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## PROCURING PRODUCE IN A RURAL, APPALACHIAN COUNTY: A THEMATIC ANALYSIS OF COMMUNITY MEMBER EXPERIENCES

Caroline Blincoe

*University of Kentucky*, [cmb1234@uky.edu](mailto:cmb1234@uky.edu)

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Caroline Blincoe, Student

Dr. Heather Norman, Major Professor

Dr. Dawn Brewer, Director of Graduate Studies

PROCURING PRODUCE IN A RURAL, APPALACHIAN COUNTY: A THEMATIC  
ANALYSIS OF COMMUNITY MEMBER EXPERIENCES

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THESIS

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A thesis submitted in partial fulfillment of the  
requirements for the degree of Master of Science in Nutrition and Food Systems in the  
College of Agriculture, Food and Environment at the University of Kentucky

By

Caroline Blincoe

Lexington, Kentucky

Director: Dr. Heather Norman, Professor of Human Nutrition and Dietetics

Lexington, Kentucky

2021

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## ABSTRACT OF THESIS

### PROCURING PRODUCE IN A RURAL, APPALACHIAN COUNTY: A THEMATIC ANALYSIS OF COMMUNITY MEMBER EXPERIENCES

Rates of obesity and other health disparities are exceptionally high in rural Appalachian counties compared to the nation as a whole. One causal factor of these health disparities in Appalachian counties is the inequitable allocation of healthy food. Food insecurity and the local food environment are large drivers for obesity experienced by Martin County, Kentucky residents. Successful socioecological model (SEM) and policy, systems, and environmental (PSE) interventions have shown promising results in reducing obesity and enhancing food security in this population. Through the transcription of semi-structured focus group interviews, thematic analysis aimed to obtain perspectives on the local food system. This study identified major barriers, facilitators, and existing food programs relative to produce procurement in Martin County. Findings from this study will be used to tailor food security interventions for Appalachian counties in effort to reduce the obesity prevalence in this population.

**KEYWORDS:** Health disparities, PSE, food access, dietary behavior, farmers' market, gardening

Caroline Blincoe

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04/21/21

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Date

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By  
Caroline Blincoe

Dr. Heather Norman

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Director of Thesis

Dr. Dawn Brewer

---

Director of Graduate Studies

04/21/2021

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Date

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## CHAPTER 1. INTRODUCTION

### 1.1 Background

Americans living in rural areas of the United States are at an increased risk of health-related chronic diseases and premature death (Davis, n.d.). Rural community members make up 15% of all Americans and are more likely to die of the leading causes of death (cardiovascular disease, cancer, unintentional injury, respiratory disease, stroke) than those living in urban areas (Adult Obesity, 2019).

Health disparities are differences in health that can be linked to economically, socially, and/or environmentally disadvantaged populations (Marshall, 2017). Research has found that health disparities are also linked to diet quality (Beatty, 2019; Krometis et al., 2017; Marshall, 2017; Walker, Keane, & Burke, 2010). Future funding opportunities and initiatives for obesity prevention programs must consider health disparities in their approach to be successful (Kumanyika & Grier, 2006). Inequitable allocation of food and access are deep systemic issues that leave rural populations especially vulnerable. This can serve as a risk factor for chronic conditions such as diabetes and heart disease. These chronic conditions account for up to 21% of all healthcare spending in the United States (Beatty, 2019).

Appalachia is a primarily rural geographic region in the Eastern half of the United States that is particularly affected by lack of food access due to its furthered distressed status compared to other rural counterparts (Beatty, 2019). Findings suggest that these chronic conditions are more prevalent in the Appalachian region compared to the nation as a whole (Beatty, 2019; Gustafson et al., 2018; “High Obesity”, 2020; Liu et al., 2017;

Trivedi et al., 2015). The Appalachian region includes all of West Virginia and parts of 12 other states ranging from New York to Mississippi and Alabama (Marshall, 2017). Covering 205,000 square miles and 420 counties, 42% of the region's population is rural compared to 20% of the nation (Marshall, 2017). Kentucky, one of the 12 states included in the Appalachian region, is divided into 120 counties, 54 of which are Appalachian counties (Marshall, 2017). Several Appalachian counties such as Martin County, Kentucky has a large percentage of the population that falls below the poverty line, are unemployed, and have a low income ("Socioeconomic Data", 2020). For these reasons, Martin County, and several other communities within Appalachia, have been categorized as economically distressed ("Socioeconomic Data", 2020). It was reported that 29.8% of community members fall below the poverty line ("Socioeconomic Data", 2020).

Poverty and lack of food availability are large drivers of obesity (Bardenhagen et al., 2017; Beatty, 2019; Kim et al., 2018; Walker et al., 2010). The Appalachian region's built environment, low levels of education, and limited employment opportunities make it nearly impossible for residents to break free from the existing persistent cycle of poverty and have proper access to healthy food. The lack of supermarkets and the high availability of fast-food restaurants in rural counties have been associated with decreased consumption of fruits and vegetables (Davis, n.d.). This deficit in produce availability, affordability, and quality could explain the high rates of chronic conditions, such as obesity. Due to the complexity of obesity between the built environment, health behaviors and the development of chronic diseases there is a need for multilevel approaches to prevent and manage lifestyle-related chronic conditions there is a need for multilevel approaches to prevent and manage lifestyle-related chronic conditions.. The socio-ecological model uses

a multi-dimensional framework to shape public health work with respect to complex multifaceted issues such as obesity (Advanced, n.d.). Using the socio-economic model (SEM) in conjunction with community-specific needs and considerations, a more culturally appropriate and sustainable program can be created to reduce obesity prevalence. SEM is described using five levels beginning with intrapersonal, interpersonal, into organizational, community, and finishing with public policy (Advanced n.d.). With policy being the outer ring of the SEM model, it begins to identify larger issues within the food system and may have the greatest impact on the largest number of individuals. The implementation of policy, systems, and environmental (PSE) changes could improve food availability, sustainability, and allow for behavior change in the community. With PSE approaches, the community is involved and often included in the program planning and implementation. Using the PSE and SEM models, the community becomes better connected and resources more readily accessed with equity as an important component of implementation. This in turn, will help eliminate health disparities that exist in Appalachia regions.

Rural regions in North Carolina, Missouri, and other parts of Kentucky have used farmers' markets and community gardens as PSE solutions to providing healthy foods to community members in geographically isolated and rural areas (Barnidge et al., 2013; Jilcott Pitts et al., 2014; Jilcott Pitts et al., 2017). Research has found a positive correlation in fruit and vegetable consumption in shoppers who go to the farmers' market (Jilcott et al., 2017). Farmers' markets and community gardens also promote community involvement and pride (Barnidge et al., 2013; Cardarelli et al., 2020; Jilcott Pitts et al., 2014). Although these seem like promising solutions due to their success in similar

counties, barriers cannot go unacknowledged. Cited barriers to farmer's markets include lack of buyers or small consumer bases in rural areas and limited availability of space and time to sell produce (Bardenhagen et al., 2017; Jilcott Pitts et al., 2014). Similarly, barriers to community gardens include unfavorable locations and higher produce prices (Barnidge et al., 2013; Barnidge et al., 2015).

## 1.2 Statement of the Problem

Historically, Appalachian regions are subject to unfavorable health disparities linked to a lack of healthy food access. They often rely on what is available at small grocery stores, convenience stores, gas stations, or at their local farmers' market for fresh produce (Bardenhagen et al., 2017). Lack of food access, financial resources, transportation, nutrition education, and participation by farmers in rural farmers' markets results in the decrease in consumption of fruits and vegetables in these disadvantaged communities (Bardenhagen et al., 2017; Beatty, 2019; Jilcott Pitts et al., 2017). This leads to an increased consumption of fast food and energy dense foods contributing to high prevalence of diet-related diseases. Extensive research has been conducted on food availability and behaviors in rural regions, but there is a lack of research on individual communities with unique environmental circumstances. There is also a limited assessment in the differences of dietary behaviors among Appalachian communities. This gap in research assumes that all rural and disadvantaged regions have similar dietary behaviors and procure healthy food items in a similar fashion. Obtaining perspectives from community members in Martin County will identify barriers, facilitators, and existing community-based efforts that may be useful in establishing PSE approaches to promote healthy food options,

specifically fruits and vegetables. Through the process of transcribing and analyzing focus group conversations, qualitative data will aid in the creation of a culturally acceptable and sustainable health promotion program to improve food access.

### 1.3 Research Questions

1. What are facilitators for obtaining fresh produce for individuals residing in a low-income Appalachian community?
2. What are barriers to obtaining fresh produce for individuals residing in a low-income Appalachian community?
3. What are sustainable interventions to ensure proper access to fresh fruits and vegetables for those living in a geographically isolated community?

### 1.4 Hypothesis

1. Food assistance programs that are easily assessable will be the largest facilitator for Martin County residents to procure produce enabling them to consume more fruits and vegetables and lower their risk for diet related disease.
2. Lack of community engagement to change dietary behaviors within Martin County will be the most reported barrier experienced by residents due to the unhealthy stigma that exists.
3. Increased use of the SEM framework will identify the factors that influence dietary behaviors of Martin County residents thus establishing opportunities for PSE-change model interventions to achieve better access to fresh produce.

## 1.5 Purpose of this Study

The purpose of this study is to collect formative data to guide future PSE change interventions providing fresh fruits and vegetables to rural community members within an economically distressed Appalachian county. These sustainable interventions will be grounded within the socio-ecological model to provide a multi-faceted approach to the complex issue of obesity. This in turn, will ideally increase fruit and vegetable consumption in this population and ultimately improve health outcomes associated with chronic diseases.

## 1.6 Impact

This study aims to provide a better understanding of the current factors that influence food procurement, specifically fruits and vegetables, in a rural Appalachian county. This will help understand why current food programs are not successful in the community and do not promote public health. Creating an effective PSE-change intervention, for this county's unique needs may improve the consumption of fruits and vegetables to help reduce and manage chronic conditions over time and give way to a better understanding of how to provide fresh produce to similar geographically isolated and economically distressed communities.

## CHAPTER 2. REVIEW OF LITERATURE

### 2.1 Introduction

Cardiovascular disease, diabetes, cancer, COPD, and obesity rates in rural regions of the United States are higher than those of their urban counterpart (Davis, n.d.). Nearly 70% of Kentucky qualifies as “rural or very rural” when ranked on their degree of rurality (Davis, n.d.). The most concentrated area of “very rural” communities occupy Eastern Kentucky where the Appalachian Mountains reside (Davis, n.d.). The Appalachian region, particularly the included Kentucky counties, continues to experience economic distress, which largely contributes to greater health disparities and poor health outcomes compared to similar rural counterparts (Beatty, 2019).

Health disparities are differences in community environments and socioeconomic factors that cause disadvantages to one’s health (Marshall, 2017). The community food environment of those living in geographically isolated or rural areas is very limited. Specifically, Appalachian communities seem to grapple with limited food access, availability, and affordability resulting in a major impact on dietary behaviors and a rise in obesity and diabetes (Jilcott et al., 2017). For example, Appalachian residents living in “distressed” regions are at a 33% higher risk of diabetes than those living in non-distressed regions (Liu et al., 2017). In one study, it was found that it is not uncommon for



Appalachian communities to exhibit obesity prevalence greater than 40% (Gustafson et al., 2018). Those who live close to supermarkets have been found to have healthier diets and a lower body mass index (BMI) (Jilcott et al., 2017). Having access to a variety of affordable produce has been associated with more fruit and vegetable purchases. Consumption of these purchased fruits and vegetables can reduce an individual's risk of becoming obese (Liu et al., 2017). Individuals residing in Appalachia seldom have access to supermarkets in their immediate community.

