PARITICPATORY PHOTO-MAPPING: BUILT ENVIRONMENT COMMUNITY ASSESSMENT FOR HEALTHY EATING AND ACTIVE LIVING

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Bachelor of Science in Family & Consumer Sciences

Nutrition Sciences

Baylor University

Waco, Texas

2013

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
The Degree of
MASTER OF SCIENCE
July 2015

PARTICIPATORY PHOTO-MAPPING: BUILT ENVIRONMENT COMMUNITY ASSESSMENT FOR HEALTHY EATING AND ACTIVE LIVING

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ACKNOWLEDGEMENTS

Thanks to my committee, Dr. Hildebrand, Dr. Fink, and Dr. Parker. I appreciate your help over the last year and I am grateful for your guidance, advice, and time. Thanks also to the Logan County participants for joining with us in collecting data for this project.

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Date of Degree: JULY 2015

Title of Study: PARTICIPATORY PHOTO-MAPPING: BUILT ENVIRONMENT COMMUNITY ASSESSMENT FOR HEALTHY EATING AND ACTIVE LIVING

Major Field: NUTRITIONAL SCIENCES

Abstract: The purpose of this research was to identify factors within the built environment of a community that either facilitated or inhibited healthy eating and physical activity prospects within Logan County, Oklahoma.

Methods: Participants were recruited from Logan County, Oklahoma, and were current residents. Data was collected via Participatory Research methods, including PhotoVoice, Geographic Information Systems, and Participatory Photo-Mapping. Using smartphones, participants took photographs of factors that either facilitated or inhibited healthy eating and physical activity; photographs were then mapped on Geographic Information Systems software according to the coordinates of picture location on their smartphone. A facilitated discussion was then held with the group of participants to discuss photographed factors of the built environment and their perceived effect on healthy lifestyles. Common themes were determined based on group discussion of facilitators and barriers.

Results: Participants resolved that access, finance, and social support were underlying themes regarding facilitation and/or inhibition of healthy eating and active living opportunities within Logan County, Oklahoma. Factors within these themes served as facilitators, but when perceived as limited or inadequate, functioned as barriers.

Conclusion: Participatory Research methods, specifically Participatory Photo-Mapping, is a useful tool to assess the built environment of a community to determine its effects on local healthy living. In relation to Logan County, Oklahoma, it was found that the primary barriers to healthy eating and active living could be attributed to deficient resources regarding access, finance, and social support. County and community leaders should explore opportunities to enhance healthy eating and active living by increasing healthy food selection and advertising, as well as awareness of locally-grown food sale, seeking additional funding prospects to build sidewalks, update, and maintain public physical activity areas, and formalizing joint-use agreements at each school site.

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CHAPTER I

INTRODUCTION

Obesity is a risk factor for the development of chronic disease and is associated with an increased risk for all-cause mortality (Borrell & Samuel, 2014). There is a positive correlation between overweight or obese populations and dissatisfaction in health-related quality of life, as well as diagnosis of health conditions, including cardiovascular disease, type 2 diabetes mellitus, and depression (C. Fjelstad, A. Fjelstad, Acree, Nickel, & Gardner, 2008; Rawlins, Baker, Maynard, & Harding, 2013). As of 2012, 66.3% of the adult population in Oklahoma was considered overweight, categorized as having a BMI $\geq$ 25 (CDC, 2012). A study on low-income preschoolers in the state of Oklahoma discovered that one-third of this population was categorized as overweight or obese based on a BMI $\geq 85^{th}$ percentile (Weedn, Ang, Zeman, & Darden, 2012). Forty-one percent of children with Native American heritage living within Oklahoma had a BMI $\geq 85^{th}$ percentile in 2005; in 2012, the adolescent population of Oklahoma reached an overweight or obese prevalence of 30.5% (Polley, Spicer, Knight,

& Hartley, 2005; CDC, 2012). The effects accompanying being obese contributed to 147 billion dollars of health costs in the year 2009, highlighting the negative influences on the physiological and psychological health of all individuals who are at an unhealthy weight (Finkelstein, Trogdon, Cohen, & Dietz, 2009; CDC, 2012).

Healthy eating and active living are important lifestyle behaviors related to decreased risk of obesity and chronic disease (Nykiforuk et al., 2013). Sedentary activities and lifestyles, such as excessive television viewing, contribute to low energy expenditure, while over consumption of high-energy foods results in excessive energy intake, and consequently, higher prevalence of overweight and obesity (Shriver et al., 2011; Polley et al., 2005). According to Polley et al. (2005), increasing rates of physical activity, especially in children, decreases body fat levels, prevents the onset of chronic disease, and also improves mental health status. Along with physical activity, monitoring daily energy consumption through portion control behaviors has been shown to have a positive influence on BMI, demonstrating that a decrease in energy consumption aides in weight loss (Poelman, Vet, Velema, Boer, Seidell, & Steenhuis, 2015). This suggests that environmental factors, as opposed to genetic factors, are the primary cause for the increasing prevalence of obesity, especially in young children (Rawlins et al., 2013). The built environment of a community, as an environmental factor, is thus a central target "critical for planning appropriate interventions likely to increase active living" and, similarly, incentives for healthy eating that will have the effect of reducing the pervasiveness of obesity and chronic disease (Dennis, Gaulocher, Carpiano, & Brown, 2009, p.467).

The built environment refers to the human-made environment and includes the physical activity resource environment and the food environment, as well as the access and availability of other resources, such as walkability, zoning influences, parks, and safety development within a neighborhood, town, or city (Fink, 2014). The built environment has a role in disease prevention and health promotion, either as a facilitator of or barrier to healthy eating and active living. Examples of how the built environment acts as a barrier to physical activity include the absence (or breaks in) sidewalks or shoulders along the road, the absence of street lights and the condition of the road surface, the presence of vacant homes, and locked schoolyards and recreation equipment (Hennessy et al., 2010). In regards to the food environment, barriers to healthy eating include distance to the supermarket (the food landscape overall), the presence or absence of produce in the neighborhood small market as well as the cost and quality of food at the market (Hennessy et al., 2010; Ghirardelli, Quinn, & Foerster, 2010). On the other hand, facilitators to healthy eating and active lifestyles include proximity to a supermarket and restaurants serving vegetables, greater distance to convenience stores and fast food outlets, the opportunity for church physical activity programs, destination proximity, and park and recreation areas, to name a few (Hennessy et al., 2010; Lucan, 2015; Rawlins et al., 2013).

According to Hennessy et al. (2010, p.537), characteristics of the "physical landscape, built environment design, social norms, and culture" of a specific place differ from community to community; accordingly, the presence of certain facilitators and barriers to healthy lifestyle behaviors may be different in one place as compared to another. In order to develop appropriate place-based interventions and initiatives in a

community to support healthy lifestyle behaviors, one must acknowledge the context behind the nature and use of the built environment in each setting; this can most aptly be accomplished by involving the residents living within a community using participatory research methods (Dennis et al., 2009; Hennessy et al., 2010).

By means of community engagement and participation, the built environment can be accurately assessed for healthy eating and active living opportunities. Community engagement is a key factor in the assessment of the built environment because it aids with the identification of barriers and facilitators that are specific to each community. Approaches to community engagement include the use of participatory research methods, particularly the combined research protocols of PhotoVoice and Geographic Information Systems that encompass Participatory Photo-Mapping.

Briefly, participatory research refers to a community-based research approach that creates opportunities for the collaboration of community members and researchers from outside of the community (Haggis, Sims-Gould, Winters, Gutteridge, & McKay, 2013). This partnership occurs during data collection, decision-making, and during the distribution of research findings to the community at large, as well as local policymakers (Vajjhala, 2005). PhotoVoice is a participatory research method utilizing photographs and facilitated discussions to influence community development and change (Wang & Burris, 1997). For this method, community members capture images that relate to the research question, discuss their potential themes and meanings, and then present their research findings to the community and its local policymakers (Wang & Burris, 1997).

Geographic Information Systems refers to a family of programs that integrate spatial data and attributes onto a map, such as the latitude and longitude locations of sidewalks, rivers, buildings, and neighborhoods, in order to create a visual of both social and objective experiences occurring within the community. Participatory Photo-Mapping refers to the combination of both PhotoVoice and Geographic Information Systems (Dennis et al., 2009). These two methods work in conjunction to highlight associations between qualitative data gathered through PhotoVoice's photo-elicitation and spatial data mapped in Geographic Information Systems software (Dennis et al., 2009). These four research methods are discussed in detail in the following chapter.

The purpose of the present research is to identify the factors that facilitate and inhibit healthy eating and physical activity specific to each community in the state of Oklahoma, allowing for the incorporation of new and existing healthy lifestyle choices. By identifying themes that encourage healthy lifestyle choices and incorporating them into the particular community, it will potentially reduce the presence of the effects of unhealthy lifestyles, such as overweight, obesity, and the occurrence of chronic disease.

The objectives of the ensuing research entail (1) engaging the community in visual perceptive and objective research to identify factors affecting healthy lifestyle behavior initiation, (2) identifying specific facilitators and barriers to healthy eating and active living, and (3) empowering residents to affect change in their communities based on their findings. This research is important because it will extend the knowledge on what is known about the effects of the built environment as it pertains to healthy eating and active living from the perspective of residents, and it will generate pertinent

information for the endorsement of change in Oklahoma communities with the goal of making the healthy choice the easy choice.

Terms and Definitions

ADA: American's with Disabilities Act; endorsed by the U.S. Congress in 1990, it forbids any discrimination based on disability and, of particular importance to this paper, enforces accessibility requirements on public venues (ADA.gov, n.d.).

BMI: Body Mass Index; a measurement of body fat based on height and weight (NIH, 2014).

Food Desert: communities without easy access to healthy foods. These communities may be primarily served by fast food restaurants, convenience stores with limited selection of foods, or have no food sources at all (USDA, n.d.)

Food Environment Index: indicator of access to food sources; scale from 0 (worst) to 10 (best) (Robert Wood Johnson Foundation, 2014).

GIS: Geographic Information Systems; integrates spatial data onto a map of a specific location.

Joint-Use Agreement: a school or other public or private organization opens indoor and outdoor spaces to public use, for example: gyms, soccer fields, basketball courts, playgrounds, etc. (Joint Use, 2009).

Limited Access to Healthy Foods: estimate of the proportion of the population that is both low-income (≤200% poverty threshold for comparable family size) and food insecure (Robert Wood Johnson Foundation, 2014).

PR: Participatory Research; community-based research approach that allows for a collaboration between researchers and community residents (Haggis et al., 2013).

PPM: Participatory Photo-Mapping; a fusion of PhotoVoice and GIS (Dennis et al., 2009).

SHOWeD: acronym for a structured set of questions used during PhotoVoice discussion, including (1) What do you **S**ee in this photograph? (2) What is really **H**appening in this photograph? (3) How does this relate to **O**ur lives? (4) **W**hy do these issues **E**xist? and (5) How can we become **E**mpowered and what can we **D**o about this? (Vaughn et al., 2008).

TSET: Tobacco Settlement Endowment Trust; their mission is to enhance the overall health of Oklahomans by reducing the use of tobacco and improving nutrition and fitness opportunities (TSET, 2015). TSET is funded by settlements made against any tobacco company; it was created to manage this money by the State of Oklahoma.

