial standing. *Examples:* Surveys that ask about porn use, illegal drug or alcohol use, religion, use of alcohol while driving, AIDS, cancer, etc. contain sensitive information.
***European Economic Area** - Collection of data in the European Economic Area (the 28 states of the European Union and Iceland, Liechtenstein, Norway, and Switzerland). Special considerations apply -if data are not 100% anonymous. See GDRP Guidance for more information

If using Qualtrics for anonymous surveys, see guidance here.

2. The ONLY involvement of human subjects will be in the following categories (check all that apply)

PLEASE READ CAREFULLY: MUCH CHANGED WITH NEW REGULATIONS, JANUARY 2019

☐ 1) **Educational Research:** Research conducted in established or commonly accepted educational settings, involving normal educational practices. Research is not likely to adversely impact students' opportunity to learn required educational content or the assessment of educators who provide instruction. This includes most research on regular and special education strategies, and research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

2) **Surveys, Interviews, Educational Tests (cognitive, diagnostic, aptitude, achievement), Observation of Public Behavior (including video or auditory recording).** AT LEAST ONE OF THE FOLLOWING MUST BE MET

☐ (i) Information recorded by the investigator cannot readily identify the subject (either directly or indirectly)

☐ (ii) Disclosure of subjects' responses outside the research could **NOT** reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, educational advancement, employability, or reputation

☑ (iii) Information recorded by the investigator includes identifiers and the investigator specifies strong security measures to protect the data (e.g., encryption for electronic data; multiple locks for paper data). Minors are **NOT** permitted under this sub-category

3) **Benign Behavioral Interventions (BBI):** Research involving interventions in conjunction with collection of information from an adult subject through verbal or written responses (including data entry) or audiovisual recording, if the subject prospectively agrees to the intervention and information collection.

- BBI is limited to communication or interpersonal contact; cognitive, intellectual, educational, or behavioral tasks; manipulation of the physical, sensory, social or emotional environment
- Intervention Requirements:
    - brief duration (maximum intervention = 3 hours within one day; data collection may extend more hours & over days)
    - painless/harmless (transient performance task-related stress, anxiety, or boredom are acceptable)
    - not physically invasive (no activity tracker, blood pressure, pulse, etc.)
    - unlikely to have a significant adverse lasting impact on subjects
    - unlikely that subjects will find interventions offensive or embarrassing
    - no deception / omission of information, such as study purpose, unless subject prospectively agrees

AT LEAST ONE OF THE FOLLOWING MUST BE CHECKED

☐ (A) Recorded information cannot readily identify the subject (either directly or indirectly)

☐ (B) Any disclosure of subjects' responses outside the research could **NOT** reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation

☑ (C) Information is recorded with identifiers and the investigator specifies strong security measures to protect the data (e.g., encryption for electronic data; multiple locks for paper data)

☐ 4) **Biospecimen Secondary Research**: Secondary Research for which consent is not required: use of identifiable information or identifiable biospecimens that have been or will be collected for some other 'primary' or 'initial' activity, if **ONE** of the following is met: (i) biospecimens or information is publicly available; (ii) information recorded by the investigator cannot readily, directly or indirectly identify the subject, and the investigator does not contact the subject or re-identify the subject; (iii) collection and analysis involving investigator's use of identifiable health information when use is regulated by HIPAA; or (iv) research information collected by or on behalf of the federal government using government-generated or -collected information obtained for non-research activities.

☐ 5) **Research and Demonstration Projects on Federal Programs**: The study is conducted pursuant to specific federal statutory authority and examines certain federal programs that deliver a public benefit [call IRB for details if you think your study may fit].

☐ 6) **Food Tasting/Evaluation**: Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

PART II — Abbreviated Application

3. Project Title: Quitman County Corner Store Interviews

4. Principal Investigator: ☑ Dr. ☐ Ms. ☐ Mr. Georgianna Mann

Department: Nutrition and Hospitality Management
Department Chair's email (for cc of approval): Yunhee Chang chang@olemiss.edu
Work Phone: 662-915-2621
Home or Cell Phone: 770-316-0784

E-Mail Address: grmann@olemiss.edu

If Principal Investigator is a student:

Graduate student:
☐ Dissertation ☐ Master's thesis
☐ Other graduate project

Undergraduate student:
☐ Senior thesis: ☐ SMBHC ☐ Croft Institute ☐ Other
☐ Other undergraduate project

Research Advisor: (required for student researchers)

Department:
E-Mail Address:
Work Phone:
Home or Cell Phone:

5. List ALL personnel involved with this research who will have contact with human subjects or with their identifiable data. All personnel listed here must complete CITI training OR the Alternative to CITI (ATC) training before this application will be processed*.