Using a socio-ecological model (SEM) helps define characteristics of a community food system and healthy food availability. Understanding the individuality of a community allows for a tailored intervention to be created. Studies have shown that farmers' markets and community gardens may be a viable option for increasing fruit and vegetable availability in Appalachian communities that has a broader community impact (Barnidge et al., 2013; Jilcott Pitts et al., 2014; Jilcott Pitts et al., 2017). Furthermore, interventions like these or others that increase fruits and vegetables in an Appalachian county can be created and sustained.

To create a successful and sustainable program to prevent or reduce the prevalence of diet related disease, policy, system, and environmental (PSE) approaches should be followed. These strategies allow the community to better communicate their nutrition knowledge, engage in the intervention, and provides a more equitable impact across the community. The purpose of this study is to analyze qualitative data to guide future PSE change interventions within an economically distressed Appalachian county to increase fruit and vegetable consumption. These sustainable interventions will be grounded within the SEM to provide a multi-faceted approach to the complex issue of obesity.

## 2.2 Health Disparities in Rural Areas

Health disparities cause negative and unfavorable differences in health in those they impact. Minority groups, low-income individuals, or socially isolated residents are the primarily victims of unequal allocation of resources within a community. Disparities between rural and urban communities have been well researched and have been often referred to as the “rural mortality penalty” (Cosby et al., 2008). As a result, disadvantaged populations, such as those in rural areas, are associated with adverse health outcomes (Beatty, 2019; Krometis, et al., 2017; “Leading Cause of Death”, 2019; Marshall, 2017).

This contributes to the increased prevalence of obesity and increased risk factors for diabetes and heart disease observed in rural communities. A deeply systemic issue our society faces is the inability to give ample opportunities to those who are disadvantaged. Lack of employment, fair wages, healthcare, and proper food access makes one’s ability to advance difficult and leads to unfavorable health outcomes (Marshall, 2017). This population is less likely to participate in early screenings and preventative services due to lack of healthcare (Elnicki et al., 1995). Cost, distance, and lack of awareness are explanations to why healthcare and health promoting services remain underutilized. One possible solution is to increase healthful food options. This includes adequate food availability, accessibility, variety, and quality to reduce the need of health screenings. Over time, this may improve dietary intake and health outcomes of community members.

In one study, a community-wide program aimed to improve health behaviors in rural Kentucky (Gustafson et al., 2019). The results of this study found that the intake of fruits and vegetables increased by 0.23 and 0.18 servings respectably. The success of this

study could be attributed to the partnering with community members to improve consumer health behaviors and alteration to the food environments (Gustafson et al., 2019). In a more involved community, successful programs such as a farmers' market or community gardens can be created and maintained. These would aid in narrowing the gap between prevalence of food insecurity and health related disease in communities that struggle to supply fresh fruits and vegetables.

To improve diet quality, policy and community-based programs are recommended to have the most positive impact (Walker et al., 2010). It is understood that community members over time often set the social and cultural norms of what a traditional diet looks like. Traditional diets in isolated regions, such as Appalachia, are high in calories, sodium, fat, sugar, and low in fiber and complex carbohydrates (Walker et al, 2010). These norms may stem from the unequal distribution of food within Appalachian communities that has existed through several generations of community residents. Community food stores offer fewer affordable fresh fruits and vegetables than its supermarket counterpart, which often can be dozens of miles away. Residents in these geographically isolated communities may rely on their local community for food and support. Healthy eating can be difficult to achieve in these communities framed within these systems and cultures.

### 2.3 Health Disparities in Appalachia

Some of the most severe health disparities in the United States occur in rural Appalachia in Kentucky, largely due to the isolation caused by the mountainous geography and landscape. This environment creates physical barriers and increased distance between residents and healthcare, employment, schools, and well supplied food markets. Reduced

access to healthcare and proper food access seems to be the largest contributors to serious health complications.

Since the 1950's, economic struggle has been the norm for residents of the Appalachian area (Beatty, 2019). Appalachia has some of the nation's highest poverty rates, although being on a decline of 1.2%, this region sits at 15.8% vs the United States average 14.1% ("Socioeconomic Data", 2020). This may be due to low income or unemployment rates compared to other regions of the United States. In a 2012-2018 community survey, it was found that the median household income was \$43,167 compared to the national average of \$54,446 ("Socioeconomic Data", 2020). The Appalachian region of Kentucky is even more disadvantaged with 5.7% of its region being unemployed vs the entire Appalachian region sitting at 3.9% ("Socioeconomic Data", 2020). This leaves 25.3% persons living below the poverty line in the Appalachian region of Kentucky ("Socioeconomic Data", 2020).

Persistent poverty, unemployment, and low income have created an environment of great economic distress. An index-based economic classification system has been created and used to identify significant areas of distress in Appalachia. Martin County, a Kentucky county within Appalachia, has since been classified as an economically "distressed" county ("Socioeconomic Data", 2020). The poverty rate is 26.3% persons, 6.5% are unemployed, and the per capita income as of 2018 is \$29,840 compared to the average of the Appalachian region \$43,167 ("Socioeconomic Data", 2020). These communities not only have high rates of economic distress but poor health outcomes as well.

Health disparities occur largely in these rural areas and are exacerbated in economically distressed regions of Appalachia. Regions of economic distress have a

mortality rate 33% higher than those classified as non-distressed (Marshall, 2017). Findings show that obesity is higher in Appalachian counties (31%) than non-Appalachian counties (27.1%) (Beatty et al., 2019). The highest rates of obesity are found in central Appalachia (34.7%) which includes Martin County, Kentucky. Obesity is a risk factor for several chronic conditions such as cardiovascular disease, diabetes, and hypertension. Heart disease mortality was found to be 18% higher and diabetes mortality 11% higher in Appalachian counties than the national rate (Appalachian, 2020). Heart disease mortality is 42% higher in Central Appalachian counties than the national rate (Beatty et al., 2019). Diabetes mortality rates in Central Appalachia are 41% higher than the nation as a whole (Appalachian, 2020).

Other contributing factors are the existing barriers within these communities to healthy eating. This economically distressed community leaves people in need of financial support and accessibility to provide nutritious food for their families. Fourteen percent of the state of Kentucky is participating in the Supplemental Nutrition Assistance Program (SNAP), in Martin County that percentage is even higher at 26.8% (2,996 people) (“Tracking SNAP”, 2020).

The system and structure of this region makes it improbable for Martin County residents to break free from the cycle of persistent poverty. An effective approach to ending this cycle is to change the system in which it exists. Implementing a PSE (policy, systems, and/or environmental) change can create a sustainable and favorable future for disadvantaged populations. PSE change happens within a specific community, organization, or population with respect to the community around it ensuring that the ongoing change will be well received, sustainable, and successful. Research shows that

rural areas that adopt PSE approaches have been successful in creating a healthier environment (Wallace et al., 2019). Healthier environments could promote the consumption of fruits and vegetables, provide proper food access, and may positively impact diet quality (Wallace et al., 2019). This, in turn, will reduce the prevalence of obesity in the region of central Appalachia. A PSE change approach supports behavior change in this society by addressing multiple factors that facilitate healthy living. Addressing factors, such as access to healthy food, will narrow the gap of existing health disparities and support health-promoting behaviors.

#### 2.4 Barriers to Healthy Eating

Food environments can heavily influence health outcomes and dietary behavior (Davis, n.d.). Limited food access and high rates of poverty are barriers to consumption of perishable foods, like fresh fruits and vegetables, in disadvantaged and isolated communities (Miller et al., 2016). Lack of money, transportation, well supplied grocery stores, education, and quality produce largely explains why diet related diseases are so prevalent. An unsuitable food environment encourages poor dietary behaviors to be adopted and maintained throughout adulthood and across generations (Bardenhagen et al., 2017).

Lack of purchasing power has been associated with the consumption of shelf-stable and energy dense foods (Bardenhagen et al., 2017; Liese et al., 2007). In a study looking at availability of food types and cost in a rural environment, it was found that some food items' availability in grocery stores was less consistent than in supermarkets (Liese et al., 2007). Items that are considered lean, such as skinless, boneless chicken and frozen

seafood, were not available in local grocery and convenience stores. There was a substantial difference in the nutritional quality of items found between supermarkets and convenience stores (Liese et al., 2007). Convenience stores may be connected to a gas station, but not all gas stations have a convenience store. These stores are typically smaller and offer fewer food options than a grocery store. Convenience stores are more likely to have less nutritious options available (Liese et al., 2007). For example, low-fiber options were the most readily available type of bread (86%) vs high-fiber (4%), whole milk was most readily available (68%) vs reduced-fat (30%) and nonfat milk (2%) (Liese et al., 2007). Convenience stores had nearly 80x fewer fruits, vegetables, and lean meat options, compared to their supermarket superior (Liese et al., 2007). It was also found that healthier versions of food types were more expensive within convenience stores, with the exception of milk (Liese et al., 2007). Geographically isolated regions, such as Martin County, can leave several residents miles away from a supermarket or large grocery store.

A food desert is an urban or rural area that does not have readily accessible, fresh, healthy, and affordable food according to the USDA (Ver Ploeg, 2011). An area can qualify as a food desert if they meet certain income and access thresholds. According to the USDA, an area is branded a food desert if they have a poverty rate of 20% or greater, or median family income at or below 80% of the statewide or metropolitan area median family income; or at least 500 persons and/or at least 33% of the population lives more than 1 mile from a supermarket or large grocery store (10 miles, in cases of rural census tracts) (Ver Ploeg, 2011). Lack of access to nutritious and affordable food is the leading barrier for many rural community members (Davis, n.d.; Miller et al., 2016). Foods higher in fat, cholesterol, sodium, calories, and lower in price may be prioritized in these areas and can

lead to obesity and cardiovascular disease. On the other hand, increased food availability, affordability, advertisements, and display of health-promoting foods seem to have a positive impact on healthy food intake in rural environments (Barnes et al., 2014; Liese et al., 2007).

Existing literature focuses heavily on health promotion in grocery stores in middle-class areas where built environment and socioeconomic levels may be more stable (Barnes et al., 2016; Foster et al., 2014; Liese et al., 2007). Research suggests that marketing and advertising in convenience and dollar stores tailor to higher energy options (Barnes et al., 2016; Foster et al., 2014). Although healthy options and produce are available in stores to the public, 94% of the advertisements were for less nutritious options and nearly all the stores placed high calorie options near the checkout as “impulse buys” (Barnes et al., 2016). In a previous study, there was an increase in healthier food purchasing when signage and food placement was changed to promote more nutritious options (Foster et al., 2014). This suggests that marketing and advertising can significantly increase sales of nutritionally dense foods and improve public food purchasing.

## 2.5 Food Access in Rural Communities

It is estimated that 2.3 million Americans are living in rural areas that are considered food deserts (Ver Ploeg, 2011). Specifically, it has been observed that several communities in the Appalachian regions meet the thresholds to be deemed a food desert (Marshall, 2017; “Socioeconomic Data”, 2020). This presents a unique challenge for populations struggling to access healthy food.