CHAPTER II

REVIEW OF LITERATURE

In 1990, the adult obesity rate in Oklahoma was 10.3%; in 2004, this increased to 24.1% (Robert Wood Johnson Foundation, 2015). This upward trend continued through 2013 when the adult obesity rate was measured at 32.5%, ranking Oklahoma the 7th most obese state within the United States (Robert Wood Johnson Foundation, 2015). The increasing prevalence of obesity involves increasing developments in physical infirmities, including metabolic abnormalities, hypertension, heart disease, obesity-related cancers, and osteoarthritis (Fuzhong, Harmer, Cardinal, Bosworth, & Johnson-Shelton, 2009; Robert Wood Johnson Foundation, 2015). According to Fuzhong et al. (2009, p.203), not only do obese individuals develop physical concerns, but "people suffering from obesity also face psychological problems, including depression, appearance consciousness, and lack of self-confidence." As might be expected, obesity has increased both medical and social costs substantially (Finkelstein et al., 2009; Fuzhong et al., 2009).

Overweight and obesity occurs due to an energy imbalance within the body; the gap between calories consumed and calories expended incurs abnormal and excessive fat

accumulation (WHO, 2015). The escalation in number of calories consumed by individuals may be attributable to increased portion sizes, increased intake of energy-dense foods, and an increase in meals eaten outside of the home (Poelman et al., 2015; WHO, 2015; Zainal Abidin, 2014). Opposing this trend and widening the energy imbalance gap is the trend towards physical inactivity. Physical inactivity has become more apparent, especially in the Western world, due to the increased sedentary nature of work, increased screen time, and decreased active transport venues (Thorne, Smith, Morgan, Babic, & Lubans, 2014; WHO, 2015). According to Fuzhong et al. (2009, p.204) overall weight gain is increasingly recognized as attributable to "biological, behavioral, and environmental factors."

The built environment is an environmental factor within communities that interplays considerably with the prevalence of overweight and obesity across the United States (Rawlins et al., 2013). In 2014, Chow et al. published a study that analyzed the built environment through photography, conducting research in eighty-six communities across five countries. They evaluated the built environment and determined factors that could increase physical activity within a community; these included (1) pedestrian facilities and safety features-quality of sidewalks, cross-walks, traffic signals, and quality and presence of bike lanes, (2) aesthetics/beautification-landscaping and natural features, (3) community disorder-presence of litter and vacant/poorly maintained buildings, (4) urbanization/density- street and vehicle density, and (5) overall appeal-pedestrian friendly, attractive buildings, and an aesthetically pleasing atmosphere (Chow et al., 2014).

The built environment affects not only active living but healthy eating opportunities as well. In 2010, Krukowski, West, Harvey-Berino, & Elaine-Prewitt published research assessing the availability and price of healthy foods and their influence on purchasing patterns. The results of their study found that larger stores (supermarkets) "consistently offered more favorable prices for healthier options" as compared to smaller grocery stores (Krukowski et al., 2010, p.318). The presence of supermarkets, density of and distance to grocery stores within a community, and amount of fast food outlets per unit area are also variables of the built environment that influence healthy eating (Drewnowski et al., 2014; Gomes et al., 2011).

In order to accurately assess avenues of potential change regarding the ramifications of the environment toward overweight and obesity prevalence, it is important to acknowledge factors that promote and inhibit healthy eating and active living behaviors. This identification will allow for specific modifications within community environments that support healthy lifestyle choices, such as exercise and the purchase of fresh fruits and vegetables.

Variables that act as facilitators or barriers to healthy eating and active living differ from community to community, thus no definitive nor objective understanding of cause and effect of the environment on a population can be ultimately established (Hennessy et al., 2010). Built environment research is also affected by natural changes, increasing the difficulties in conducting an experiment founded solely on cause and effect. Due to the particularly subjective nature of the consequences of the environment on the health of a specific population, it is vital to include the population of interest in researching factors that either promote or inhibit their choices in establishing healthy

lifestyles. Participatory research methods engage community members and outside researchers to work as a team in determining the primary factors and resources influencing the health of a population. The techniques of PhotoVoice and Geographic Information Systems, as well as their combination technique Participatory Photo-Mapping, are key participatory research methods encouraging "mutual learning on the part of the researched and researcher alike" (Lorenz & Kolb, 2009, p.263).

Participatory Research

Participatory research (PR) is defined as a community-based research approach involving a partnership between the community of interest and outside researchers (Haggis, Sims-Gould, Winters, Gutteridge, & McKay, 2013). It is a tool for community change that bridges the gap between knowledge and action by creating opportunities for the collaboration of community residents, researchers, and local policymakers (Khan, Bawani, & Aziz, 2013; Lorenz & Kolb, 2009). Savin-Baden & Wimpenny (2007, p.333) explained PR concisely as researching an "issue systematically from the perspectives and lived experiences of the community members most affected by that issue." For optimal and effective participation, collaboration between groups involves information gathering and dissemination, stakeholder communication, and participatory decision making (Vajjhala, 2005).

PR does not originate from a specific researcher or research group, but instead it incorporates ideas from a variety of developers, including Kurt Lewin and Paolo Freire (Freire, 1970; Glassman, Erdem, & Bartholomew, 2013; Lewin, 1947). Lewin, Freire,

and other pioneers juxtaposed the concepts of objective observation and subjective experience in regards to the acquisition of knowledge and the call to action that would produce social change (Freire, 1970; Gonzalez et al., 2007; Lewin, 1947). Objective observation, such as what might be done by outside researchers, may represent what the researchers think is an important aspect of a community to assess; while subjective experience, such as data gathered from community residents, would represent what the community views as important. In PR, this is a critical differentiation because, according to Wang & Burris (1997, p.372), "what researchers think is important may neglect what a community thinks is important," thereby affecting capacity for action and change.

Several principles are integrated into the model of PR: community participation, knowledge acquisition, and the association between knowledge and action. PR may be goal-oriented towards participant action, and thus may also include principles regarding empowerment, capacity building, and accomplishment (Gonzalez et al., 2007; Savin-Baden & Wimpenny, 2007; Tanjasiri, Lew, Kuratani, Wong, & Fu, 2011; Vajjhala, 2005). Community participation is key to PR data collection and is an aspect of virtually each principle. Tanjasiri et al. (2011) identifies community participation in the research partnership between community residents and researchers as occurring in the development and implementation stage of the project, as well as during data collection. The "cooperative engagement" of the research partnership is especially critical to successful interventions in the area of public health, allowing for simultaneous learning between both the participant and researcher (Tanjasiri et al., 2011; Haggis et al., 2013).

Knowledge acquisition is a key factor in all research models; the identifying variable in PR is the aim to "encourage mutual learning on the part of the researched and

researcher alike," similar to the idea of cooperative engagement (Lorenz & Kolb, 2009, p.263). Knowledge acquisition leads to increased awareness of public health challenges that may be specific to separate communities (Lorenz & Kolb, 2009). An important aspect of knowledge acquisition among community-based participatory research methods is critical dialogue (Wang & Burris, 1997). Critical dialogue includes reflection and problem-posing discussion among researchers and participants where the facilitator of the group discussion identifies a community health issue and supports discussion to ascertain themes regarding the issue of interest (Wang & Burris, 1997).

The association between knowledge and action shares an important link with the principle of empowerment in PR research. As joint learning occurs throughout the research process, specifically through critical dialogue, participants are encouraged to acknowledge issues that may contribute to community concerns; participants are then encouraged to address these concerns by advocating for community change with policymakers and stakeholders (Haggis et al., 2013; Tanjasiri et al., 2011). By empowering individuals of the community to address health concerns, PR produces findings that may generate more applicable health promotion ideas for specific communities (Dennis et al., 2009).

The last two recognized principles of PR regarding action-based research, capacity building and accomplishment, occur post-analysis of the research findings and after advocating for community change amongst policymakers and other stakeholders. Capacity building involves "sustained health monitoring and intervention activities" (Gonzalez et al., 2007, p.79). This principle of community-based participatory research is important to overall health promotion by instigating lasting impact within the

community. Examples of lasting impact within a community include both abstract and concrete accomplishments, such aspects as social capital, disease prevalence, and quality of life measurements (Gonzalez et al, 2007).

Based on these principles, PR, as a research model, is an essential tool in identifying aspects of communities that residents find as being either barriers or facilitators to healthy eating and physical activity. After identification of these facilitators and barriers, the principles of PR encourage action to produce community change that inspires healthy living.

PhotoVoice

PhotoVoice is one method of PR that uses a photographic technique to facilitate community development and change. Building off of the historical components of documentary photography and Paolo Freire's problem-posing critical education style, Caroline Wang and Mary Ann Burris developed the PhotoVoice procedure, originally termed photo novella, in 1994 (Wang & Burris, 1997). As a technique of PR, PhotoVoice necessitates community participation and employs a visual research method for members of the community to document their realities through images (Wang & Burris, 1997).

Wang and colleagues established three main goals of the PhotoVoice method: (1) enable community residents to document and critically reflect on their community's strengths and shortcomings, (2) facilitate dialogue and mutual learning about community issues through group discussion of visual images, and (3) influence policymakers and

other stakeholders (Wang & Burris, 1997; Wang & Redwood-Jones, 2001). Documentation of community strengths and shortcomings, as they relate to the research question, through the use of a visual image has been found to be an especially valuable tool to "promote an effective, participatory means of sharing expertise and knowledge" (Wang & Burris, 1997; p.369). Group discussion and dialogue concerning the visual images produced during data collection enhances the understanding of both the researcher and researched alike; conversation amongst participants identifies common themes developing in regards to the research question posed (Harley, 2012; Wang & Burris, 1997). Reaching policymakers, as the end goal of the PhotoVoice method, is accomplished by presenting the evidence of the visual image along with the identified themes. The target of PhotoVoice, as a PAR model of research, is to invite the community of interest to become the catalysts for positive change within their home communities (Wang & Burris, 1997).

The community should be involved in all phases of the PhotoVoice research process, including selection of the participants and planning of various aspects of the project, such as identification of the research question or discussion facilitation, as well as project implementation and information dissemination (Lorenz & Kolb, 2009; Wang & Burris, 1997). If possible, policymakers and stakeholders in community development should be included in all phases of the research partnership in order to increase capacity for change and the likelihood of lasting impact (Haggis et al., 2013). Dependent on the community and the research question(s), participants in the study may also become discussion facilitators (Wang & Burris, 1997). This may be ideal in a setting where

perhaps the community participants do not feel comfortable discussing issues with the researcher.

Discussion facilitation is a key variable in the PhotoVoice procedure. Discussion facilitation can be led by either a researcher or a participant who is dedicated to the outcome of the research being executed and who has an understanding of the local culture (Wang & Burris, 1997). It is important that discussion facilitators encourage critical reflection and dialogue between participants while at the same time resisting the urge to begin discourse over their own opinions (Wang & Redwood-Jones, 2001). In the PhotoVoice process, the facilitator acts as a support to pose questions, encouraging critical analysis of apparent themes that have been identified by the participant and not the researcher, and to build consensus on themes between the participants (Hennessey et al., 2010).

Discussion begins with selection of photographs that the participants find important, and method of selection can occur in various ways. Tanjasiri et al. (2013), in their study on tobacco control in Asian American and Pacific Islander youth, combined photographs taken by all individuals (168 photographs total) and then had the group select what they found important out of the stack (37 selected). On the other hand, Vaughn, Rojas-Guyler, & Howell (2008), in their study on Latina girls' perceptions of health, had each participant choose 1-2 photographs out of their personal total that they thought to be most important.