NAME	FACULTY OR STAFF	GRADUATE STUDENT	UNDER-GRAD STUDENT	ROLE ON PROJECT	Training completed: CITI or ATC
Anna Conner anconne1@go.olemiss.edu	☐	☐	☑	Investigator	☑ ☐
Georgianna Mann grmann@olemiss.edu	☑	☐	☐	PI	☑ ☐
Anne Cafer amcafer@olemiss.edu	☑	☐	☐	Investigator	☑ ☐
Kym Gordon krgordo1@go.olemiss.edu	☐	☑	☐	Investigator	☑ ☐

If space is needed to list additional project personnel, submit Appendix A.
***See Exempt Human Research Policy for training exceptions**

6. Funding Source:

Is there funding for this project? ☑ Yes ⇨ ☐ No

If Yes, is the funding:
Internal: ☑ Source: Sally M. Barksdale Honors College
External: ☐
Pending/Agency:
☐ Awarded/Agency:
PI on external funding:

Research Methodology/Procedures

7. Check all procedures below that apply to your study:

☐ Pre-existing data or biological samples ⇨	Source of data: Do data/samples have identifiers? ☐ Yes* ☐ No Must explain how data will be secured (e.g., encryption for electronic data; multiple locks for paper data). Minors are **NOT** permitted under this sub-category
☐ Observation	
☐ Oral history	
☑ Interview ⇨ ⇨ ⇨	Attach interview questions.
☐ Focus group ⇨ ⇨ ⇨	Attach topic and questions.
☐ Questionnaire or survey ⇨ ⇨ ⇨	Attach questionnaire or survey. If online, state program to use (e.g., Qualtrics):
☑ Audio recording or videotaping ⇨ ⇨ ⇨	Use and attach a release form if you plan to disseminate **quoted** comments or taped content. (This covers you and UM legally – Not for IRB purposes)
☐ The study has misleading or deceptive: ⇨ (1) study descriptions; (2) procedure explanations; and/or (3) survey instructions/rationales.	In the abstract, provide complete details and a rationale for employing misleading/deception information. Include **Appendix D** in your attachments.
8. Consent Procedures:	
☐ Oral ⇨ ⇨ ⇨	Attach script.
☑ Information Sheet/Cover Letter ⇨ ⇨ ⇨	Attach. (**No subject signatures required**, see example here: Go to Examples and Templates, then 'Sample Information Sheet')
☐ Not applicable, Explain:	

9. Project Summary

Briefly summarize your project using non-technical, jargon-free language that can be understood by non-scientists.

See http://www.research.olemiss.edu/irb-forms for abstract examples.

The purpose of this research is to observe and investigate the availability and accessibility of fresh/healthy food in Quitman & surrounding counties in MS via interviews with local grocers and store owners. The importance is to identify barriers that store owners face in stocking healthy food and to generate ideas to break down these potential barriers. It will be mirrored off a similar study conducted in Baltimore by Johns Hopkins University.

Kim, Mhinjine & Budd, Nadine & Batorsky, Benjamin & Krubiner, Carleigh & Manchikanti, Swathi & Waldrop, Greer & Trude, Ângela & Gittelsohn, Joel. (2016). Barriers to and Facilitators of Stocking Healthy Food Options: Viewpoints of Baltimore City Small Storeowners. Ecology of food and nutrition. 56. 1-14. 10.1080/03670244.2016.1246361.

Describe the **ages and characteristics** of your proposed subjects and **how you will *recruit* them** (attach recruitment script or materials to the application): Participants will be store owners or managers of corner stores, grocery stores, convenience stores, or any food retailer of groceries in Quitman County.

For studies using only adult subjects, state how you will ensure they are 18+:	☑ First question on survey/interview ☐ Other: ☐ Not applicable

We plan to ask personally if owners would be interested in participating. Once contacted, those who choose to participate will meet with a researcher at a mutually agreed upon time for the 30min-1hr interview. Participants will be shown the informational consent cover letter, sign the audio release, and proceed with the interview if they agree. Interview scripts/recordings will be stored separately from signed audio releases so they cannot be matched. The list of participants being contacted will be stored by researchers on password-protected devices. Participants will be given the $30 incentive for completing the interview.

Step 1: After IRB approval, contact store owners personally to ask for an 30min-1hr interview for a $30 gift card incentive. Step 2: Schedule interview times and dates for each participants
Step 3: On the interview days, read the informational cover sheet, obtain audio release signature and interview which will last 30 minutes to 1 hour
During this time, the interview should go as follows:
Introduction/Rapport Establishment: The interviewer will provide and explain the consent form to the subject, and the audio release form. The researcher will verify with the participant that they are >18 years old.
Interview will turn on the recording, and conduct the interview questions. They will then turn the recording off, number the file, and save.
The $30 will be provided in appreciation for their time.
Step 4: Consent forms will be secured in the PI's office under lock and key.