A large majority of remote, low-income Appalachian communities rely on federal assistance programs or food pantries to fill the void of food accessibility. Food pantries are food organizations that provides groceries at little to no cost to their patrons (Duffy et al., 2009). These pantries often lack fresh fruits and vegetables and may only provide canned or shelf stable food items for patrons (Duffy et al., 2009). In addition, food pantry clients are more likely to be overweight or obese (Duffy et al., 2009).

It has been predicted, that for every 1 mile traveled to purchase food the odds of being obese increase by 5.0% (Miller et al., 2016). Due to the mountainous region these Appalachian communities reside, they can be several miles from the nearest grocery store. It was found that a family of four could save \$44.82 per week or \$179.28 a month if they traveled further to buy food at a large supermarket (Miller et al., 2016). Those in financial hardship may expand their dollar by buying inexpensive shelf stable items and spend less money on perishable foods, like fruits and vegetables, due to cost being the primary force of food purchasing.

Residents with poor access to transportation or limited finances may be unable to afford the expense of traveling further distances, therefore limiting these residents to the local food in their environment (Bardenhagen et al., 2017). Stores, such as supermarkets, that offer healthful and more affordable food items are outnumbered in this community and require longer travel time (Liese et al., 2007). This discourages the frequency of grocery shopping. Families prioritize processed foods and fast food in order to feed their families leading to poor health outcomes (Walker et al., 2010).

A study found that those who are more likely to visit local corner and convenience stores were more likely to choose unhealthy food items (Miller et al., 2016). Studies

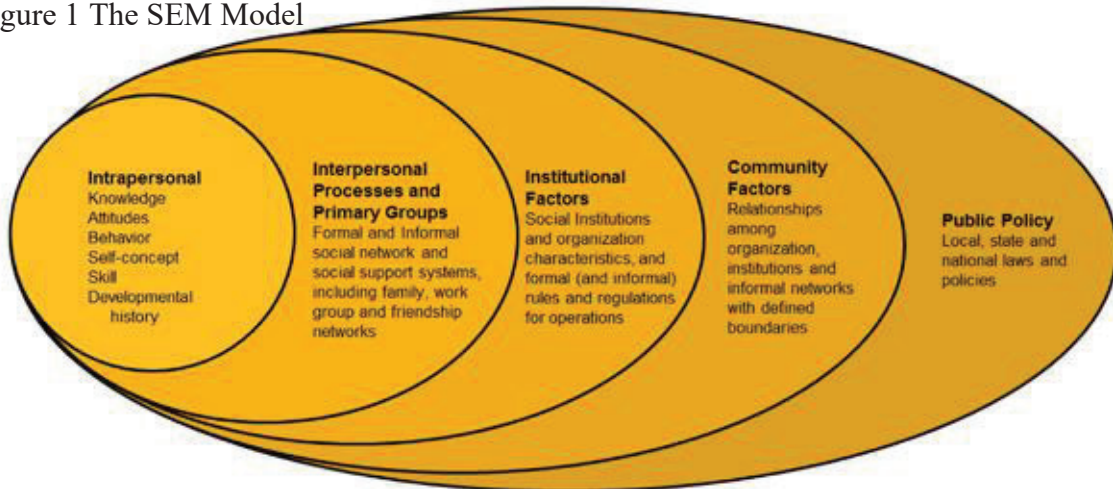
continue to find that cost and marketing at these locations are the two leading causes of poor dietary choices in rural Appalachia (Barnes et al., 2016; Miller et al., 2016). In one study, grocery baskets and their food items were totaled and compared. It was found that healthful food baskets were substantially more expensive than food baskets containing less-healthful foods (Liese et al., 2007). For example, healthier baskets of food products were on average 16-22% more expensive than “regular” baskets of foods (Liese et al., 2007). In an observational study, it found that advertisements often support consumption of discretionary calories in local convenience stores (Miller et al., 2016). In low-price stores, such as convenience and corner stores, junk-food dominates the entrance view by 67% compared to the supermarkets where fruits and vegetables dominated by 71% (Miller et al., 2016).

In a study done in a rural environment, it was found that convenience stores outnumbered both supermarkets and grocery stores combined (Liese et al., 2007). Supermarkets were found to be in medium wealthy neighborhoods. Grocery stores, corner stores, dollar stores, and convenient stores were found to be significantly higher in minority and disadvantaged areas (Liese et al., 2007). Food environments with fewer supermarkets and limited food access are associated with higher levels of hypertension, obesity, and lower levels of fruit and vegetable consumption (Liese et al., 2007; Miller et al., 2016; Walker et al., 2010), which is consistent with what has been observed in Appalachian communities.

## 2.6 The Socio-Ecological Model

The socio-ecological model (SEM) focuses on determinants of health and their response to internal and external factors (Advanced, n.d). This model looks at different

Figure 1 The SEM Model



levels within an individual's life that may influence their well-being and motivation.

These levels are intrapersonal, interpersonal, institutional, community factors, and public policy.

Intrapersonal, within the individual, the persons own identity, attitudes, and behaviors are factors contributing to levels of motivation. Interpersonal are primary groups such as peers, family, and close social systems that may influence behaviors. Institutional factors such as time, organizations, rules, and regulations are looked at as influence to behavior change. Communities including local food resources, neighborhoods, and built environments that have a major impact on behavior change and motivation. Finally, within public policy, laws and regulations can alter one's ability to change or be motivated (Advanced, n.d). Using a SEM model provides context for an individual living within a community, helps explain the disparities in communities, and potentially clarifies the lack of motivation within its community members.

A SEM model can also provide a framework for creating a project, intervention, program, or initiative that will be well received and sustainable for a specific community. The improvement of health disparities involves participation from all levels within a community (Krometis et al., 2017). It has been suggested that the best way to establish successful community interventions is to gather feedback and spread information through the community by the members themselves (Barnidge et al., 2013; Jilcott Pitts et al., 2014; Krometis, 2017). Participation will spark motivation to improve public health and dietary behaviors and increased social support will enable maintenance of the program to ensure it is successful. This multi-level support built into the SEM model will allow positive community change.

The SEM model permits understanding of complex issues that exist within unique communities. This enables the development of a multifaceted program aimed to improve the livelihoods of those who live in this specific community or geographic location, taking into consideration the unique factors and circumstances of that community. It works not only on an individual level but organizational and beyond. Policy is the furthest ring that the SEM model includes (Advanced, n.d). Policy creates the very structure of food systems therefore influencing health behaviors within a specific community (“*What is Policy*”, 2012). Understanding this idea has allowed organization to shift their focus to an environmental and systems change approach.

## 2.7 The PSE-Change Model

In recent years funding agencies have invested more in policy, systems, and environmental (PSE) change interventions to increase healthy eating and active living for

obesity reduction and prevention purposes (Honeycutt et al., 2015). It has been shown that projects that do not target policy, systems, or the environment have limited effect on behavior change over time (Evaluating Policy, 2015). PSE interventions are complex and involve work within outer rings of the SEM (Evaluating Policy, 2015). These projects target the root causes of larger systemic issues within a community to understand and build a sustainable structure (Evaluating Policy, 2015).

The PSE model involves changing the policies, formal and informal rules, laws, and regulations at a governmental level (Honeycutt et al., 2015; *“What Is Policy”*, 2012). Implementation of new procedures could be at federal, state, or local levels (*“What Is Policy”*, 2012). For example, this could include the provision of land under the county to move a farmers’ market to a new location and increase accessibility for community residents (Honeycutt et al., 2015).

Changing policy encourages agriculture, transportation, education, distribution, and support change in the broader food system within a community (Honeycutt et al., 2015). These large-scale policy changes can be effective for changing individual behavior by discouraging unhealthy foods or behavior and/or promoting healthy foods and behaviors (Honeycutt et al., 2015). Behavior change could be a result of putting up barriers to prevent unhealthy food consumption or taking down barriers to facilitate healthy eating. For example, a way to promote a healthy diet is to change the food environment by decreasing the amounts of food that are high calorie or lack nutritious value. Taxes on sugary beverages can deter this population from purchasing it and may improve their health (Falbe et al., 2016). Building a community that residents are proud of in addition to implementing

health promoting policies will motivate them to be more socially active and change dietary behaviors thus extinguishing the unhealthy stigma (Kumanyika, 2019).

Systems change works closely with policy as it focuses to change the structure of the distressed areas (*“What Is Policy”*, 2012). Change in the system allows for the community to better connect with each other to achieve sustainability. The systems approach aims to connect different levels of the community to provide ample resources to those who reside there.

Environmental change is physical modifications to the local environment itself. Changes to the environment can better allow for resource allocation, food access, and opportunity for physical activity. Installing safe sidewalks may encourage residents to be more physically active and/or access food easier (*“What Is Policy”*, 2012). PSE strategies aim to change the structure by connecting all levels of society and creating and maintaining a health focused community. This, in turn, will lead to sustainable behavior change and decreased rates of health-related disease.

## 2.8 Local Farmers’ Markets

A dilapidated food environment is associated with poor dietary behaviors and health outcomes (Beatty et al., 2019). Food environments can help or hinder the consumption of a healthy diet rich in fruits and vegetables (Jilcott Pitts et al., 2014; Jilcott et al., 2017). A common method used as an environmental change within communities is the implementation of a community farmers’ market to increase access and availability of fresh fruits and vegetables. Having a well-established and visited farmers’ market in rural and isolated communities allow individuals greater access to improved quality of produce.

In addition, farmers' markets connect local farmers to community members. This is especially important within the Appalachian region of Kentucky. Fresh produce is more accessible to the food insecure, and the economically disadvantaged community as a whole (Jilcott et al., 2014). Prior studies have found that shopping at farmers' markets was associated with higher self-reported intake of fruits and vegetables (Jilcott Pitts et al., 2014; Jilcott et al., 2017). Having a reliable farmers' market improves availability, accessibility, accommodations, affordability, and acceptability of produce within communities (Jilcott Pitts et al., 2017).

In a cross-sectional study that took place in 17 counties in northeast North Carolina, researchers focused on rural and geographically isolated communities that had a high prevalence of obesity. Surveyors collected customer reviews from farmers' market patrons at 15 different locations. The primary motivators to purchase food at the farmers' market were fresher produce, supporting local agriculture, taste, and the friendly atmosphere. The main barrier was lack of convenience. It was found that more frequent shopping was associated with greater fruit and vegetable consumption and lower BMI (Jilcott et al., 2017).

In another cross-sectional survey, a sample of farmers' market customers and primary food shoppers, in eastern North Carolina and the Appalachian region of Kentucky, found there was a positive association with fruit and vegetable consumption with use of the farmers' market (Jilcott et al., 2014). The Kentuckians who visited the market consumed 0.8 servings of fruits and vegetables more than those who seldom or never visited. According to this study, residents in North Carolina reported consuming 1.3 servings more of fruits and vegetables to Kentucky residents (Jilcott et al., 2014). Barriers

most frequently cited regarding the farmers' market were unfavorable times and inconvenient locations. The market was open on unfavorable days, during weekdays, and during normal work hours. Weather conditions and location of the farmers' market were also reported as additional barriers (Jilcott et al., 2014). A farmers' market may be a sustainable option to increase produce consumption within this specific population keeping in consideration the high need for food assistance programs in these areas. These regions are especially vulnerable and may rely on federal nutrition assistance programs such as SNAP. It was found that 32.4% of North Carolina customers and 40% of Kentucky customers at local farmers' markets were SNAP participants (Jilcott et al., 2014). Using a similar framework to a farmer's market may be an acceptable solution.