After selection of the photographs, the process of "contextualizing" begins in the group setting (Findholt, Michael, & Davis, 2011; Wang & Burris, 1997). This stage of

the PhotoVoice discussion involves storytelling and critical reflection to elucidate the meaning behind the images chosen. Dialogue may be enhanced by use of a structured set of questions posed by the facilitator, termed SHOWeD (Vaughn et al., 2008). This acronym imparts use of the following questions as participants reflect on their photographs: (1) What do you **S**ee in this photograph? (2) What is really **H**appening in this photograph? (3) How does this relate to **O**ur lives? (4) **W**hy do these issues exist? and (5) How can we become **E**mpowered and what can we **D**o about this? (Vaughn et al., 2008).

Once selection and contextualizing the photographs has taken place, the last stage of data analysis occurs: codifying (Wang & Burris, 1997). PhotoVoice elicits qualitative data, which can then be categorized into pertinent issues and themes relayed by the discussion (Vaughn et al., 2008; Wang & Burris, 1997). Codifying data may also lead to development of theories as they relate to the research question and discussion (Wang & Burris, 1997).

Reaching policymakers and other stakeholders within the community is an end goal of PhotoVoice, as determined by its pioneers Wang & Burris (1997). By completing this stage of the PhotoVoice technique, long-term impact can be addressed. In order to reach policymakers, increase public awareness of the issue at hand, and advocate on behalf of their communities, it is essential for participants and/or the researchers to present their findings. In a study completed by Tanjasiri et al. (2011), using PhotoVoice to assess the impact of tobacco control on Asian American and Pacific Islander community youth, presentation of findings occurred through the research staff at a meeting assembled by tobacco control advocates. Bennett & Dearden (2013) used

PhotoVoice to assess environmental and social changes in coastal communities in Thailand. They presented the findings of their research by printing a book that included photographs taken by participants and written passages depicting the stories that coordinated with the photograph. These books were printed for all of the participants, the village chiefs, and the local school districts in order to raise awareness. Along with the previous examples, presentation of findings has also occurred through newspaper articles and photography exhibitions (Findholt et al., 2010; Vaughn et al., 2008).

PhotoVoice is highly valuable as a participatory research method due to its relative ease of use and its flexibility in how it can be used (Wang & Burris, 1997). PhotoVoice can be utilized to reach different groups and communities; it is especially suitable for use in vulnerable populations, such as collaboration with children and marginalized groups, and amongst less educated groups, such as the illiterate or those who cannot write in the dominant language (Wang & Burris, 1997). The flexibility of how PhotoVoice can be used allows this technique to meet specific goals to answer a research question posed. In past and current research, PhotoVoice has been used in three separate ways: as a participatory needs assessment technique, a program evaluation tool, and as a method to address distinct public health issues.

Vaughn et al. (2008) used PhotoVoice as a participatory needs assessment technique in order to assess preadolescent Latina girls' notions of health, including their possible health concerns. As a minority group and vulnerable population, the use of PhotoVoice in this scenario gave a voice to the youth, whose input did not typically factor into large community initiatives. By analyzing the Latina girls' concept of health and what might worry them, based on the photographs they produced during data

collection and their critical reflection dialogues, specific needs of this community were identified and made known to policymakers through a photography exhibition. The conclusion of this study's data determined that when needs are recognized and acknowledged by policymakers, more "sound, cost efficient, and successful programs and interventions" can be generated (Vaughn et al., 2008).

Kramer, Schwartz, Cheadle, and Rauzon (2012) used PhotoVoice as a program evaluation tool to assess a community-based obesity prevention effort, the Kaiser Permanente Community Health Initiative, in three Denver, Colorado and three Northern California communities. In this study, the PhotoVoice technique was utilized twice, once as a needs assessment before the initiation of the Community Health Initiative, describing barriers to healthy eating and active living, and once during follow-up of the Community Health Initiative to determine changes that had occurred within the communities. At the second PhotoVoice utilization, a review of baseline photographs occurred before participants took cameras out into their community to photograph the biggest accomplishments of the Community Health Initiative. The conclusion of this data suggests that, as a program evaluation tool, PhotoVoice is valuable in ascertaining community views of the success of a program as well as useful in obtaining a supplemental subjective, versus objective, evaluation (Kramer et al., 2012).

Findholt et al. (2010) engaged the use of PhotoVoice to address a distinct public health issue: obesity. In this study, six high school students were recruited to use two disposable cameras and take pictures regarding characteristics of their community that affect both children's food choices and their physical activity. In this manner, PhotoVoice was used to specifically address the facilitators and barriers to healthy eating

and active living due to an individuals' environment. The conclusion of this data determined that, in regards to specific health issues, PhotoVoice was an effective method to reach community residents and stakeholders, increase awareness of the effects of environment on health, and promote youth leadership (Findholt et al., 2010).

Geographic Information Systems

There is an evidence-based association between where people live in regards to their surrounding built environment and their potential health-related behaviors (Kerr, Duncan, and Schipperjin, 2011). As Dennis et al., (2009) emphasized, health interventions on an individual or population level would likely be enhanced by additional "place-based interventions." An avenue of research for exploring place-based interventions is the incorporation of Geographic Information Systems (GIS) into the research process. While PhotoVoice incorporates subjective experiences into the research practice, GIS uses the integration of spatial data to detect social and objective experiences (Vajjhala, 2005). GIS layers physical resources of a community and synthesizes spatial information from a variety of sources onto a multi-layered map of a community (Vajjhala, 2005).

An individual's lifestyle behaviors, whether health-related or other, do not typically occur only in one place; on the other hand, multiple locations and environments influence an individual's lifestyle decisions (Kerr et al., 2011). Thus, it is important for location devices to be lightweight for ease of carrying to separate locations, fostering accurate and comprehensive data collection for use in GIS mapping (Kerr et al., 2011).

The location devices used in place-based research have most commonly been global positioning systems (GPS) devices (Kerr et al., 2011). GPS devices have been made to be lightweight and low-cost, and are commercially available for research purposes (Abraham et al., 2012). Mobile communication devices, such as smartphones, have GPS units installed within them, and therefore are becoming a tool increasingly used in place-based location research (Lwin & Murayama, 2011). Enabling GPS utilization through smartphones allows for the association of a location with specific content on the mobile device (Boone, 2012). Smartphones are carried around naturally on a daily basis to various activities and their small frame permits easy carrying, enhancing their potentially valuable role in social science research (Boone, 2012).

GIS can be used to assess local needs, evaluate a program or governance pattern, and to determine local land use and resource allocation (Kwaku Kyem, 2001). Specifically in regards to health research, GIS can be used to represent health data, such as access to healthcare, disease prevalence, surveillance, and clustering, and health outcomes spatial analyses (Beyer, Comstock, & Seagren, 2010).

Ghirardelli, Quinn, & Foerster (2010) used GIS mapping as a method to document the food environment of low-income California communities. They assessed food store types located within a specified distance from the selected low-income neighborhoods, identifying supermarkets, large grocery stores, small markets, convenience stores, and dollar/drug stores. Within a selected sample, they surveyed the store options of fruits and vegetables, such as quality, price, and amount. Overall, Ghirardelli & Foerster (2010) concluded, based off GIS spatial data, that although low-

income neighborhood stores may carry produce, the quality offered does not meet the standards found in food stores in higher-income neighborhoods.

In a study completed by Hajna, Dasgupta, Halparin, & Ross (2013), GIS was used to derive the walkability of a neighborhood in Canada. Results showed that GIS was a useful tool in assessing factors of the built environment, such as street connectivity and land-use mix, that boosts the neighborhood's walkability status, but they also found that GIS-assessed walkability status of the neighborhood did not correlate well with participant-reported walkability of the neighborhood.

The focus of GIS is limited to characteristics of specific locations within a community, although population and livelihood information may be more pertinent for analyzing attributes of the community as a whole (Vajjhala, 2005). To glean this additional information, participatory GIS, also known as public participation/ community integrated GIS or participatory mapping, has established itself in the field of research (Dunn, 2007). This participatory approach to GIS research draws social information from a community of interest and organizes it spatially; it remains as complex and precise as GIS alone, while also incorporating locally relevant issues due to community participation (Vajjhala, 2005).

Participatory GIS allows a researcher a glimpse into not only *where* people live, their location of place, but also a glimpse into *how* they live (Vajjhala, 2005). By interposing social information collected by community members onto objective spatial information, the community and its stakeholders can "visualize, organize, and create a dialogue of events" that occur within their community (Brandusescu, Sieber, & Jochems,

n.d.). In turn, this information can be useful as a diagram to assess local needs, especially in terms of health outcomes and promotion (Dennis et al., 2008). Falling under the category of participatory research, participatory GIS recognizes that community members, versus outside researchers, have the greatest amount of knowledge regarding their local assets and better understand the context of where they live (Brandusescu et al., n.d.). In this manner, the perceptions of residents within a community are the best tools for identifying potential place-based approaches to health interventions and promotions that are most likely to be applied later on (Dennis et al., 2009).

Participatory Photo-Mapping

As both participatory research methods, participatory GIS and PhotoVoice work in conjunction to apply the research protocol of participatory photo-mapping (PPM) (Dennis et al., 2009). PPM employs the qualitative data gathered from photo-elicitation techniques, such as picture narratives and theme identification, and combines it with the spatial data collected within GIS software (Dennis et al., 2009).

As outlined by Dennis et al. (2009), PPM follows a four-step process to integrate the factors of both PhotoVoice and GIS. In the first step, documentation occurs. Participants in the research procedure are asked to take photographs in reference to the research question and to assemble coordinates of the location of the photograph taken. PPM may use various methods to document the lived experience; participants may be provided cameras as well as a GPS unit, or participants may use provided or personal smartphones that contain both a camera and a GPS locating system. In the second step, discussion of

the photographs and interviews with the participants occurs, similar to the facilitated discussion of PhotoVoice. Photographs are viewed by both participants and researchers, and a discussion ensues to determine the participants' perspective of the importance of the photograph. In this manner, a story can be attached to developed images. In the third step, researchers map the images based on their GPS coordinates obtained during the documentation phase. This step in the PPM process allows for the combination of both the qualitative information of PhotoVoice and the quantitative information derived from GIS. Lastly, step four of the PPM process encourages action to be taken regarding local policy, based upon the analysis of the research findings discovered in the previous steps. In this fashion, the information discovered through PPM can be used as evidence either advocating for intervention at the community level or indicating a need for collection of more micro-level data.

CHAPTER III

METHODS

The purpose of the present research was to identify factors that promote or inhibit healthy lifestyle choices, specifically healthy eating and physical activity. Considering that these variables differ depending on both the natural and built environment within a particular community, the present study enlisted the involvement of communities in different counties across the state of Oklahoma, allowing for contextual identification and incorporation of healthy lifestyle opportunities.

Participants

Nine counties in Oklahoma participated in the PPM project, including Carter, Oklahoma, Okmulgee, Cleveland, Logan, Tri-County, Beckham & Roger Mills, Jackson, and Caddo & Kiowa. Specifically, this paper will analyze the results for Logan County.