10. Appendix Checklist:

A. Additional Personnel not listed on first page of application?
☐ No ☑ Yes – complete Appendix A

B. Will the research be conducted in schools or child care facilities?
☑ No ☐ Yes – complete Appendix B

C. Does your research involve deception or omission of elements of consent?
☑ No ☐ Yes – complete Appendix D

D. Will your research be conducted outside of the United States?
☑ No ☐ Yes – complete Appendix E

E. Will your research involve protected health information (PHI)?
☑ No ☐ Yes – complete Appendix F if applicable

11. Attachments Checklist:

Did you submit:

a. survey or questionnaires?
☐ Yes ☑ Not Applicable

b. interview questions?
☑ Yes ☐ Not Applicable

c. focus group topics?
☐ Yes ☑ Not Applicable

d. recruitment email, announcement, or script?
☑ Yes ☐ Not Applicable: No subject contact

e. informed consent information letter or script?
☑ Yes ☐ Not Applicable: No subject contact

f. permissions for locations outside the University?*
☐ Yes ☑ Not Applicable

***if giving a survey, whether on or off campus, please ensure the person giving permission (e.g., the teacher of a class) has an explicit opportunity to see the survey before they give their permission for its distribution**

12. **If using class points as incentives, are there alternative assignments available for earning points that involve comparable time and effort?**

☐ **Yes** ☑ **Not Applicable**

13. **If using an anonymous survey through Qualtrics and giving incentives in a separate survey, have you read and conducted the testing of the surveys according to the procedures here?**

☐ **Yes** ☑ **Not Applicable**

PART III: ASSURANCES

Conflict Of Interest And Fiscal Responsibility

Do you or any person responsible for the design, conduct, or reporting of this study have an economic interest in, or act as an officer or a director of any outside entity whose financial interests may reasonably appear to be affected by this research?

☐ YES ⇨ ⇨ If Yes, please explain any potential conflict of interest.

☑ NO

Do you or any person responsible for this study have existing financial holdings or relationships with the sponsor of this study?

☐ YES ⇨ ⇨ If Yes, please explain any potential conflict of interest.

☑ NO

☐ N/A

Principal Investigator Assurance

PRINCIPAL INVESTIGATOR'S ASSURANCE

I certify that the information provided in the application is complete and correct. As Principal Investigator, I have the ultimate responsibility for the protection of the rights and welfare of the human participants, conduct of the research, and the ethical performance of the project. I will comply with all UM policies and procedures, as well as with all applicable federal, state, and local laws regarding the protection of participants in human research, including, but not limited to the following:

- Informed consent will be obtained from the participants, if applicable and appropriate;
- Any proposed modifications to the research protocol that may affect its designation as an exempt (brief) protocol application will be reported to the IRB for approval prior to being implemented.
- Adverse events and/or unanticipated problems will be reported to the IRB as required.

I certify that I, and all key personnel, have completed the required initial and/or refresher CITI or CITI Alternative courses in the ethical principles and regulatory requirements for the protection of human research participants.

Georgianna Mann — December 15th, 2019

Typed signature/name of Principal Investigator **Date**

RESEARCH ADVISOR'S* ASSURANCE (REQUIRED FOR STUDENT PROJECTS)

Email your Advisor with the following:

1. Email subject line: "IRB Advisor Approval Request from (your name)"
2. Your IRB submission materials as attachments
3. Copy and paste the statements below into the body of the email
4. Forward the reply email from your Advisor to irb@olemiss.edu along with your IRB submission materials attached.

***The research advisor must be a UM faculty member. The faculty member is considered the responsible party for the ethical performance and regulatory compliance of the research project.**

Please review my attached protocol submission. Your reply email to me will constitute your acknowledgement of the assurances below.

Thank you,
[type your name here]

As the Research Advisor, I certify that the student investigator is knowledgeable about the regulations and policies governing research with human participants and has sufficient training and experience to conduct this particular research in accordance with the approved protocol.

I agree to meet with the investigator on a regular basis to monitor research progress.

Should problems arise during the course of research, I agree to be available, personally, to supervise the investigator in solving them.

I will ensure that the investigator will promptly report incidents (including adverse events and unanticipated problems) to the IRB.

If I will be unavailable, for example, on sabbatical leave or vacation, I will arrange for an alternate faculty member to assume responsibility during my absence, and I will advise the IRB by email of such arrangements.

I have completed the required CITI course(s) in the ethical principles and regulatory requirements for the protection of human research participants.