## 2.9 Community Gardens

Although fruit and vegetable consumption is associated with reduced risk of diet related diseases, the majority of Americans are not consuming the recommended amount (Barnidge et al., 2013). Community gardens are often associated with high fruit and vegetable intake in those who participate in them (Barnidge et al., 2013). These community gardens would provide closer access and promote affordability of high quality produce to the population. This population, specifically those within Appalachian regions, are living within food deserts and a grocery store can be dozens of miles away. These gardens can encourage fruit and vegetable consumption by increasing access to these rural residents and create a better food environment (Bardenhagen et al., 2017).

In a study examining a rural Missouri community, twelve community gardens were started and fully equipped. Prior to the study, residents ate fewer than 2 servings of fruits



and 3 servings of vegetables a day (Barnidge et al., 2013). There was an association between the community garden exposure and consumption of produce by 1.35 servings a day (Barnidge et al., 2013). The geographic similarities suggest that the garden may be a powerful motivator for produce consumption in other isolated and distressed communities.

In a separate study, BMI was observed after the implementation of a community garden. It was found that prior to the intervention the mean BMI for the study population was 69.8; however, after 6-months of participation with the community garden reduced the mean BMI by 8.9 points (Barnidge et al., 2015). These statistically significant findings suggest that the community garden was successful in lowering BMI of overweight and obese individuals with increased fruit and vegetable consumption as a contributor. This study also had a positive effect on blood pressure and overall dietary behaviors (Barnidge et al., 2015). Participants had 3.06 times higher odds, of eating five servings of fruits and vegetables daily, than those who did not participate (Barnidge et al., 2015). This research concludes that community gardens can be successful at improving health metrics that are indicative of chronic disease over time. Lowering BMI can lead to a decreased risk of obesity and other diet related chronic disease, such as high blood pressure and heart disease.

Due to a large majority of rural community residents not meeting fruit and vegetable recommendations, a community garden can increase access, produce consumption, and aid in disease prevention. Community gardens would provide ample availability of high-quality produce not available at local grocery stores or could only be obtained from food retailers several miles away.

## 2.10 Conclusion

Health disparities are often present in rural and geographically isolated areas. The food environments in these areas lead to decreased food and store access and unhealthy dietary behaviors. The county economic status, of Martin County, Kentucky, continues to be “distressed” and draws light on the financial instability that exists. Nearly one in three residents fall below the poverty line (“Socioeconomic Data”, 2020). These “distressed” areas are often denied opportunities and lack the ability to improve their economic and public health status.

Poverty and lack of food availability are large drivers of obesity (Bardenhagen et al., 2017; Beatty et al., 2019; Kim et al., 2018; Walker et al., 2010). The rates of obesity and diseases related to it, in Appalachian communities, are higher than that of its urban counterpart (Beatty et al., 2019; Gustafson et al., 2018; “High Obesity”, 2020; Liu et al., 2017; Trivedi et al., 2015). These conditions account for nearly a quarter of all health care spending (Beatty et al., 2019). It is important to recognize that obesity is a complicated issue and viable solutions to reduce the rates will also be multiplex. Interventions incorporating PSE-changes with multifaceted approaches working within several socioecological levels serve as the best response to a complex issue such as obesity (Honeycutt et al., 2015). Understanding a complex community and their unique challenges will lead to success of health promotion interventions. Improving this populations access to food, through a food system approach, can help lower the health complications they are unable to escape.

Little to no research has focused on the differences of dietary behavior between Appalachian communities. Research on food access and poverty in these areas is

extensive, yet there is a gap in literature determining the differences in their food systems and how that contributes to observed health outcomes in the region. This gap allows for assumptions to be made that these communities have similar dietary behaviors. Conducting focus groups in these isolated areas will aid in the development of community specific interventions that are more appropriate and culturally accepted within the population. This, in turn, makes it easier for the community to sustain healthy lifestyle behaviors such as increased produce consumption. Farmers' markets and community gardens have been found to increase food security, consumption of fruits and vegetables, and lower BMI in similar area as Martin County (Barnidge et al., 2015; Jilcott et al., 2014). These solutions decrease the distance this population must travel in order to have access to quality and safe produce, thus decreasing their risk of obesity (Barnidge et al., 2015).

## CHAPTER 3. METHODOLOGY

### 3.1 Research Design

This qualitative study entailed the collection of data from the target community of Martin County. Martin County is located in eastern Kentucky, adjacent to West Virginia. Nearly 40% of the residents live in poverty, struggle with unemployment (12.4%), and have limited education (QuickFacts, 2019). This community is classified as a food desert. This, among other factors, leaves one in five households (21%) food insecure (United., n.d; Food Insecurity, n.d) Martin County qualified for the CDC 1809 High Obesity Project because their county adult obesity prevalence was greater than 40% (Murriel et al., 2020) These funds were granted to the University of Kentucky Extension Services to increase access of healthier foods and increase active living in counties such as Martin County (CDC). Focus groups were conducted with community members as a baseline assessment of community perspectives in year one of the funded project. This study was approved by the Institutional Review Board at the University of Kentucky.

### 3.2 Participants and Sampling

In summer of 2019, participants were recruited via the Martin County Cooperative Extension Facebook page and flyers distributed throughout the community. Individuals were eligible to participate if they had been a resident of Martin County for at least one-year, English speaking, and eighteen years or older. Participants completed a written informed consent and completed a survey about their sociodemographic variables (Appendix B). The goal was to recruit five or more participants per focus group.

Participants received a \$25 gift card to a local grocery store for participating in the focus groups.

### 3.3 Data Collection

Five focus groups were conducted by a trained moderator using a guide while being recorded on two devices. Two note takers were present at all focus groups in addition to the moderator. Four focus groups were conducted at the Cooperative Extension Office in Martin County. One focus group was held at the local middle school to better accommodate the group's needs. A moderator guide (Appendix 1) was created to assure consistency and approved to direct these focus group conversations to learn about healthy eating and active living in Martin County, in aims to reduce rural obesity. These questions were created to unveil barriers and facilitators to this population in relation to obesity prevention.

### 3.4 Data Analysis

Verbatim transcripts were created from the audio recordings of the five focus group sessions. There were three qualitative analysts who read through the transcripts independently and created initial code books with definitions and direct text examples. The primary qualitative analyst was involved with transcription and coding but not physically present during the focus groups. An inductive-deductive approach identified themes observed in the data about assets and barriers to healthy eating in Martin County. The transcripts were then imported into qualitative analysis software, QSR NVivo 11, and coded by the primary qualitative analyst. The analysts came together again, and the final

themes were established from all the generated codes. A thematic analysis approach was used to guide coding and theme identification of the transcripts (Vaismoradi et al., 2013).

## CHAPTER 4. RESULTS

### 4.1 Demographics

Five focus groups were conducted with a total of 34 participants. The goal was to recruit five or more participants per focus group. There was a range of four to nine participants in each focus group, with an average of six people per focus group. The length of each focus group ranged between 53 minutes to 76 minutes with an average of 62 minutes. Sociodemographic data reported by the participants, as well as those of Martin County, are reported in Table 1. Among the 34 participants, the mean age was 50.4 years old. These groups were largely female (79%). The only race present was white Caucasian. The education level of participants included 50% being college graduates followed by some college (35%), then high school graduate (12%), and finally 7<sup>th</sup>-8<sup>th</sup> grade education at only 3% of the group. Three ranges of household incomes were equally reported: “less than \$20,000”, income of “\$40,000-\$59,999”, and income of “\$60,000-\$79,999”. Next, was an income of \$21,000-\$39,999 at 15%. The least reported household income was more than \$100,000 with only 2 participants (6%).

Table 1 Sociodemographic

<b>Characteristics</b>	<b>Focus Group</b> n=34 (%)	<b>Martin County</b> n= 12,175 (%)
<b>Age (median), yr</b>	50.4	39
<b>Gender</b>		
<b>Female</b>	27 (79%)	45%
<b>Male</b>	7 (21%)	55%
<b>Race</b>		
<b>White</b>	34 (100%)	92.4% (population share)
<b>African American</b>	0	4.72%
<b>Hispanic</b>	0	1.21%
<b>Other</b>	0	0.879%
<b>Education</b>		
<b>7<sup>th</sup>-8<sup>th</sup> grade</b>	1 (3%)	27%
<b>High school graduate</b>	4 (12%)	39%
<b>Some college</b>	12 (35%)	25%
<b>College graduate</b>	17 (50%)	5%
<b>Household Income</b>		
		\$29,239 (median)
<b>Less than \$20,000</b>	8 (23%)	35.77%
<b>\$21,000-39,999</b>	5 (15%)	23.05%
<b>\$40,000-59,999</b>	8 (23%)	18.96%
<b>\$60,000-79,999</b>	8 (23%)	8.64%
<b>\$80,000-\$99,999</b>	3 (9%)	8.25%
<b>More than \$100,000</b>	2 (6%)	5.28%

## 4.2 Themes and Subthemes

Twenty-eight coding categories were derived from the focus groups. Seven themes were evolved from analysis, with eighteen subthemes total. The seven major themes were lack of community capacity, generational divide, loss of farming, peer/community support, persistent poverty, transportation, and lack of healthy food access. For the purpose of this thesis, physical activity has been omitted due to its lack of relevance to eating behaviors. Selected quotes that represent each theme and subtheme are available in Table 2.

### Theme 1: Lack of Community Capacity

#### *Subtheme: 1.1: No desire to change dietary habits or public perception of the community*

Significantly, participants agreed that community members were unhealthy and have poor dietary behaviors. Several individuals suggested that unhealthy eating is part of their culture. These groups suggest that these tendencies did not happen overnight but have evolved through generations. More importantly, participants concluded that money was the key motivation factor for achieving a healthy lifestyle. Due to the existing cycle of persistent poverty and prevalence of fast-food chains, poor dietary habits are cemented into the society as a necessary way to feed themselves and their families.

#### *Subtheme 1.2: Unfamiliar food items are not well received*

Participants drew connections between Appalachian culture and food choices they make. Traditional foods such as bananas, tomatoes, peppers, corn, potatoes, and green beans take precedence in food-retail stores due to their popularity. Members agree that there is a great degree of comfort and familiarity with preparing and consuming these foods. Individuals provided several scenarios where various atypical foods were introduced



to the community, or themselves, and they were not purchased or taken. Unfamiliar and unprofitable foods are withdrawn from sale, therefore narrowing variety in this unfavorable food system.

*Subtheme 1.3: Lack of community participation with growers*

Multiple food resources are available to encourage and achieve healthy eating. A farmers' market, high school garden, and various food pantries exist in the community but are underutilized. Donations from other community members were identified as a source of fresh produce. Upon investigation, it was determined residents are not motivated to go pick-up said donations. Individuals vocalize that residents grow tired of preparing fresh produce and revert to pre-prepared, convenient, and fast foods.