Logan County consists of six incorporated areas: Coyle, Crescent, Guthrie, Langston, Mulhall, and Orlando. In the midst of these established communities, numerous unincorporated areas exist. Unincorporated areas were excluded from this project; the community of Langston was also excluded in the middle of the project in response to community members' request to research it independently. The total population of Logan County is 43, 666 people (Robert Wood Johnson Foundation, 2014); the population of the five participating communities may be seen in Table 1, along with demographics of interest for the county.

The recruitment process, recruiting only adults 18 years or older, occurred from January to March 2014, beginning with the recruitment of current grantees under the Tobacco Settlement Endowment Trust (TSET) and their *Community of Excellence in Physical Activity and Nutrition* initiative across the state of Oklahoma. Once TSET grantees were recruited, they aided in the engagement of community members in each county via wellness coalitions and word-of-mouth. TSET grantees also engaged local policymakers and invited them to participate in the PPM project.

Table 1. Socio-demographic Characteristics of Logan County, Oklahoma

	Logan County	**Oklahoma**
Population [b]	44,422	3,878,051
Coyle [c]	341	-
Crescent [c]	1,493	-
Guthrie [c]	10,908	-
Mulhall [c]	240	-
Orlando [c]	158	-
Age Distribution		
% below 18 years old [b]	24.1%	24.6%
% above 65 years old [b]	14.6%	14.3%
Racial/Ethnic Distribution		
% Non-Hispanic White [b]	82.3%	75.4%
% Non-Hispanic African-American [b]	9.2%	7.7%
% Hispanic [b]	5.5%	9.6%
% American Indian and Alaskan Native [b]	3.5%	9.0%
Socio-Demographics		
% Living in poverty [b]	13.1%	16.9%
% Rural [a]	55%	34%
Health Indicators		
% Food insecure [a]	14%	17%
% Limited access to healthy foods [a]	10%	9%
Food Environment Index [a]	7.3	7.1
Physical inactivity [a]	31%	31%
Access to exercise opportunities [a]	34%	64%

[a] Robert Wood Johnson Foundation, 2014
[b] United States Census Bureau, 2015
[c] Oklahoma Demographics, 2013

Training

For each county that participated, researchers conducted a two hour training for the participants which outlined the specific aims of the study and discussed terms, such as built environment, PhotoVoice, and GIS. Also explained during the training was the ethics of photographing others and techniques of photography, as well as clarification regarding how to use a smartphone for both photography and location services. A description of how to enable location services for iPhones, Androids, and Blackberry's was discussed. Each training consisted of an explanation of how to utilize the Photo Log for the PPM project and then concluded with a short time period to decide, as a community group, the preferred method of releasing information to policymakers at the end of the project (e.g. news conference, photography exhibit, brochure, video, or public service announcement).

The Photo Log provided information for each photograph taken, and consisted of four main parts. Part one asked for the date of the photo, the cross-streets where the photo was taken, and a brief description of the area. Part two asked for the purpose of the picture: does it prevent or help healthy eating or active living? Part three asked for a description of what is happening in the picture. Part four asked for a description of why the picture is important to the participant at the time they took the photo. An example of the Photo Log format may be found in appendix E. Participants labelled their electronic photographs to match the number of the Photo Log that went with it.

Data Collection

Participants in each county were asked to photograph no more than 20 unique elements within their environment that acted as facilitators or barriers to healthy eating and active living; data collection occurred over a period of two weeks. Each element was photographed twice, so that each element would have two separate pictures. This incurred a total of no more than 40 photographs per participant. The photographs taken by each participant were identified by the following documentation: LastName_Picture#_a/b; "a" referred to the first picture of the set for one element, "b" referred to the second picture of the set for the same element. For example, the first photograph taken of one element would be "Zwerneman_1_a", while the second photograph taken of the same element would be "Zwerneman_1_b".

Photography protocol consisted of six steps to help ensure that GPS data would be associated with the photographs when they were taken. Step one required the participant to open their free GPS app on their smartphone to make sure it was enabled and had at least four satellites that could mark the location. Step two involved opening the camera app on the smartphone; step three involved photographing the specific element. Step four required that the participant re-open their GPS app to verify that it was enabled and had four satellites targeting their position. Step five involved re-opening the camera app and taking a second photo of the same element. Lastly, step six required completion of the Photo Log for the set of photographs that was just taken.

Overall, data included photographs taken by participants, Photo Logs and SHOWeD worksheets completed during analysis. The PhotoVoice analysis discussion was video-taped, thus data was also collected in the form of audio transcripts.

Analysis

Once the data collection period was over, GPS data was mapped for each county by a qualified researcher through ArcGIS and an analysis workshop occurred at each training site. During this time, participants gathered for a PhotoVoice discussion of the photographs that were taken within their counties and were given the GIS map that coordinated to the location of their photos. The map for Logan County, Oklahoma is provided in Appendix E. One researcher facilitated this discussion; the analysis was video-recorded and transcribed. Each analysis workshop began with a brief review of the training workshop, mentioning the aims of the study and the questions to be answered, and then proceeded to provide an overview of the discussion that would occur during analysis.

Photograph Viewing

The first step of the analysis workshop was to share photographs taken by each individual. Photographs were enlarged onto a screen for the group participants to view. The photographer would explain each photograph as it appeared on the screen, describing the reason behind the picture, whether it was a facilitator or barrier to healthy eating or physical activity, and any further explanation that was warranted. Once all photographs taken by one photographer were viewed and explained, the group would view and hear

explanations regarding the next photographer's photographs, and so on, for all participants present at the analysis. During this time, participants asked questions and made general comments regarding individual photographs.

Individual Analysis

After all photographs of each participant were viewed and discussed, thoughtful individual analysis took place. Participants were given index cards and instructed to answer the following questions:

1. Think about the photographs that you took and were taken by others. What are the first thoughts that come to mind?
2. Write 3-5 words or phrases that capture the facilitators of healthy eating and physical activity in your community.
3. Write 3-5 words or phrases that capture the barriers of healthy eating and physical activity in your community.

Small Group Analysis

After individual analysis occurred, participants grouped themselves into small groups (if needed, dependent on number of people present). Small groups were based on similar locations or themes of photographs, similar demographics, or other parallel categorizations. Within their chosen small groups, participants sorted words on their index cards from their individual analysis into common categories. Each of these categories became a theme, and a title for that theme was given. Small group participants then selected 10-15 photographs from their group's personal collections that they felt best explained the themes distinguished by the group as a whole. The small groups placed the

chosen photographs on a large poster board, grouping them together based on themes. After the selection process was completed within each small group, each group presented and explained three things to the large group:

1. The photographs they chose,
2. Why they chose those photographs (how photographs aide in explanation of the theme), and
3. The photograph's importance to the community.

Large Group Analysis

Once small group presentations were completed, each participant gathered in one large group to work together to decide on 10-15 photographs that most aptly describe the themes previously elected. This time period involved group discussion in the selection of photographs and the process of elimination, with little to no input from the facilitating researcher. Participants placed the chosen photographs on a poster board (or multiple, if necessary), with theme divisions and brief descriptions either under each photograph or under each theme.

Action Steps

During the discussion, pictures were selected and themes were coded. At this time, the end product of the PPM project was determined, based on the decision made by the group of participants within each county. The intention of creating an end product, a brochure, a photography exhibit, a public service announcement, etc., is so that the

project can be presented to local policymakers with the objective of effecting positive change within the specific Oklahoma community.

CHAPTER IV

FINDINGS

The purpose of this research was to identify variables within specific Oklahoma communities that acted as either facilitators or barriers to healthy eating and active living opportunities. The results for Logan County, Oklahoma were specifically analyzed in this paper. Nine participants completed this study between the ages of 22-59; this is similar to Oklahoma's overall age distribution where about two-thirds of residents are between 18-65 years old. Two-thirds of participants were non-Hispanic White, one-third African American. Participants were predominantly female, and two-thirds had at least a graduate degree. Particular population demographics can be seen in Table 1.

The first objective of this research was to engage the community in visual perceptive and objective research to identify factors affecting healthy lifestyle initiation. This aim was accomplished by utilizing the research concepts of both PhotoVoice and GIS, collecting photographs taken by participants and then analyzing and mapping photographs with intentional discussion and discrete spatial understanding. The second

objective of this research was to identify specific facilitators and barriers to healthy eating and active living. This aim was accomplished through PhotoVoice, using both facilitated discussion and the SHOWeD framework for analysis. The presence of these variables was mapped on GIS software. The third objective of this research was to empower residents to effect change in their communities based on the findings elicited from PhotoVoice and GIS. This third objective is an implication for future practice, completed by the research participants. In order for this to be accomplished in whatever form it manifests, it is necessary that the participants have personal buy-in and motivation to take the required steps based on the route they decide, as a group, to choose for advocacy of healthy lifestyles in their community.

Data included photographs taken by participants, Photo Logs and SHOWeD worksheets. The PhotoVoice discussion was video-taped, thus data was also collected in the form of audio transcripts. Based off photograph discussion, participants determined common underlying themes without input from the researchers who were facilitating discussion. Three prominent themes for Logan County were as follows: access, finance, and social support. These themes, or factors, served as facilitators, but when perceived as limited or inadequate, functioned as barriers. When a factor affected more than one theme, it was addressed in both. A summary is presented in Table 2. All data were derived from videoed participant discussion (V), Photo Logs (PL), and notes recorded on SHOWeD worksheets (N).

Table 2. Factors that facilitate healthy eating and active living in Logan County.

Themes	Facilitating Factors	Examples
Access	Fresh produce	*"50% of what is grown [in the community garden] goes to the [local] food bank…"* *"[The Crescent farmers' market has been] set up to accept WIC and SNAP benefits"*
	Public transportation	*"If you're going to a doctor's appointment or preventative care, [the trolley driver only] charges $1"*
	Implementation of local ordinances	*"You are allowed to have small animals [within city limits]"* *"Logan County community supports individuals growing their own food"*
	Bike lanes & bike racks	*"[Bike racks are] all outside downtown Guthrie, utilized all the time…"*
	Playgrounds & parks	*"Open to public…during non-school hours"* *"This is the only opportunity for youth to access to play"* *"[I] always [see] people walking/running around [the Masonic Lodge park space]"*
Finance	Donations	*"[The Masonic Lodge donated] money to the city for sidewalks"* *"[The afterschool facility] donates salsa to the parents"*
	Fundraisers	*"They use [the salsa garden] as a fundraiser"* *"The [community garden] has grown and people embrace it…we raise money for it"*
	Financial support from the federal government	*"We use money to stock the police cars with helmets"* *"[The Crescent farmers' market has been] set up to accept WIC and SNAP benefits"*
Social Support	Community interest	*"[The Garden Center] encourages healthy eating and shows how the [community] can give local support"*

	Adoption of local ordinances	*"Logan County community supports individuals growing their own food"* *"Within the city limits, you're allowed to have small animals"* *"[3 Feet stickers] are on all of the police cars"*
	Open physical activity areas	*"I always see people walking/running around [the Masonic Lodge]"* *"[The Coyle School District has a] joint-use agreement with the playground and gym"*

Table 3. Factors that limit healthy eating and active living in Logan County.