Theme 2: Generational Divide

*Subtheme 2.1: Lack of knowledge toward food, agriculture, and environment*

Multiple suggestions reinforce that nutrition education is unknown across all generations. Children were often the audience most identified as being naïve to the benefits of eating fresh foods and growing produce. Schools and parental guidance were reported to be responsible for leaving children uneducated. Schools no longer prioritize Home Economics, which older generations recall as being the source of food education. Home Economics was a mandatory high school course that focused heavily on cooking and nutrition, supplementing with other household duties. According to participants, this is where individuals learned basic cooking skills and nutrition education. Lack of parental guidance was also attributed to why cooking and preservation of fresh produce was widely unknown. It was discussed that children are not being taught in their home on how to cook.

This disconnect can be highly attributed to the existing food system. Ample fast-food chains are readily available and are widely used according to every focus group. Menu items are inexpensive and convenient, making them desirable to this unique population. These practices deter the consumption of fresh fruits and vegetables across all generations. When prompted, it was found that canning was of great interest to participants, yet few individuals knew the process. This exposed the disconnect between the desire to prepare fresh foods and the act of doing so in this community. The parents are unable to teach their children what they learned, because they lack cooking knowledge themselves.

Younger generations are also not being exposed to gardening and therefore the tradition of farming is not being passed down. Farming is a dying field in the community due to the evident lack of motivation and bartering over economic investment. Older generations are not teaching their children because there seems to be a lack of interest to learn.

#### *Subtheme 2.2 Younger generation lacks motivation for learning food and nutrition skills*

Adults in this community suggest that younger generations are apathetic about cooking, nutrition, and agriculture. Many indicated there was a difference in strong work ethic between generations. Younger generations are often coined as “lazy” and disinterested in cooking and agriculture. Several connections were made between technological advances and laziness in children. This presumed disinterest has led to a loss of farming, gardening, and nutrition knowledge.

### Theme 3: Loss of Farming

#### *Subtheme 3.1: Little return on investment (money, time, labor, and knowledge)*

Participants believed that this profession is not financially lucrative. Farming is perceived as a hobby due to lack of fiscal contribution, as a result the field is dying. Participants agree it would be more financially beneficial for them to go to the store and buy produce and goods rather than growing it themselves. This attitude and dissolving profession leave the community untrained on agriculture. As a result, availability of fresh fruits and vegetables declines.

#### *Subtheme 3.2: Dwindling interest in Farmer's Market*

Participants have noticed a drop in community involvement at the farmers' market. Farmers who are selling have noticed both a drop in other competitors and a drop in customers. Participants believe that community members tire of fresh produce and therefore have no need to visit the farmers' market. Availability of fast-food is stated to be a major contributor to why the farmers' market is not being well visited. Barriers such as the market being open during unfavorable times and locations, discourage customers. Community members find going to their local corner store is easier than going to the farmers' market. With a dwindling customer base, more farmers choose to not participate in the farmers' market each year.

#### Theme 4: Peer/Community Support

##### *Subtheme 4.1: Home gardening as a self-sustaining food source for social networks*

It was observed that community members were eager to speak about produce grown by their family and neighbors. The few who do possess the knowledge of gardening, sell or donate their homegrown produce to the community through outlets other than the farmers' market. According to groups, it is more traditional to donate excess garden

produce to others. Platforms such as Facebook, faith-based organizations, and downtown were areas where donations take place. This produce is perceived as healthier and fresh. People are greatly interested in this due to the crops at their local stores being rotted or of poor quality.

*Subtheme 4.2: Bartering and sharing food in community*

Garden produce that is unused by the grower is traditionally distributed to the community through an informal fashion of food bartering and sharing. This is due to the lack of motivation to sell at the farmers' market. Frequently, members stated that the amount of labor needed to sell the produce at the farmers' market was not worth the profit. Furthermore, many gardeners value donations and their relations to friends and family over economic profit.

*Subtheme 4.3: Grow Appalachia serving as resource to support growing/gardening in county*

Grow Appalachia is a non-profit organization in the community that aids in the production of local produce and aims to reduce food insecurity. It was mentioned by many as being a helpful organization that supports home gardening by providing labor and financial support to achieve a rich crop yield. Those who received assistance from the organization speak often of their success and knowledge they gained. Techniques, such as the preservation of various produce items, expand the number of products the farmers can sell and improves food access. Support from Grow Appalachia and the Martin County Cooperative Extension Office encourages the production and preservation of fresh produce therefore enhancing food security.

## Theme 5: Persistent Poverty

### *Subtheme 5.1: Largely poor population relying on government assistance programs*

A large percentage of this population is on a fixed income and rely on federal nutrition assistance programs and food pantries to provide food for their family. Due to this reason, they are limited on the foods they can purchase and/or consume. According to members, food pantries are not always open and have little variety including shelf stable foods or often rotten produce. Patrons of food pantries are extremely limited to their food choices. They must have an extensive knowledge of how to prepare donated foods to not be at risk of further insecurity. This lack of variety and culinary knowledge leads the impoverished to invest their money in energy-dense foods that require little preparation and have low nutritional value.

### *Subtheme 5.2: Healthy food items cost more than unhealthy foods within traditional food retailers*

A subtheme that was identified in nearly every focus group was the belief that healthy food, such as produce, was more expensive than shelf stable or fast food. Focus group participants suggest that those who are impoverished do not have a choice when investing in food. Participants express that fast food has cheaper meal options than if one were to cook a meal at home. Additionally, processed foods are easy to prepare, store, and are more affordable, making them irresistible to those in financial crisis.

## Theme 6: Transportation

### *Subtheme 6.1: Rough geography makes destinations hard to reach*

Rough terrain and travel time related to the geography pose as barriers to citizens reaching their everyday destinations. Several focus group individuals state that biking and walking are uncommon and dangerous due to the road conditions. Participants identify those living in the hollers being most directly affected by geography. Lengthy travel time and unsafe roads deters residents from frequenting the grocery or other everyday destinations.

*Subtheme 6.2: Most of the community have access to modes of transportation*

Most of the focus group participants state transportation as being a facilitator to healthy behavior. Cars are the main mode of transportation, but busses and bikes were also mentioned as possible options. The group members suggest that transportation is seldom a barrier and that even those without a car have access to a form of transportation. This community frequently helps their neighbors to and from the grocery stores.

*Subtheme 6.3: Transportation barrier does exist for some individuals*

A few focus group participants do believe that transportation is a barrier for some people. Specific groups cited to have the largest barrier to transportation include senior citizens, those living in poverty, and in the holler. Participants state that those without access to a car makes it nearly impossible to get to a supermarket easily. More so, transportation to better stocked grocery stores and supermarkets seem to be the biggest barrier to healthy eating. Several residents do not have time to travel to these well supplied food stores. Due to these problems, people only go to the supermarket once or twice a month.

Theme 7: Lack of Healthy Food Access

*Subtheme 7.1: Lack of variety and high-quality produce*

Due to limited shelving space and the isolated geography of the region, there is limited produce made available to local stores. Members state that the produce that is available is of poor quality because it takes so long to reach the shelves. The produce that is left is often rotted or overly ripe, so the community is forced to shop elsewhere for healthy food. The local produce stand within the county is often closed or poorly stocked. Due to the lack of purchasing of unfamiliar fruits and vegetables, stores will discontinue the sale of those foods resulting in less variety offered to the public.

*Subtheme 7.2: Few food outlets in county*

According to the group there are only 3-4 outlets for food within the county. IGA, Save-A-Lot, and Jude's Produce are the only reported stores to be frequented for produce and other food. Gas stations, corner stores, and small grocery stores makes it nearly impossible for residents to purchase everything they need in one trip. Several of the local stores have limited quantities of fresh produce and therefore it sells out quickly. Lack of commodities leads members to search for goods outside of the county. This significantly limits the food options available to members of the county without proper transportation or time. The farmers' market is often held at times and locations that do not work with the citizens and therefore is hardly used. Furthermore, after the completion of the focus groups, one of the three grocery stores closed related to COVID-19. This further reduced the food outlets available to residents.

*Subtheme 7.3: Availability of fast food*

It was suggested that the availability of healthy foods is limited because of the dense concentration of fast-food and restaurants. Focus group members describe the food environment as offering high volumes of fried and fatty foods and limited availability of healthy food options. Healthy options are priced higher, those on a fixed income can expand their dollar further by purchasing energy-dense and high fat foods. The abundance, affordability, and popularity of unhealthy food retailers deters many from consuming fresh fruits and vegetables.

The table below includes selected quotes that were pulled to develop themes and subthemes.



Table 2. Selected Quotes by Theme

Major Theme	Sub-Theme	Selected Quotes
<b>Lack of Community Capacity</b>	<ul style="list-style-type: none"> <li>• No desire to change dietary habits or public perception of the community</li> <li>• Unfamiliar food items are not received well</li> <li>• Lack of community participation with growers</li> </ul>	<p>FG1.150: “I think it’s just tradition, people are used to eating their fatty...fried foods.”</p> <p>FG1.502: “it’s never really been a part of our culture around here, it just isn’t. I mean we’re like the unhealthiest people in the country. This part, I mean that’s just honest, central Appalachia it is.”</p> <p>FG5.333: “And I will say in our area, I think if it was something really obscure, they wouldn’t eat it, I would be willing to try it, but I think a lot of people wouldn’t. My grandchildren wouldn’t.”</p> <p>FG5.373: “I know when I had a garden, and I had extra produce. I would tell people you can have anything you want they just have to come get it. They didn’t want to. They only wanted it if you picked it for them.”</p> <p>FG5.391: “They are lazy. Hey, I am so sorry but it’s just.” “And that’s the saddest reality of it.”</p>
<b>Generational Divide</b>	<ul style="list-style-type: none"> <li>• Lack knowledge toward food, agriculture, and environment</li> <li>• Younger generation lacks motivation for learning food and nutrition skills</li> </ul>	<p>FG4.421: “And they have where, my grandkids don’t know where stuff comes from. They don’t work in a garden.”</p> <p>FG3.167: “you don’t see a lot of the younger generation getting into it.” [when asked why] “in my opinion, laziness.”</p> <p>FG1.241: “Nutrition education, I think, you know, there’s a big gap there. I think a lot of people just don’t realize the benefits of fresh fruits and vegetables as opposed to, you know, junk food.”</p> <p>FG3.481: “I am sure there are a lot of kids out there right now that’s in high school that have very little fresh vegetables their whole life. Their parents have always went to McDonalds or a pizza place.”</p>

		FG4.738: “Exactly the farming too...I’m just afraid we’re going to have a generation that wouldn’t know how if they had to.”
<b>Loss of Farming</b>	<ul style="list-style-type: none"> <li>• Little return on investment (money, time, labor, and knowledge)</li> <li>• Dwindling interest in Farmers’ Market</li> </ul>	<p>FG2.1365: [in response to what are barriers to farming] “probably property. I mean you have to have a good size place to produce.”...”I think some of it too is just don’t have that motivation and don’t want to do it.” ...”I was going to say it is hard work.”...” It’s the new generation, they want what’s easy, like something quick.”</p> <p>FG4.599: “You would probably have to have someone to teach people because while there aren’t any farmers in the county, they’re getting old or they have already died off and heaven forbid the kids would ever have to work in a garden.”</p> <p>FG3.125: “You can’t do it and make your car payment every month. You couldn’t use it as a 2<sup>nd</sup> income. There is no way to be profitable with it.”</p> <p>FG5.238: “Not nearly as many people garden as they use to. Even like 10 years ago.” (why is that question asked) “I think they are getting older and they don’t feel like getting out there and doing it.” “And the younger generation won’t.” “Yeah, they don’t know how.”</p> <p>FG3.111: “dad sell at the farmers’ market. And he has noticed it seems to be declining a little bit, especially as the year goes on. It starts out pretty strong, he says, but as the year goes on...I don’t know if they get burned out on produce, everyone gets used to eating fast food and stuff.”</p>
<b>Peer/Community Support</b>	<ul style="list-style-type: none"> <li>• Home gardens as self-sustaining food source for social networks</li> <li>• Bartering and sharing food in community</li> </ul>	FG 2. 554 “I just pickled up some corn. About almost 3 weeks ago it was my first time preserving anything. But it was like, a couple in my church that does that stuff, and they kind of walked me through it and showed me. And I just wish we had more resources to show us how to do those things.”

	<ul style="list-style-type: none"> <li>• Grow Appalachia serving as resource to support growing/gardening in county</li> </ul>	<p>FG5.230: “I was a participant in Grow Appalachia, and I enjoyed it...I already knew a lot, but I have learned a lot...more about canning and different things...we grew tomatoes, cucumbers, green beans, corn, zucchini, squash...peppers”</p> <p>FG3.174: “I do share. I’ve not sold anything this year, it was the first year I had that big a garden. But yeah, my grandma, my parents, whoever, they want to drive out and help. I told them if they want to come help pick it, they can have some.”</p> <p>FG4.133: “Yeah, I can answer that for myself there. When I raise things, I mean, I don’t sell it. I don’t believe in selling it. If I have got, usually I got a whole bunch, I give it away.”</p>
<p><b>Persistent Poverty</b></p>	<ul style="list-style-type: none"> <li>• Largely poor population relying on government assistance programs</li> <li>• Healthy food items cost more than unhealthy foods within traditional food retailers</li> </ul>	<p>FG1.364: “It’s like, say you go to McDonald’s or Wendy’s or somewhere, you know a salad is four or five dollars compared to you know, chicken nuggets a dollar.”</p> <p>FG2.1131: “A lot of people are on fixed income...and it’s hard to eat healthy....it’s the bottom line. It is way expensive to eat healthy.”</p> <p>FG2.759: “These lower incomes can’t afford it. At the 1<sup>st</sup> of the month, you go to save a lot and you have these parents with their kids with them. That cart is loaded down with a lot of processed food, because it is cheap, easy to fix, and it goes a long way with feeding their kids.”</p> <p>FG3.413: “You can buy a box of little debbie’s for \$1.99 and you can’t buy hardly anything out of the produce case for \$1.99.”</p>
<p><b>Transportation</b></p>	<ul style="list-style-type: none"> <li>• Rough geography makes destinations hard to reach</li> <li>• Most of community has access to modes of transportation</li> <li>• Transportation barrier does exist for some individuals</li> </ul>	<p>FG2.39: “we are a lot of back roads. You know, there’s not sidewalks everywhere.”</p> <p>FG5.698: “It’s too far and it is not safe”</p> <p>FG1.197: “With the senior citizens, we bring them in two days a week and some of them their family won’t take them to the grocery store so they have to buy stuff that’s going to keep until the next time they come into the center.”</p>

		<p>FG4.279: “Transportation is, transportation is a very big issue...it’s getting out there and getting them to a grocery store that’s a barrier for them.”</p> <p>FG5.632: “transportation is the biggest issue for this community.” “It is a big obstacle.” “It is getting them to church, it is for getting them to school, it is for getting them to the grocery store, to the doctor, it is just a major issue.” “I have people that pay people to drive them out of the hollow basically.”</p> <p>FG5.704: “There are break off’s in the road, people driving like crazy, and so it is a safety concern.”</p>
<p><b>Lack of Healthy Food Access</b></p>	<ul style="list-style-type: none"> <li>• Lack of variety and high-quality produce</li> <li>• Few food outlets in the county</li> <li>• Availability of fast food</li> </ul>	<p>FG1.80: “one of the main problems with IGA is not enough people in our community buy the fruits and vegetables and so they don’t keep as much on hand because it doesn’t sell as quickly here.”</p> <p>FG1.89: “I know for the senior citizens, like, we will order bananas but we can’t get them around here ‘cause they don’t have enough for us to go purchase. So we have to order them and they come frozen. And when you open it up its black.”</p> <p>FG2. 271: “We do have a local produce, private owned produce store, but they don’t keep a lot of stuff.”</p>

## CHAPTER 5. DISCUSSION

This study identified many facilitators and barriers to obtaining healthy foods in the geographically isolated region of Martin County, Kentucky. Investigating the characteristics of the food system, that shapes purchasing behaviors, allows for the foundation of a sustainable food program to be laid and built upon. The results indicate that the food environment in Martin County, Kentucky could negatively impact the health behaviors and outcomes of its residents, as suggested by previous research and the findings of this qualitative study (Bardenhagen et al., 2017; Liese et al., 200; Miller et al., 2016; Walker et al., 2010). It was hypothesized that food assistance programs would be the largest facilitator and lack of community engagement would be the largest barrier to consuming healthier foods in this community. It was also hypothesized that the use of a SEM framework will aid in establishing a sustainable PSE-change model intervention for Martin County.

### 5.1 Facilitators to obtaining fresh produce in a low-income Appalachian community.

Martin County, Kentucky is one of many rural Appalachian communities who suffer from food insecurity (“Food”, 2020; Jilcott et al., 2014). Focus group participants suggest that their community and peers, non-profits, and faith-based organizations promote food security and healthy eating.

Community support seemed to be the biggest overarching facilitator to obtaining fresh produce in the region. Donations are often a primary source of produce as stated by focus

group participants. Whether the produce is from backyard gardens, non-profits, or unpurchased crops from the farmers' market; people are donating, sharing, or bartering produce with one another, which identifies a unique and altruistic culture of an Appalachian community.

“When I raise things, I mean, I don't sell it. I don't believe in selling it. If I have got, usually I got a whole bunch, I give it away.”

The community believes in investing back into its residents through food donations instead of making a profit. This is contradictory to what would be believed as true due to the poverty rates in the region. The few backyard growers believe in sharing their resources rather than selling them at the market. These results suggest that, contrary to the literature, farmers' markets aren't well received, financially successful, or a sustainable option in improving food access in this community (Jilcott Pitts et al., 2014; Jilcott et al., 2017). There doesn't seem to be enough of a return on investment from a financial stand point. Other communities in Appalachia have shown great success with sustainable farmers' markets (Jilcott Pitts et al., 2014; Jilcott et al., 2017). However, findings from this focus group suggest that the success with the farmers' markets may be community specific. There are significant challenges within this Appalachian community for a robust farmers' market throughout the year. Participants identified community involvement as a major challenge. During warmer months there seems to be an interest in the farmers' market, yet interest quickly wanes as the seasons carry on. As a result, lack of buyers and demand diminish leaving growers unsupported. Many focus group participants believe this is due to people regressing back to purchasing convenience and fast food. With accordance to the literature, these food options are very popular and familiar to this type of demographic (Barnes et al.,

2016; Foster et al., 2014; Liese, et al., 2007; Walker et al., 2010). The economic investments required for a successful farmers' markets are not being met, thus doesn't make them a plausible solution for this community.

Non-profits are also a major source of fresh produce procurement. Grow Appalachia, helps local farmers and home growers expand their crop yield. According to focus group participants, Grow Appalachia will supply the individual with labor, seed, and equipment needed to have a large crop yield. "they (Grow Appalachia) paid for all my seeds and everything...I bet there was between tools and everything, well over a \$1,000 put into my garden." Another advantage to Grow Appalachia is the education residents receive on how to preserve excess produce. "I have learned a lot...more about canning and different things..." This in turn, can be sold for profit at the local farmers' market.

Grow Appalachia and its partnering with the Martin County Cooperative Extension could fill the gaps between food security and health related outcomes. This partnership is serving as a resource to help equip, train, and support local gardening in the county all season long (Cardarelli et al., 2020). In identified themes such as Lack of Community Capacity and Generational divide, it was highlighted that people are not motivated to keep a garden without help to maintain it. Due to the ongoing and individualized support, a Grow Appalachia framework could be a sustainable solution to maintaining a crop yield and enhance produce procurement in this area (Cardarelli et al., 2020).

Finally, faith-based organizations have been mentioned by many as being a resource of obtaining produce (Table 3). These organizations often have food pantries where donated food is stored for those in need of it. Similar to existing literature, these local food pantries also lack fresh fruits and vegetables but provide patrons with ample shelf-stable and

nonnutritive foods (Duffy et al., 2009). These areas are also where community members congregate, share food recipes, and bring produce to give to one another. The faith, activity, and nutrition (FAN) program has published several studies about its success to increase physical activity and fruit and vegetable consumption through a church-wide intervention (The Faith, 2020). The program involves pastors, church directors, coordinators, and/or passionate clergy members to lead a committee to improve healthy eating and physical activity within their church. After a 15-month follow up, churches involved in the FAN program consumed 0.64 cups more than control churches (Wilcox et al., 2020) These programs have been maintained for over a 2-year period and could serve as a sustainable solution in Martin County or similar communities. These organizations need to be further researched using a SEM model to better understand this untraditional food outlet as a part of the local food system.

Due to food assistance programs such as these, produce procurement is simplified and achievable. These findings support the hypothesis that food assistance programs are the largest facilitator for obtaining produce in Martin County. These findings will allow for future SEM and PSE-change frameworks to be a sustainable solution for residents to acquire fresh fruits and vegetables.

## 5.2 Barriers to obtaining fresh produce in a low-income Appalachian community.

The cost, lack of resources, lack of motivation, and lack of nutrition education were common barriers in all the focus group interviews which is consistent with previous reports from Appalachian communities (Davis, n.d.; Duffy et al., 2009; Kumanyika, 2019; Liese et al., 2007; Miller et al., 2016).



Food cost is a significant barrier, a study validated the fact that healthier baskets of food were 16-22% more expensive than “regular” baskets (Liese et al., 2007). Participants and research stress that those on a fixed income do not have the financial resources to pay for expensive perishable goods (Bardenhagen et al., 2017; Liese et al., 2007; Miller et al., 2016). Although the desire for fresh fruits in vegetables is there, shelf stable items and fast-food are perceived as a better investment to feeding families due to their inexpensive price and shelf-stability. “When it (fresh fruits and vegetables) is available, do you think that the community is purchasing them?” “[participants multiple]: Absolutely!”

Cost and product availability limits the purchasing power of residents in rural communities including Martin County (Bardenhagen et al., 2017; Liese et al., 2007). According to focus group members, the few local grocery and corner stores do not have a wide selection of nutrient dense foods. This finding is consistent with previous research, where convenience stores had nearly 80x fewer fruits, vegetables, and lean meat options compared to their supermarket superior (Liese et al., 2007). Access to healthier food was a reported barrier mentioned by most participants. Residents without modes of transportation or limited finances may be unable to afford the expense of traveling to well supplied supermarkets (Bardenhagen, 2017). According to research, this increases their risk of obesity and disease outcomes (Liese et al., 2007; Miller et al., 2016; Walker et al., 2010).