Themes	Limiting Factors	Examples
Access	Limited options for healthy food at restaurants	*"[Food is] almost all fried…no veggies"*
	Distance to grocery stores	*"You must travel to access goods and services not available in the community"* *"City of Orlando has no food sources"* *"Coyle is a food desert"*
	Lack of sidewalks	*"There's no sidewalks at all, unless you are downtown"* *"beautiful brick sidewalks…but they're not ADA accessible [and] they're not maintained"*
	Lack of playgrounds or park space	*"Track locked so public can't access it"* *"[The pool] is currently closed"*
Finance	Lack of funds to build sidewalks	*"Our city planner would love a sidewalk…unless [money] magically pops out of somewhere that's not gonna happen"*
	Low maintenance of physical activity areas	*"It's expensive to bring [the pool] up to code"*
	Cost of produce	*"[Residents] will not shop in the produce section because it's so much higher [priced]"*
	Unhealthy Food Advertising	*"[Homeland should] pay more for the [bigger] billboard to help us [encourage healthy eating]"*

Support	Lack of Community Interest & buy-in	*"[Guthrie School District's] track and playgrounds [are] inaccessible to the community"* *"The city does not support [the farmer's market] at all"* *"I can't tell you how many times we've offered canning to our Food Bank participants…they don't come"*
	Lack of Awareness	*"I just don't think there's a lot of knowledge that people can [have farm stands]"* *"Most people don't know about [the food co-op]"*

Theme 1: Access

Access as a Facilitator to Healthy Eating and Active Living

Access and availability were used interchangeably regarding this theme; access was defined as the ability to go to or obtain a place or thing of interest while availability was defined as if the place or thing of interest was offered in the community. Multiple opportunities within Logan County existed that facilitated access and availability to healthy eating and active living. These included (1) fresh produce, (2) local ordinances regarding small animals (i.e. chickens, goats, rabbits, and bees), (3) access to a public transportation system, (4) the presence of bike lanes and bike racks, and (5) the presence and maintenance of playgrounds and public park areas conducive to active living.

Fresh Produce

The availability of fresh produce via farm stands, community gardens, food co-ops, and farmers' markets facilitated healthy eating. One photo depicted a woman selling produce on the side of IH-35 (Figure 1); according to the participant who took the photograph, "[farm stands get] people to eat healthy, as well as supports local growers" (PL). This participant "would like every community to embrace [farm stands]" (V) and to emphasize to their residents to "get out on their roads and sell their stuff- people will buy it" (V).

Figure 1. Farm Stand

Guthrie's community garden was used "some as a teaching garden" (V) and was a source of fresh produce in the community (Figure 2). According to one participant, "50% of what is grown [in the community garden] goes to the [local] food bank…[and] because of this garden- 6 other ones in the community [have] stemmed from it" (PL), creating more opportunities for community residents to see where food comes from and participate in their own healthy eating prospects. This locally-sourced food donation to

the Food Bank allows for fresh produce access and availability to low socioeconomic status populations, facilitating healthy eating.

Figure 2. Guthrie Community Garden

Food co-ops were also available to community residents, supporting access to healthy eating. One photograph from a participant depicted the "drop off place in Logan County for the OK Food co-op site" (PL) with the attached statement: "Most people don't know about this" (PL) (Figure 3). Although a food co-op was a "great idea that we could use as a resource" (V), participants believe that this healthy eating opportunity is being "under-utilized" (V).

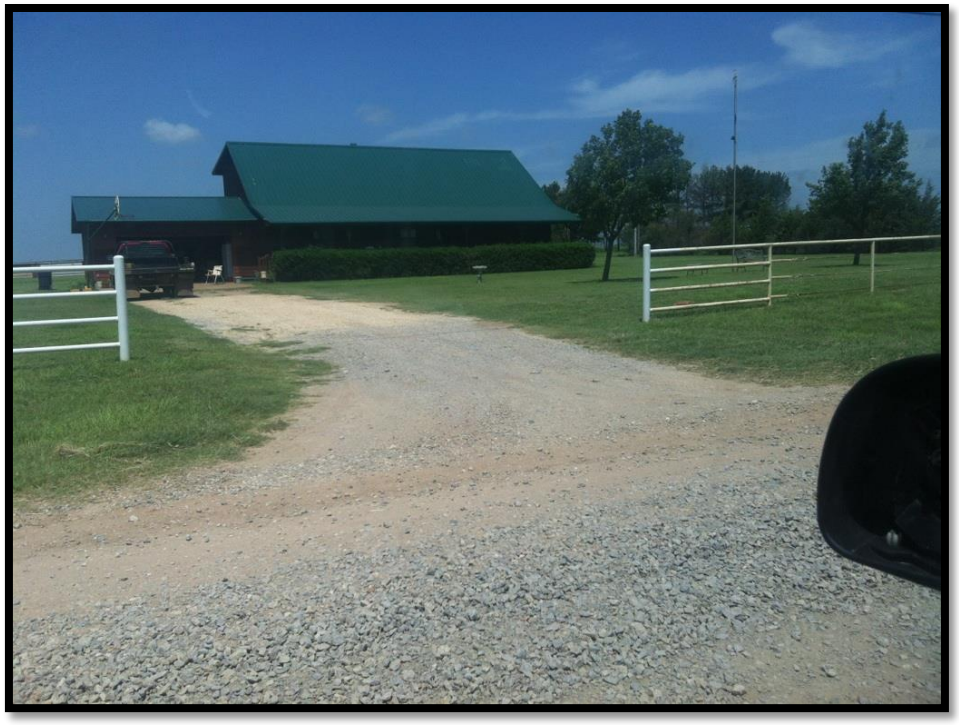

Figure 3. Food Co-op Drop Site

There was one farmer's market in Logan County, which was identified during the photo selection and discussion. One participant described that there was "a lot of interest but not a lot of growers" (V) in regards to the availability of the farmer's market and fruit and vegetable selection. The Crescent farmer's market met outside of city limits, at the Garden Center, and has been "set up to accept WIC and SNAP [benefits]" (V). One photo depicted the Garden Center and described the picture's importance as follows: "[it] encourages healthy eating and shows how the community can give local support" (PL) (Figure 4).

Figure 4. The Garden Center in Crescent

Local Ordinances

City policies regarding small farm animals also acted as facilitators to healthy eating opportunities within Logan County. According to one participant, "you are allowed to have small animals…you can have goats, you can't have pigs, you can't have horses, you can't have cows, but you can have farm animals. So you can have chickens" (V). This discussion stemmed from two photos depicting a man's goat (Figure 5) and honey bees (Figure 6) located at his house in the town of Mulhall. This man "raises up rabbits, sells rabbits, and sells his honey" (V).

Figure 5. Goat in Mulhall City Limits

Figure 6. Bee Farm in Mulhall City Limits

A photo from another participant depicted a chicken coop in a woman's yard within the city limits of Guthrie (Figure 7). The attached statement to this photo read: "people have options for organic/farm-raised poultry" (N). In discussion, this participant pointed out that this same woman "normally has a sign for fresh eggs [in her yard] but she didn't have it out" (V) at the time of this picture. When discussing these photos, the participants compared Logan County policies regarding farm animals to the policies of other counties; it was determined that "Logan County community supports individuals growing their own food" (V) as opposed to other counties, which tend to have restrictions on small animals within city limits. Each of these three photos were marked as a "picture of something that helps me in healthy eating".

Figure 7. Chicken Coop

Public Transportation

The presence of public transportation systems to get to more populated areas with grocery options facilitated healthy food purchases and other health-promoting

opportunities. Logan County covers 750 square miles, most of which is rural, and only offers three grocery stores (Robert Wood Johnson Foundation, 2014; United States Census Bureau, 2010). During discussion of one photo depicting a rural intersection in Coyle (Figure 8), one participant mentioned a trolley service in Guthrie that has a contract with Langston. According to the participant who took the picture of the intersection, this trolley service charges a low price for transportation. The service also facilitates health behaviors other than healthy eating. For instance, "if you're going to a doctor's appointment or preventative care, [the trolley driver] charges $1" (V). The existence of this public trolley system offered residents without other modes of transportation an opportunity to pursue healthy living, i.e. through preventative care appointments, as well as healthy eating opportunities through the ability to travel to grocery options that may be too far otherwise.

Figure 8. Food Desert

Bike Lanes and Bike Racks

In addition to public transportation, the City of Guthrie provides resources for active transport and recreational activity. Four photos depicted different aspects of bicycling within Logan County, and each were listed as a "picture of something that helps me in active living" (PL). Two depicted "Share the Road" signs (Figures 9 & 29), one depicted a bike rack (Figure 10), and another depicted a bike store (Figure 11).

Figure 9. Share the Road Sign in Guthrie

While some participants voiced concern for safety while riding bikes on roads (e.g. going the wrong way in traffic or cycling on the sidewalk to ease their fears), they also shared community efforts to make this form of active transport safer. For example, the City of Guthrie "stock[ed] the police cars with helmets just in case they see a child or

someone that doesn't have one" (V), and the three feet signs and stickers on police cars remind drivers to keep a safe distance. In this manner, community residents found increased feelings of safety while utilizing bikes as a mode of transportation, and therefore, found it more accessible.

Bike racks acted as a facilitator to accessing and utilizing bikes as a mode of transportation. "The city [of Guthrie] wrote a grant to get" (PL) bike racks for their community, and they are present "all outside of downtown Guthrie, utilized all the time" (V). Bike racks facilitated active living by allowing residents who choose to use bikes as a mode of transportation to safely leave their bike as they go about their business within town. If there is no place to leave their bike safely, this mode of transportation becomes inaccessible.

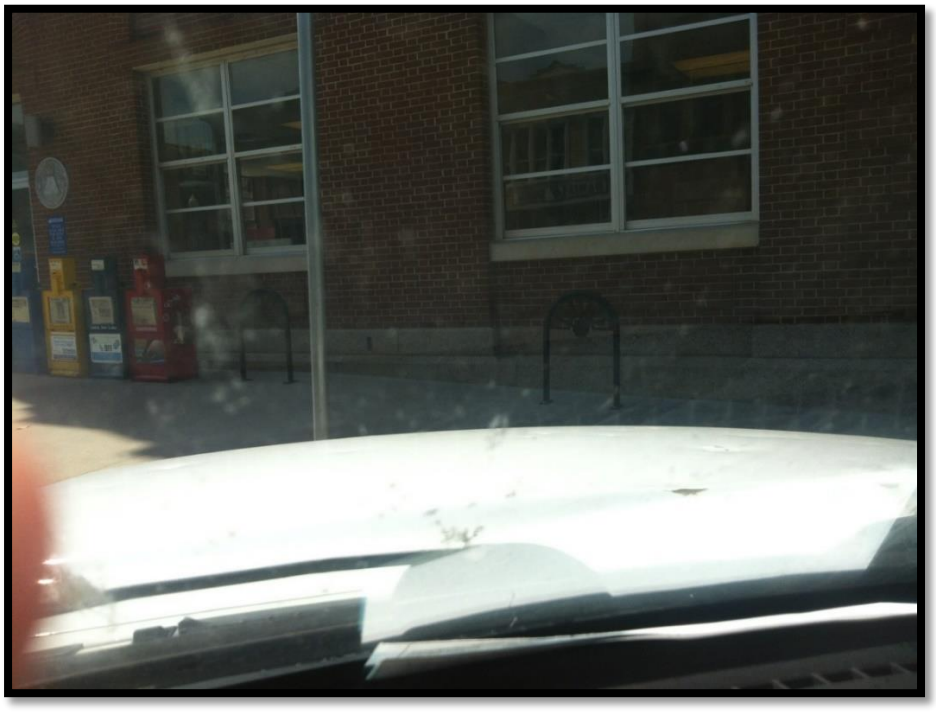

Figure 10. Bike Rack in Guthrie

The presence of a bike store also facilitated access to utilizing bikes as an opportunity for active living. There is only one bike store in Logan County, located in Guthrie, and, according to one participant, a "bike store supports a biking community [and]…encourages bike riding" (PL) by providing access to the chance to purchase a bike or bike repairs.