A clear picture is painted by focus group members of what the food environment is like in Martin County. The limited amount of produce is reported to be overly ripe, rotten, black, and/or non-appealing to patrons. Furthermore, there is an overabundance of fast-food restaurants with a variety of inexpensive options. This inconvenience discourages residents from purchasing fresh produce and encourages fast-food consumption. Consistent

with findings, Martin County and other rural farmers' market and local produce stands are frequently understocked and unopen (Jilcott et al., 2014). This further hinders accessibility of fresh foods. As illustrated in Table 3, the farmers have also noticed a decrease in consumer participation over the years.

Lack of motivation was a key theme identified as being a reason for decrease in consumer purchasing. These insights support the barriers discussed in the literature review on farmers' markets but conflict that this may be a sustainable solution for this specific community. PSE strategies, such as a farmers' market, may not be a "one size fits all." This may be a sustainable solution in other parts of rural Kentucky but for Martin County other strategies need to be utilized in order to address food access and affordability that is culturally relevant and appropriate for the community residents.

Participants suggest that cultural norms, social influences, and individual factors are what drive their food choices. According to residents, the culture in the community consists of the consumption of unhealthy food. Consistent with findings, Martin County has a high prevalence of obesity at 43.3%, yet residents seem unconcerned about improving (Martin, n.d.). "It's (healthy behaviors) never really been a part of our culture around here, it just isn't. I mean we're like the unhealthiest people in the country. This part, I mean that's just honest, central Appalachia it is." This lack of motivation drives the purchasing of convenient and fast foods, ultimately contributing to diet-related disease. Acceptance of their cultural perceptions and traditions has made the community apprehensive toward unfamiliar foods and programs working to improve healthy food choices.

Comfort and familiarity are strong drivers for food purchasing. Unfamiliar foods are often avoided or remain unpurchased by residents in this community. Parallel to research

on similar regions, this culture has a strong comfort with pre-prepared, instant, shelf-stable, and fast foods (Bardenhagen et al., 2017; Liese et al., 2007). Literature heavily suggests that availability and affordability are the leading barriers to fruit and vegetable consumption in these communities (Davis, n.d.; Liese et al., 2007; Miller et al., 2016). However, these findings suggest that there is a culturally relevant component to produce being offered and the acceptability of it. According to focus group members, the community is resistant to introducing fruits and vegetables they do not know how to prepare. Concurrent with the literature, this disadvantaged county lacks the proper nutrition and culinary knowledge (Bardenhagen et al., 2017; Barnidge et al., 2015). As identified by focus group participants, an absence of nutrition knowledge, in multiple generations, is attributed to laziness and school curriculum. Parental figures are not passing down their knowledge because they either lack it themselves or prioritize premade foods. “I am sure there are a lot of kids out there right now that’s in high school that have very little fresh vegetables their whole life. Their parents have always went to McDonalds or a pizza place.” According to residents, “Home Ec” or Home Economics is no longer offered at the local high school, which historically was their source of education for food preparation and nutrition.

This lack of education on food, nutrition, and agriculture was identified by many focus group participants as being a major barrier to healthy eating. Most of the community is unfamiliar with basic cooking techniques and/or gardening. “Nutrition education, I think, you know, there’s a big gap there. I think a lot of people just don’t realize the benefits of fresh fruits and vegetables as opposed to, you know, junk food.” Due to the absence of education and availability/affordability of produce, people are limited on what they can

prepare at home. Community gardens seem to be a sustainable solution in similar counties but historically Martin County residents suggest this didn't enhance their food security, as seen in Table 3 (Jilcott Pitts et al., 2017; Jilcott Pitts et al., 2014; Barnidge et al., 2013). These findings demonstrate the importance of determining existing factors to create an individualized PSE-change model intervention.

It becomes increasingly clear that lack of community engagement to change dietary patterns and food purchasing is a major barrier to Martin County residents in terms of produce procurement. These findings are synonymous with the hypothesis. Although lack of community capacity is a major barrier, it remains unclear if this was the most reported barrier experienced by residents as hypothesized.

### 5.3 Existing SEM and PSE Change Programs

It was identified through various focus groups that Grow Appalachia, the local farmers' market, and food pantries are the main sources for better-quality produce in the region. Community gardens, although not a main source, was identified as a potential program that may enhance food security. Community gardens could build off the communal nature exemplified by home gardens that promoted bartering and sharing of goods. Participants agree that, although these programs have been identified to increase food security to some degree, they are not without their issues. Understanding existing food systems and their flaws, in respect to Martin County, allows for the development of a sustainable solution.

Table 3. Existing Programs in Martin County

Existing Program	SEM/PSE Change	Issue with the Program	Community-wide Result
Community Gardens	SEM: Incorporates Intrapersonal, Interpersonal, and Community Factors  PSE: Changes to Environment	Understaffed and unmaintained.  Doesn't address institutional or public policy.  Doesn't include change to the policy or system.	Missed opportunities to learn and promote food access
Farmers' Market	SEM: Incorporates Intrapersonal, Interpersonal, and Community Factors  PSE: Changes to Environment	Lack's participation from farmers and buyers.  Doesn't address institutional or public policy.  Doesn't include change to the policy or system.	Extinction of farming and further limits food availability
Food Pantries	SEM: Incorporates Intrapersonal and Community  No PSE change	Residents may be unaware of resource. It offers a quick fix. Does not address the root cause of food insecurity.  Doesn't address interpersonal, institutional, organization or public policy.  Doesn't include change to the policy, system, or environment.	Continued existence of food insecurity and poverty due to missed opportunities
Grow Appalachia	SEM: Incorporates Intrapersonal, Interpersonal, Institutional, and Community Factors	Funds individual farmers.  Doesn't address public policy.	Limited number of community members are supported. Welcomed more than other programs

	PSE: Changes to System and Environment	Doesn't include change to the policy.	
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Although community gardens were not identified by focus group members as being a main source of produce procurement, it was identified as a temporary resource for food. Community run gardens showed promising results to improving BMI, consumption of fruits and vegetables, and providing food access to similar rural counties (Bardenhagen et al., 2017; Barnidge, 2013; Jilcott et al., 2014). Group members agree that nearly every community garden program that has been started in the past has inevitably failed. Missing the vital parts institutional and public policy of the SEM framework and leaving policy and systems unchanged could explain the abandonment of the project.

Historically, these programs have worked due to community-wide participation and pride in the produce they grew (Jilcott Pitts et al., 2014). A disconnect between focus group reports of community pride and participation began to emerge during the sessions. A participant, in the fourth focus group, stated kids loved it (gardening) and they would proudly flaunt what they grew; “kids were able to say “I helped grow this cabbage and make the kraut. And they had a local gentleman come in and do soup beans. So those kids were able to you know kind of show off what they did...” This demonstrates pride that resulted from involvement in the community garden. Discontinuation of community gardens may be caused by a lack of maintenance. Residents do not have the resources available to keep a garden growing and therefore are not a sustainable solution to food security.

A significant absence of participation in the local farmers' market was identified in several focus groups. "Happens lot more in the spring. And the early summer, like [NAME] said with the farmers' market, it fades out as the summer goes on". The lack of consumer and farmer presence creates a lesser need for a farmer's market. Due to the depreciation of farming, fewer generations are going into the profession. "You would probably have to have someone to teach people because while there aren't any farmers in the county, they're getting old or they have already died off and heaven forbid the kids would ever have to work in a garden. The kids grew up you know (laughing)". This depreciation of the market puts farmers out of business, impairs the local economy, and reduces access to fresh produce in the community. The disconnect of community resources is a result of missing links of the SEM and PSE change frameworks such as public policy and systems change. While the success of these markets has been heavily published in research (Jilcott Pitts et al., 2014; Jilcott et al., 2017), this may not be a lucrative solution for Martin County.

The local food pantries offer emergency services to those who suffer from food insecurity. Residents, who know about the pantries, report they are often closed due to a shortage in staff, are greatly understocked, and underutilized. A large majority of focus group members were unaware of several aspects of the pantries. "I have heard that there is (in reference to a food pantry) but I don't really even know where it is". "I have spoken to some, a lady that works there at the Facing Hunger food pantry and she said that there is not a lot of participation in Martin County". Limited availability of food and hours of operation deter many from frequenting food pantries (Duffy et al., 2009). Food assistance programs, like food pantries, rarely incorporate SEM and PSE change frameworks and do not target the root problems of food insecurity. As a result, food access and poor dietary

behaviors are still extremely prevalent. Identifying potential changes within the local food system and developing strategies to address the causal factors of food insecurity may be a more sustainable starting point.

Unequal allocation of resources was the main issue identified with Grow Appalachia. This non-profit partners with the Martin County Cooperative Extension Office to help communities plant, harvest, and cultivate home gardens to improve food security. Seed, equipment, services, and education allow gardens to thrive and increase produce production. Individual growers who are supported by Grow Appalachia greatly benefit from the support but a majority of the county is left without support. “Course, my whole living room is still covered in produce. I’ve still got potatoes and squash and everything laying everywhere. And I have canned over 400 jars of stuff. And I am still going”. This participant goes on to explain that they share their produce with close family, friends, and whoever wants “to come help pick it, can have some.” They do not sell it through formal outlets such as the farmers’ market. As a result, the greater community does not benefit from Grow Appalachia’s service, but rather small social networks centralized by a Grow Appalachia-supported grower. Implementation of public policies could allow for greater success.

Currently, these existing programs are not considering the roots of systemic issues and therefore are not an effective solution for Martin County. Due to the heterogeneity of rural Appalachian counties, it cannot be assumed that similar programs will be successful and sustainable across all communities. SEM and PSE-change frameworks similar to Grow Appalachia are likely to be the most successful in food procurement in Martin County due



to the support it provides to small social networks in bartering and trading locally grown produce in remote and geographically isolated pockets of this Appalachian county.

#### 5.4 Limitations

This study had multiple limitations. For this study, random sampling was not conducted. A community-engaged approach was used to recruit Martin County residents. Findings of this study may be limited due to the small sample size. The sample size skewed the general sociodemographic data due to the overall higher level of education between groups. This confirms that this small group of people may not be a good representation for the county in its entirety. More representative data could have been collected and analyzed had more participants attended focus group interviews. Reported barriers were subject to what the small sample sized had identified and does not represent all the barriers that influence access to produce and food. Incentives were given to participants regardless of their level of participation. This creates an equity perspective and further limits unbiased data collection. In addition, COVID-19 inhibited the further use of N-Vivo 11 for data analysis. Due to campus wide closure, the N-Vivo software could not be accessed. Despite the limitations, this study demonstrates that SEM and PSE-change based interventions need to be individualized to fit a unique community and their environmental circumstances to be successful. This analysis acknowledges that rural Appalachian counties need different interventions due to the individuality of their communities.

## 5.5 Implications

Findings from this study will be used to create a sustainable systems-approach solution in rural Appalachian communities. Systemic issues such as food access, persistent poverty, and equal allocation of resources must be considered in future initiatives. Understanding the specific barriers and facilitators to healthy food access within a rural Appalachian community will facilitate project development. The identification and evaluation of existing SEM and PSE change models is likely to influence the framework of future programs and the way funds are allocated to support community-based initiatives such as home-grower resources, community gardens, and food pantries. Interventions that connect residents with sustainable resources in their community are likely the key to improving access and consumption of fresh fruits and vegetables.