The City of Guthrie's efforts to support active transport will be further described under the support section of this chapter.

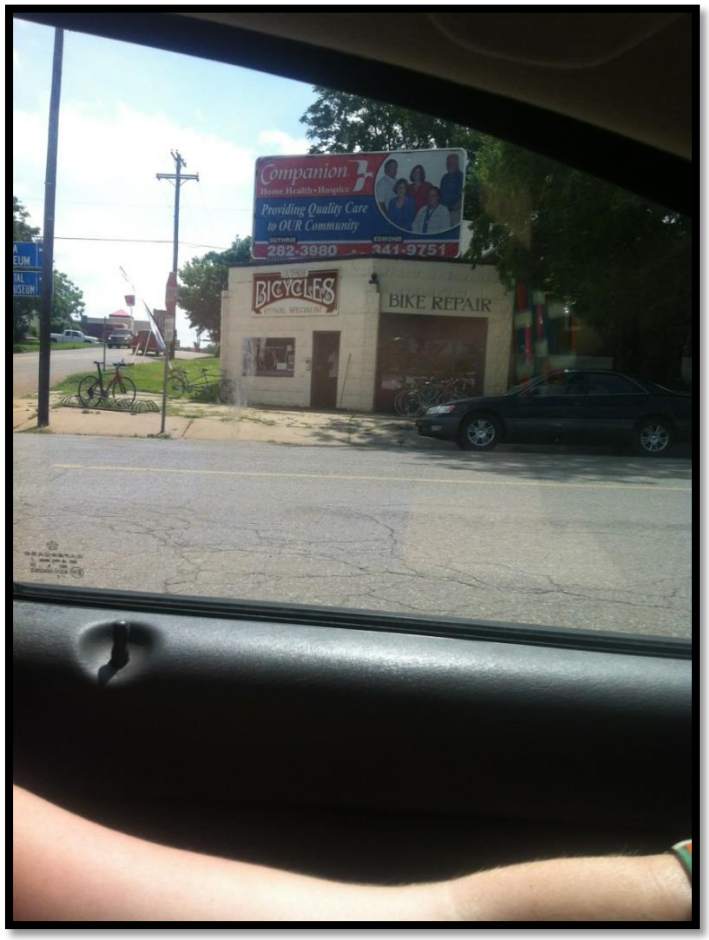

Figure 11. Bike Store

Playgrounds and Public Park Areas

The presence and maintenance of playgrounds and public areas serve as facilitators to physical activity, but only when the property is well taken care of. Four public areas and spaces within Logan County supporting active living are playgrounds, a skate park, a pool, and the Masonic Lodge/Temple park space.

The playgrounds mentioned in discussion associated with Logan County were typically attached to the local public school, with the exception of Orlando. Each school's playground was "open to the public…during non-school hours" (V); this was established either by a sign near the playground or the presence of a joint-use agreement with the school and the town. In the town of Coyle, according to one photo, the "only playground, only park" (V) in the town was affiliated with the school, and the school held a joint-use agreement that included both the playground and their indoor gym (Figure 12). According to this participant, "this is the only opportunity for youth to access to play" (PL) and encourages "parents, teachers, [and] students" (V) to be active. Playgrounds are important to Logan County residents because they are a "great place to play and be safe" (PL).

Figure 12. Coyle Public School Playground

There is one skate park in Logan County, in the town of Guthrie (Figure 13). The skate park was recently updated and provides an opportunity for youth to be active, and according to one community resident, “there’s tons of kids that use it” (V).

Figure 13. Skate Park

The public pool facilitates active living in the town of Guthrie during summer months. Although no photos depicted the pool, one participant mentioned it during discussion. The town government does not maintain the pool, but instead the local YMCA does; "it takes a loss every year but does it for the community" (V).

Guthrie's Masonic Lodge offers a "biking, running, and walking trail" (V) of which one participant describes "always [seeing] people walking/running around it" (PL) (Figure 14). The Masonic Lodge park space, according to one participant, is "safe" (V), "pedestrian friendly" (V), and maps "how far a mile is" (V). In addition, the Masonic Lodge also donated over "$250,000 worth of sidewalks and bike racks" (V) to the city of

Guthrie, further supporting the physical activity of Guthrie residents by providing accessible walking areas.

Figure 14. Masonic Lodge Park Space

Access as a Barrier to Healthy Eating and Active Living

Despite the facilitators that support access to healthy foods and physical activity opportunities, some barriers were also identified. These included (1) local business establishments lack or have limited selections of healthy food items, (2) distance to grocery stores and convenience stores, (3) the cost of healthy food options compared to unhealthy options, (4) lack of sidewalks, (5) concern for safety, and (6) presence and maintenance of playgrounds and public areas conducive to active living,

Limited Selection of Healthy Foods

According to one participant, the "closest thing to a food source" (V) in Mulhall was Lucille's Restaurant or the roadhouse-type restaurant next door that doubles as a bar at night (Figures 15 & 16). These restaurants offered a limited selection of foods, which were "almost all fried" (PL) with "no veggies" (PL); photographs depicting these restaurants were labelled as barriers to healthy eating. In Mulhall, since the only food sources lack or have limited healthy eating options, residents are deterred from eating healthfully.

Figure 15. Lucille's Restaurant in Mulhall

Figure 16. A Restaurant in Mulhall

Distance

Distance was a key variable in regards to accessing healthy eating prospects. Fifty-five percent of Logan County is rural, and according to one participant, "you must travel to access goods and services not available in the community" (N), whether that be at a convenience store, grocery store, or restaurant. The communities of Mulhall, Coyle, and Orlando, described by participants as "far away from other towns" (V), each lacked access to or did not have a grocery or convenience store within the community.

According to another participant, the community of "Coyle is considered a food desert" (PL) due to its long distance away from any store offering food products, and the "city of Orlando has no food sources" (PL). In Orlando, "residents must drive to

Stillwater (19 miles) or Guthrie (20 miles) or Perry (18 miles)" (PL) to access a food source. Although it was recognized by participants that "access to healthy foods for all Logan County is important" (PL), distance to stores selling food was an issue that prevented individuals from healthy eating.

While the Guthrie community garden was a factor that facilitated healthy eating, its distance from neighborhoods and parking areas acted as a barrier to certain groups within the community. Not only was it "not near any neighborhoods" (V), but it was also a "long walk from the parking area" (V) with an uneven surface to walk on (Figure 2). This factor made its level of ADA (American's with Disabilities Act) accessibility, along with its accessibility to any individual that has difficulty walking, low.

Cost

When healthy eating options were available, a potential barrier to their perceived accessibility was cost to purchase. According to one participant, there were three grocery stores in all of Logan County- two in Guthrie and one in Crescent. At the grocery store in Crescent, they had a "beautiful produce section, but their prices [weren't] beautiful. They have it set up amazing, but it's just higher priced, and if you ask anyone there they will not shop in the produce section because it's so much higher [priced]" (V) (Figure 17). Although produce sections aid in the effort to promote healthy eating, the cost of the produce prevented the community from purchasing heathy options. One participant described the importance of the cost of this produce section as follows: "In order to get people to make a healthier option we really need to look at cost" (PL).

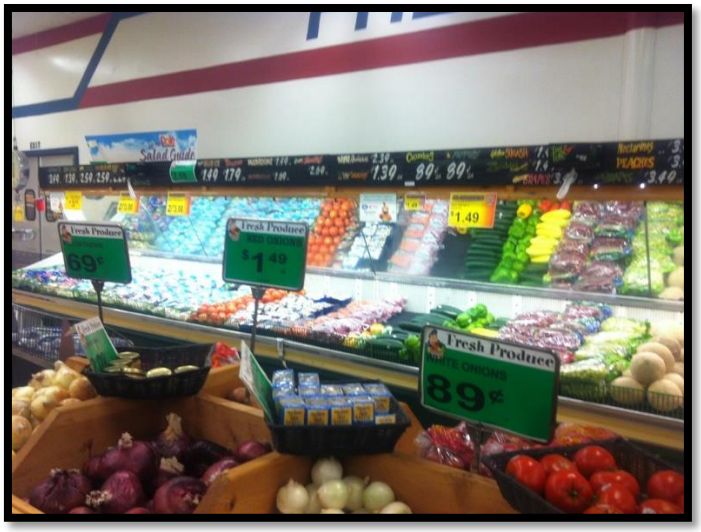

Figure 17. Grocery Store Produce Section

Some residents within Logan County are financially supported by WIC (Women, Infants, and Children Supplemental Nutrition Program) or SNAP (Supplemental Nutrition Assistance Program). These benefits facilitate access and availability to healthy eating prospects overall; however, the farmers' market in Guthrie does not currently accept WIC or SNAP benefits, although they're "working on [it]" (V). This acts as a barrier to healthy eating opportunities for low-income community residents by decreasing their accessibility to fresh and local produce.

Lack of Sidewalks

The lack of sidewalks or maintained sidewalks and bike lanes contributed to an overall deficient feeling of safety within Logan County. Logan County is "viewed as a commuter community" (N) and, as such, they have "highly accessible roads for motor vehicle traffic" (N) but lack sufficient "[encouragement] for pedestrian use" (N). According to one participant, while discussing the town of Guthrie, "there's no sidewalks at all, unless you are downtown…there's none in any neighborhood" (V). The town of

Guthrie is historic and has “beautiful brick sidewalks… but they’re not ADA accessible, you fall over them, [and] they’re not maintained….” (V) (Figure 18).

Figure 18. Brick Sidewalk

Four photos aptly displayed the problem behind the absence of sidewalks. In one, there was an image of beaten grass on the side of the road (Figure 19). This grass was beaten down due to its consistent use of people walking on it to get to a shopping area, including Love’s gas station and Wal-Mart. The second photo showed an image of a sidewalk that simply stopped in the middle of a grassy area, before a ditch, as it led to a church (Figure 20). The third photo showed an image of a family walking in the street within a neighborhood “due to lack of [safe] sidewalks” (PL) (Figure 21). Lastly, the fourth photo depicted Mulhall’s lack of sidewalks with the accompanying statement: “no sidewalks to walk to school” (PL), and listed it as a “picture of something that prevents

me from active living" (PL) (Figure 22). According to the participant who took this photo, "the only sidewalk in [Mulhall] is the one sidewalk that runs in front of town, the road in front of the elementary school" (V).

Figure 19. Lack of Sidewalk with Beaten Grass

Figure 20. Sidewalk Ends in a Ditch

Figure 21. Family Walking in the Street

Figure 22. No Sidewalk around Public School

Lack of a feeling of safety was also an issue within the bicycling community. In downtown Guthrie, one participant said that they'll see "kids [riding their bikes] on sidewalks" (V) instead of the road, and "adults on bikes going the wrong way in traffic" (V). Since Guthrie is a "huge bicycling community" (V) and this mode of transportation is encouraged, "[people] need to know they're safe" (V). Despite efforts by the City of Guthrie Police Department to promote bicycle safety, this feeling of a lack of safety prevented individuals from partaking in active living opportunities.