## 5.6 Conclusion

Food availability continues to significantly impact dietary behaviors and health related outcomes in rural Appalachian regions such as Martin County. Even with the existence of farmers' markets, community gardens, food pantries, and support from non-profits, one in five Martin County households are considered food insecure (Food, 2020). This study reveals the importance of investigating existing resources in rural Appalachian counties to identify the barriers to equal allocation of food. Historically, similar projects have had broad success in rural counties. This study revealed the heterogeneity of Appalachian counties due to the ineffectiveness these projects have had in Martin County compared to success observed with the same initiatives in other rural communities. Barriers to accessing fresh fruits and vegetables were food cost, underutilized resources, insufficient

community capacity, and lack of education. Further investigation needs to be done on the facilitators such as the impact personal gardens, non-profits, and faith-based organizations have on promoting food security. Non-profits such as Grow Appalachia have shown promising results on success and sustainability in Martin County, due to its investment to small growers and its collaboration with the community extension agents. Focusing interventions on the local food system will enhance community capacity, food security, consumption of fruits and vegetables, and improve health outcomes.

## APPENDICES

### APPENDIX 1. FOCUS GROUP QUESTIONNAIRE

University of Kentucky Family and Consumer Sciences Extension  
Project Title: Healthy Eating and Active Living to Reduce Rural Obesity through Extension

Target audiences: *local food retailers, health coalition members, community residents*  
Principal Investigator: Jennifer Hunter, PhD

Instrument Title: Focus Group Questions

We are asking you to take part in a 60-minute focus group about resources available for making healthy choices in your community, the need for additional resources to promote healthy choices, and the barriers and facilitating factors to support healthy eating habits and physical activity in your community. You have been invited to participate based on your role in the community. You do not have to respond if there are any questions you are uncomfortable answering. You will be compensated for your time at the end of today's focus group: all participants will receive a \$25 gift card. If you agree to participate, we invite you to sign our consent form at this time.

#### **Introduction Script:**

Good morning / afternoon. Thank you for taking the time to be here today. My name is \_\_\_\_\_ and I will be leading this focus group. The notetakers and I are from the University of Kentucky Cooperative Extension Service. Your participation is greatly appreciated, and we hope to have a good discussion this morning / afternoon. Please silence your cell phones so we may have fewer distractions during our time together.

My role is to ask questions and keep the conversation moving. We want to create a safe place for everyone to share their opinion, so please be respectful and let people finish their thoughts before responding. We encourage you to share your perspective, even if it is different from others. There are no right or wrong answers to the questions asked, only different points of view. You are free to participate as much or as little as you feel comfortable. We have one note taker sitting in the back of the room and will also be tape recording this focus group session.

We are here today to talk about healthy eating and active living. We would like to identify or better understand any facilitating factors and barriers to making healthy choices in your community. The responses you share today will help us identify needs for future programs in the community.

Let's begin by going around the room. Please introduce yourself by first name only and state your role i.e. grocery store manager, local farmer, coalition member, community resident etc.

## End Script:

Thank you very much for your time. It is important for us to understand the available resources for healthy choices within a community, as well as what needs to be developed. Your answers are important and useful to us. We appreciate your time and thank you again for attending and sharing your opinions.

University of Kentucky Family and Consumer Sciences Extension  
Project Title: Healthy Eating and Active Living to Reduce Rural Obesity through Extension

Target audiences: *broad representation of community residents*

### Questions:

“The first set of questions we are going to ask are related to healthy food choices. These questions will be related to resources in your community, the need for additional resources, and any challenges you may have to make healthy choices in your community.”

1. “Where are the places you can purchase food in your community?”
  - Probe: “How easy it is to get fruits and vegetables at these locations?”
2. “Who are the key people or places in the community that provide fruits and vegetables?”
3. “Do you think your community is designed to promote healthy eating choices? Why or why not?”
  - Probe: “What factors in your community make it easier to eat healthy?”
  - Probe: “What factors in your community make it harder to eat healthy?”
  - Probe: Would you consider transportation a barrier?
4. “What resources are available for people to eat healthy in your community?”
5. “What other resources do you think would be helpful to have in your community to allow people to purchase fruits and vegetables?”
6. “What would be some ways to motivate or encourage people in your community to eat fruits and vegetables?” “We are now going to transition to a few questions related to physical activity. As with those we just went through, these questions will be related to resources in your community, the need for additional resources, and any challenges to being physically active in your community.”
7. “How often are you physically active?”
  - Probe: “What kinds of physical activities do you do?” Consider walking, gardening, housework, etc.
8. “How easy is it for you to be physically active in your community on a regular basis?”
9. “What resources are available in your community that allow you to walk for physical activity?”
  - Probe: “Do you use them, why or why not?”
  - Probe: “How safe do you feel utilizing these resources in your community?”
10. “What are some of the common everyday destinations in your community?”

11. “What changes would you make to your community to encourage more walking to everyday destinations?”
  - Probe: based off question 12 responses, additionally: post office, pharmacy, grocery, community center, bank, if needed)
12. “Of the destinations you shared, are there spaces that feel safer than others? Why or why not?”
13. “What are ways to encourage people in your community to walk more?” “Thank you for your thoughtful responses so far. We want to end our time together by asking a couple of summary questions.”
14. “Of all of the things we have talked about today, what is the most important to you?”
15. “Is there anything we should have talked about, but didn’t?”

APPENDIX 2. DEMOGRAPHIC SURVEY

University of Kentucky Family and Consumer Sciences Extension  
Project Title: Healthy Eating and Active Living to Reduce Rural Obesity through  
Extension

Current resident zip code: \_\_\_\_\_

Your role (grocery store manager, farmer, Coalition member, community resident etc.)  
\_\_\_\_\_

Age: \_\_\_\_\_

**Gender:**

Male \_\_\_\_\_ Transgender male to female \_\_\_\_\_  
Female \_\_\_\_\_ Transgender female to male \_\_\_\_\_

**How do you most identify yourself?**

African American \_\_\_\_\_ White \_\_\_\_\_ Hispanic \_\_\_\_\_ Asian \_\_\_\_\_  
Native American \_\_\_\_\_ Multi-Racial \_\_\_\_\_ Other \_\_\_\_\_

**Education:**

6<sup>th</sup> grade or below \_\_\_\_\_ High school graduate or GED \_\_\_\_\_  
7<sup>th</sup> – 8<sup>th</sup> grade \_\_\_\_\_ Some college \_\_\_\_\_  
9<sup>th</sup> – 11<sup>th</sup> grade \_\_\_\_\_ College graduate \_\_\_\_\_

**Household Income:**

Less than \$20,000 \_\_\_\_\_  
\$21,000-\$39,999 \_\_\_\_\_  
\$40,000-\$59,999 \_\_\_\_\_  
\$60,000-\$79,999 \_\_\_\_\_  
\$80,000-\$99,999 \_\_\_\_\_  
More than \$100,000 \_\_\_\_\_

## APPENDIX 3. CDC CODE BOOK

### Code Book

1. Food Source
  - a. Purchasing local- gas station, IGA, Save-a-lot, dollar general, farmers market, produce stand
  - b. Beyond the county- Walmart, food city
2. Travel
  - a. Time- convivence
  - b. barriers- distance to healthy choices
  - c. destinations
  - d. feasibility
3. Food Access/Availability
  - a. Lack of variety
  - b. Lack of quality (not fresh)
  - c. Lack supply (produce stands sell out quickly)
  - d. Low demand- people are not buying produce available
  - e. Seasonality- winter/fall
  - f. Unhealthy?
4. Convenience
  - a. Non-perishables
  - b. Fast food
  - c. Easy choices – quickest and easiest over healthy choices
5. Generational
  - a. Older and younger generational divide in community
  - b. Preferences in behaviors
  - c. Cycle- never experienced healthy choices so they don't make them themselves
  - d. Example setting – mentors/parents will help adolescents make better health choices
6. Cultural Norms
  - a. Denial – do not accept ramifications of unhealthy lifestyle choices
  - b. Do not prioritize healthy choices
  - c. Shifts in cultural norms- health positivity individuals are participating in healthy lifestyle choices
7. Expensive – Healthy food items are more expensive than processed foods. Fast foods are cheaper
8. Poverty
  - a. Low SES influences ability to procure healthy foods
9. Awareness
  - a. Food pantry awareness or unawareness
10. Vouchers-
  - a. Senior farmers market
  - b. WIC vouchers accepted at food outlets



11. Nutrition Education
  - a. Gap in understanding importance
  - b. Lack of education in community- community classes
12. Knowledge
  - a. Not knowing how to prepare healthy choices,
  - b. Obtaining knowledge from others in community
  - c. Denial- knowing vs acting
  - d. Food waste
13. Preferences: Specificity of fruits and vegetables they like and dislike
14. Gardening : ind. Garden that is consumed in household and personal network
  - a. Grow Appalachia
15. Farming decline – lack of local growers producing food
  - a. barriers
16. Geography –
  - a. Isolation
  - b. Community divide “other side of the hill”
  - c. Cultural divide between community
17. Safety
  - a. Lack of safety
  - b. Perceived as safe
18. PA engagement
  - a. Competition- technology
  - b. Accountability
19. Lack of PA
  - a. Limited options/closure
  - b. PA division
20. Areas people are physically active- trails, gyms, etc. that encourages PA
21. Lack of motivation- laziness – unwillingness to be PA
  - a. Disinterest among community members in PA and use of farmers markets
22. Desire for PA options- desire for more fitness classes, trails, biking trails
23. Non-traditional food sources? – community sharing
  - a. Food pantry
  - b. Church
  - c. Personal gardening
24. Community Pride – engagement ownership
25. Lack of community investment - Loss of commerce – loss of small businesses
26. Communication channels- ways to distribute information
  - a. “Physical” – mail, flyers, grocery store bags
  - b. Social media – primary means of communication and provides network
27. Destinations- common everyday destinations within the community
28. Schools – resource in the community

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## VITA

Caroline Blincoe, RD, LD

### Education:

- Bachelor's of Science in Dietetics, Coordinated Program
  - University of Kentucky, Lexington, KY, August 2019
- Certificate in Health Science, Nutrition for Human Performance
  - University of Kentucky, Lexington, KY, August 2019
- Master's of Science in Nutrition and Food Systems (expected)
  - University of Kentucky, Lexington, KY, May 2021

### Professional Positions Held:

- Nutrition Coach
  - UHS Health and Wellness, University of Kentucky, Lexington, KY, August 2019 to present
- Graduate Assistant
  - University of Kentucky Athletics Department, Lexington, KY, August 2020 to present
- Teaching Assistant
  - Department of Dietetics and Human Nutrition, University of Kentucky, Lexington, KY, August 2019 to January 2020
- Research Assistant
  - Department of Dietetics and Human Nutrition, University of Kentucky, Lexington, KY, August 2019 to January 2020

### Professional Membership:

- Bluegrass Academy of Nutrition and Dietetics
  - December 2015 to present
- Academy of Nutrition and Dietetics
  - November 2015 to present

#### Publications/Presentations

- Blincoe C, Norman-Burgdolf H, Mullins J, Brewer D (2021, April). Procuring Produce In A Rural, Appalachian County: A Thematic Analysis Of Community Member Experiences, University of Kentucky, Lexington, KY.