Playgrounds and Public Park Areas

Some school district facilities in the county were not fully accessible to the public. The second barrier affecting access to active living opportunities was locked schoolyards, including playgrounds and track facilities, and the lack of or maintenance of playgrounds and public areas conducive to active living. One photo depicted Guthrie's locked school track (Figure 23). According to this participant, the school in Guthrie kept the "track locked so [the] public can't access it" (PL). They kept all of their playgrounds in the public schoolyards closed as well. This same participant went on to say that "[Guthrie doesn't] understand that they're not liable for anything" (V) and that "the school doesn't know that the community would like this open" (PL).

Figure 23. Guthrie School Track

Within the town of Orlando, the "only playground" (PL) that exists stands across from the community center. One participant took a photo of this playground and listed it as a barrier to being physically active due to lack of other playground options for residents (Figure 24).

Figure 24. Playground in Orlando

Highway 74 runs through Logan County and maintains a large road through one of the towns (Figure 25). This road is "extremely large [in] width" (N) and, according to one participant, there would be "plenty of room for a bike lane or smaller lanes" (PL). This road is a "way to make [their] environment pedestrian friendly" (PL), but it was listed as a barrier to active living due to its observed under-utilization.

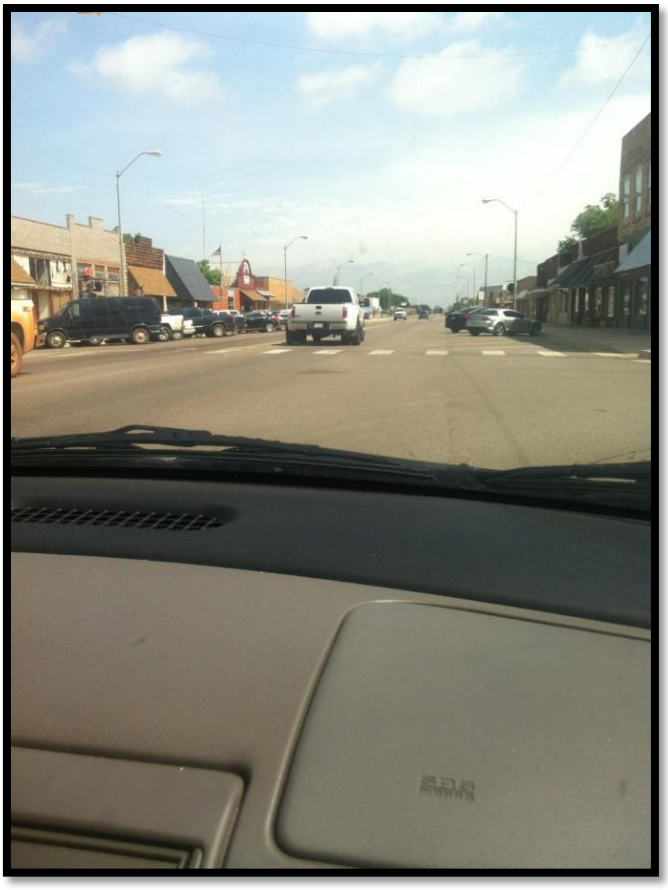

Figure 25. Large-Width Road

Theme 2: Finance

Finance as a Facilitator to Healthy Eating and Active Living

Financial facilitators to healthy eating and active living opportunities within Logan County predominantly consisted of (1) donations, (2) fundraisers, (3) financial support from the national and state government, and (4) financial support from the county itself.

Donations

The Masonic Lodge of Guthrie financially assisted active living opportunities in Logan County through their donation "of money to the city for sidewalks…over $250,000 worth of sidewalks and bike racks" (PL, V) (Figure 14). This donation facilitated active living by providing access to a safe place for community residents to walk, run, and bike.

Fundraisers

Money received from local fundraising support the community gardens; participants were unclear as to who/which group sponsored the fundraisers. According to one participant, "they use [the salsa garden] as a fundraiser…and [some people] had no idea what a cucumber was, or what a zucchini was" (V) until the salsa garden. Similarly, in reference to all the community gardens located in Guthrie, one participant stated "it has grown and people embrace it…we raise money for it" (V).

Financial Support from the Federal Government

In Logan County, community participants voiced the importance of financial support from the federal government to offer healthy eating opportunities. Although financial assistance from the federal government comes in many forms to support healthy eating and active living opportunities within Logan County, WIC (Women, Infants, and Children Supplemental Nutrition Program) and SNAP (Supplemental Nutrition Assistance Program) benefits were explicitly mentioned during discussion. The Crescent farmer's market is "set up to accept WIC and SNAP" (V), and, in regards to the Guthrie farmer's market, certain community residents are "working on" (V) getting the farmers'

booths to accept SNAP and WIC. SNAP and WIC benefits aide in healthy eating opportunities by making food more affordable for low-income families.

Financial Support from the County

Lastly, financial assistance from Logan County itself was valuable in regards to facilitating healthy eating and active living opportunities. This aspect was seen through provision of bike helmets, the trolley service to Langston, Coyle School District's subsidy of school meals from the general fund, and the YMCA pool. According to one participant, "we use money to stock the police cars with helmets just in case they see a child or someone that doesn't have one" (V). This financial assistance from the county facilitated active living by providing protection for activity and increasing individuals' feelings of safety. As mentioned previously, the trolley service between Coyle and Langston not only provides access to healthy foods and active living opportunities, but it also disposes of a potential financial barrier to the individual. For example, the trolley service charges a "very low" (V) amount for transportation to nearby Langston, allowing community residents to buy groceries and go to the facilities offered by a larger nearby towns. One participant mentioned during discussion that "if you're going to a doctor's appointment or preventative care, [the trolley driver] charges $1" (V). This low cost transportation service allows for residents to have access to a variety of healthy eating and active living opportunities that are not normally offered within their town.

The Coyle School District keeps student meal costs low by subsidizing federal reimbursements. This is explained in the statement, "[The Coyle School District] loses $0.30 per child to provide home-cooked, healthier meals for his students" (V) regardless

of income eligibility. The YMCA financially supports active living as revealed in this statement, "The YMCA takes care of the pool…[and] takes a loss every year but does it for the community" (V). This financial assistance on the county level supported the opportunities for healthy lifestyles on behalf of the community residents.

Finance as a Barrier to Healthy Eating and Active Living

Finance issues led to various difficulties in regards to healthy eating and active living opportunities. Barriers included (1) cost of produce and food advertising, (2) lack of sidewalks, and (3) maintenance of physical activity areas.

Cost of Produce and Food Advertising

The cost of produce was found to be a financial barrier in regards to healthy eating opportunities. According to one participant, Crescent has "one of our three grocery stores in Logan County" (PL), with the other two being in Guthrie. "This store has higher prices in all of Logan County" (N); they have a "beautiful produce section, but their prices aren't beautiful" (V) (Figure 17). They have their produce section "set up amazing, but it's just higher priced…the rest of the food is a little higher, but not too much" (V). One participant stated in discussion that "if you ask anyone there, they will not shop in the produce section because it's so much higher [priced]" (V). Although this grocery store encourages healthy eating via the availability of produce, it also acts as a barrier to healthy eating because, according to one participant: "In order to get people to make a healthier option we really need to look at cost" (PL).

The ability of local grocers to pay for advertising healthy foods versus unhealthy foods also presents a financial barrier to encouraging healthy eating. According to the

participants, healthy food advertising "helps me in healthy eating" (PL) and, oppositely, unhealthy food advertising "prevents me from healthy eating" (PL). This was depicted by two photos, one highlighting a huge Sara Lee advertisement "[encouraging] unhealthy eating" (PL) (Figure 26), and the other, located right across from each other, a small Homeland produce advertisement that "encourages healthy eating" (PL) (Figure 27). During discussion, one participant identified this as a financial barrier when she suggested: "Maybe we can talk to Homeland… [And say] 'You know, we love your sign. Pay more money for the bigger [billboard] and help us out'" (V).

Figure 26. Sara Lee Advertisement

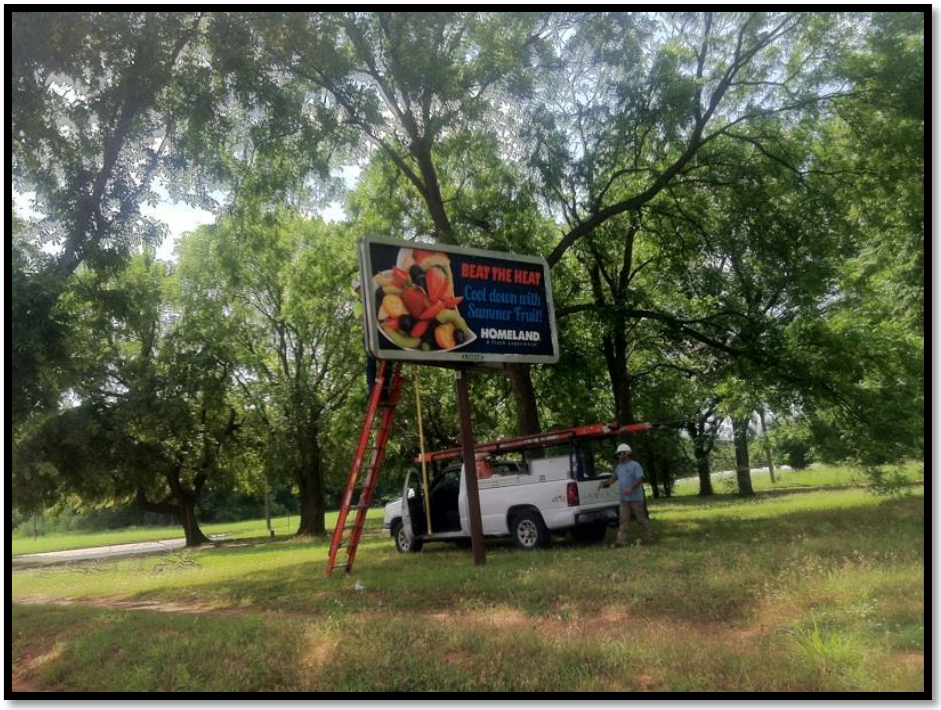

Figure 27. Homeland Advertisement

Lack of Sidewalks

Five photos aptly pictured either the lack of sidewalks in Logan County or the need for maintenance of sidewalks (Figures 18-22). According to one participant, when asked what could be done to improve or enhance this situation, her response was: "Nothing. Unless a grant for sidewalks becomes available" (N). The need exists due to lack of funds. When discussing the photo depicting a "place where people walk but no sidewalks" (N), one participant mentioned that "our city planner would love a sidewalk, but we've estimated it out and it's $2 million for both sides of the street…unless that magically pops out of somewhere, that's not gonna happen" (V). Based off her experience within the community, one participant said that, although "lack of sidewalks is an issue in rural Logan County… [She] would never go to a city and tell them they needed sidewalks… that's low on the radar" (V). This same participant went on to say

that “of course they need sidewalks, but can they afford sidewalks? [No], they can’t even afford to keep their pool open” (V). According to her, “if they painted their lines [on the road] and put in crosswalks, make sure [roads] all have stop signs… lighting… that’s easier to do” (V) and perhaps, just as worthwhile.

At the end of discussion, sidewalks were mentioned again with the following ending statements: “Are they [the city] gonna support sidewalks? Yeah, every city wants them. It’s not gonna happen…It’s not gonna happen, they’re rural communities…they just don’t have the means to do it” (V).

Maintenance of Physical Activity Areas

The maintenance of physical activity areas was also a financial barrier to active living opportunities within Logan County. The main one mentioned was the closed pool located in Crescent (Figure 28). The “city cannot afford to maintain it” (N) due to the fact that “it’s expensive to bring it up to code” (N), “estimated to be more than $500,000 to be ADA compliant and everything” (V). Within one participant’s photo depicting the pool, she mentioned that the pool is “one of the only places for youth to be active” (PL). Because it is closed, this participant listed it as “something that prevents me from active living” (PL). The public pool in Guthrie, although still open, is run by the local YMCA, who “takes a loss every year but does it for the community” (V). As seen through discussion of the pools within Crescent and Guthrie, financial limitations of city governments lead to barriers in active living opportunities.

Figure 28. Crescent Public Pool

Along with pools, active living opportunities related to biking experience financial barriers associated with the limited presence of bike lanes. Lack of funding to configure bikes lanes present a barrier to potential active living opportunities. One photo depicted a road along highway 74 with the attached description: "…There is plenty of room for a bike lane…it is a way to make our environment pedestrian friendly" (PL) (Figure 25).

Theme 3: Support

Social Support as a Facilitator for Healthy Eating and Active Living

Logan County residents are encouraged to lead healthful lifestyles when community support for healthy eating and active living exist; this occurred through (1) individual support, (2) organizational support, and (3) policy-level support.

Individual Support

Healthy lifestyles are influenced by a variety of factors regarding individual support, including both the county showing support for individuals and individuals showing support for the county's healthy living measures.

According to one participant, Whitmore Farms, located in Coyle, "sells [their] produce to Coyle Schools" (V) and also sells beef to the Logan County co-op. The co-op, as mentioned previously and depicted in Figure 3, meets monthly at an individual's personal home to distribute ordered goods. The provision of produce, beef, and a meeting place for the local co-op supported individuals' availability and opportunity to eat healthfully.

Individuals supported healthy eating by participating in the community gardens. As participation increased, the number of gardens grew. The Guthrie community garden supports healthy eating by providing a place for community residents to grow produce for themselves, as well as through their donation of "50% of what is grown…to the Food Bank" (PL). According to one participant, "because of this garden- 6 other ones in the community [have] stemmed from it" (PL), thus making the opportunity to participate in healthy eating reach a wider area. The County uses the community garden as a "teaching garden," and during this discussion, one participant was preparing for an upcoming "canning workshop" (V). Teaching individuals how to grow, prepare, and store produce supported healthy eating within the community.

The presence of community interest, buy-in, and support for healthy lifestyles was observed in Logan County through the "if you were mayor" project. This project, a

needs assessment approach, asked "the students in a class at the Jr. High asking them to write what they would do [to enhance their town]" (PL). One thing that the students asked for was an "updated skate park" (PL), which they eventually received at the intersection of 16th & Noble, demonstrating individual support. One participant's photo depicted this skate park, marking it as "something that helps me in active living" (PL) (Figure 13). The "if you were mayor" project displayed support for the community in reaching active living goals because the "city listened to the youth" (V) and provided an area for physical activity.

The presence of bike racks and the provision of bike accessories showed the community's support for active living. In turn, individuals demonstrate support by utilizing the resources. As mentioned previously, the bike racks outside of downtown Guthrie are "utilized all the time;" to obtain them, the "city wrote a grant" (PL). According to one participant, the city of Guthrie has "a lot of hardcore bicyclists…we support it" (V). The city uses "money to stock the police cars with helmets just in case they see someone that doesn't have one" (V). Guthrie also "[tries] to hold a bike safety class every year" (V) and, online, there is a "news page for news about bicyclists that get hit" (V). Each of these factors demonstrated individual support to obtain active living goals in regards to bicycling.

Organizational Support

When organizations in the community showed interest and took action in response to healthy eating and active living, it supported and encouraged healthy lifestyles. In Logan County, healthy eating was facilitated through the presence of

healthy advertisements and local growers and farmers that sell their produce and meats to the community. Advertisements that display healthy foods support healthy eating. One participant's photo exhibited a picture of Homeland grocery store's billboard advertisement displaying their produce section (Figure 27). Their accompanying statement read: "Ad that supports healthy eating from Homeland" (PL).

The Garden Center, located in Crescent, "sells vegetable/fruit plants" (PL) and hosts the Crescent farmer's market. According to one participant's photo, the Garden Center "encourages healthy eating & shows how [a business] can give local support" (PL) (Figure 4). The Garden Center supported healthy eating through the provision of a meeting place for the farmer's market.

When business owners in the community showed interest in maintaining and providing opportunities for healthy lifestyles, the community policymakers were supported to this aim; examples include: the trolley service between Coyle and Langston, the Coyle School District's business practices, the YMCA pool caretaking, and the Guthrie bike store. The trolley service provided transportation from the small town of Coyle to the larger town of Langston. This trolley provided members of the community without other modes of transportation the opportunity to shop at a grocery store or go to preventative care appointments for a "very low price" (V). In the Coyle School District, they've "stopped having janitors so that they could have a school nurse" (V); and, even though Coyle School District "loses $0.30 per child" (V), the district chooses to contract with Keystone Foods management service in their cafeteria, which prepares "home-cooked, healthier meals" (V). Both the trolley and Coyle School District's business

practices are instances where community businesses chose to support healthy lifestyles for community residents.

The YMCA of Guthrie takes care of the public pool, even though it's at a financial loss. This action of the YMCA showed support for active living within the community. Similarly, the Guthrie bike store supported active living by "[supporting] a biking community" (PL) and "[encouraging] bike riding" (PL). According to one participant's photo, the city of Guthrie as a whole "[supports] other modes of transportation" (PL). The pool and bike store each displayed community support for and facilitation of active living.

Similarly, in regards to the Guthrie community garden and city support for healthy eating, one participant identified that the "city gave the land, water, & old treatment plant for [the community's] use" (PL). The provision of space and equipment or needs related to the garden displayed the city's support for healthy eating practices.

One participant's photo depicted the Masonic Lodge park space, and the accompanying statement to their photo read: "I always see people walking/running around it (Figure 14). The [Masonic Lodge] supports them, they donated money to the city for sidewalks" (PL). The Masonic Lodge "encourages physical activity" (N) and "goes to show what all we've done for the city" (V) in regards to making available active living spaces. The financial provision by the Masonic Lodge of Guthrie for sidewalks facilitated and displayed their support of healthy lifestyles for community residents of Logan County.

Policy-Level Support

Certain local ordinances within Logan County supported and encouraged lifestyles of healthy eating and active living; these included ordinances regulating small animals within city limits (i.e. goats, chickens, rabbits, and bees), farm stands, and signage stating safety warnings and playground availability.

Three photos displayed the presence of farm animals within city limits, each one cited as a "picture of something that helps me in healthy eating" (PL) (Figures 5-7). According to one participant, "within the city limits, you're allowed to have small animals" (V); and because of these ordinances, "Logan County community supports individuals growing their own food" (V). This support increased "access to food options" (N) and "encourages healthy eating" (PL).

As mentioned previously, farm stands and markets facilitated healthy eating opportunities; thus, when the county supported these opportunities, they were supporting community residents eating healthfully. In regards to farm stands, one participant "would like every community to embrace [them], get out on their roads, and sell [their] stuff…we, as a county, support you" (V). Farm stands are important to Logan County because "[they] get people to eat healthy, as well as supports local growers" (PL). The ordinances of Logan County that allow farm stands, therefore, facilitated healthy eating opportunities on behalf of the community.

The regulation of road signs facilitated healthy living by encouraging a safe environment. Share the Road signs are "all over Guthrie" (V) and three feet stickers are "on all of [the] police cars" (V) (Figure 29). These signs and stickers promoted biking as

a mode of transportation within Guthrie, reminding cars to share the roads with bicyclists and leave a distance of three feet between the car and bike. According to one participant, these signs supported active living within the community.

Figure 29. Three Feet Sticker on Guthrie Police Car

Open schoolyards and physical activity areas supported active living and healthy lifestyles within Logan County by providing a safe place for children and adults to be active. In the towns of Mulhall and Coyle, only one playground exists; according to one participant's photo, the Coyle playground is "the only opportunity for youth to access play" (PL) (Figure 12). The Coyle Public School District has a "joint-use agreement with the playground and gym…[encouraging] parents, teachers, students" (V) to be active. This district "supports physical activity during the day" (V). Although the town of Crescent "doesn't have joint-use…they do have a sign that says 'Open to the public when school is out'…it's good they encourage it" (V) (Figure 30). Playgrounds offered a "great place to play & be safe" (PL); therefore, when playgrounds are open to the public

by joint-use agreements or other signage, it supports physical activity and active living within the community.

Figure 30. Crescent Public School Playground

Social Support as a Barrier to Healthy Eating and Active Living

Lack of community support for healthful lifestyles led to a couple of barriers in regards to healthy eating and active living. These barriers included: (1) lack of community buy-in and (2) lack of awareness in regards to healthy living opportunities.

Lack of Community Buy-In

In Logan County, lack of community buy-in was demonstrated through locked schoolyards, lack of support for farmers' markets and local healthy eating practices, and

lack of physical activity assets, including support for sidewalks. The Guthrie School District is viewed by community residents as "uncooperative" (N) in regards to facilitating active living opportunities due to their practice of "making [their school track and playgrounds] inaccessible to the community" (N). Guthrie School District does not operate under a joint-use agreement, thus, they are able to close their facilities to public use. This regulation of the school district "discourages physical activity" (N) and, according to one participant, is "something that prevents active living" (PL).

Lack of community support for farmer's markets, farm stands, and sidewalk provision acted as a barrier to obtaining and maintaining healthy lifestyles within some Logan County communities. One participant spoke blatantly concerning the Crescent farmer's market located at the Garden Center (Figure 4), stating: "The city does not support [the farmer's market] at all… [the mayor] did not want it in city limits" (V). One participant spoke with a local farmer about farmers' markets, and the local farmer mentioned that "they [the farmers] weren't getting enough people to come and it wasn't worth their time" (V) to set up a stand; the participant added: "they aren't gonna want to sit there all day and not sell out [of produce]" (V). Oppositely, although this farmer felt a lack of support from community residents, the community also felt a lack of support from the farmers. According to one participant regarding the Crescent farmer's market, "they have a lot of interest [from the community]…not a lot of growers…a *lot* of interest" (V). Lack of community support for local foods was also observed at the Food Bank program of Logan County. According to one participant, "there is no education piece to the Food Bank…I can't tell you how many times we've offered canning to our Food Bank participants…they don't come" (V).

The lack of support is also evident from the community when businesses choose not to partner in health promotion efforts. For example, one participant queried local businesses: "We will buy you a bike rack if you will buy the other one" (V), and there were "no takers" (V). Lack of support for physical activity assets, such as bike racks, prevented individuals from engaging in active lifestyles.

Even though lack of sidewalks is considered "an issue" (PL) by community residents, it was also determined through discussion that, in some areas of Logan County, "it doesn't really matter about sidewalks" (N); hence, there is a lack of community buy-in that sidewalks facilitate active living. One participant attached the following statements to a photo depicting a "sidewalk to nowhere" (N) in Coyle (Figure 20): "it shows that not all communities NEED sidewalks" (N) and "nothing" (N) can be done to improve or enhance this situation. This same participant went on to say during discussion: "Coyle, no offense, they don't need sidewalks" (V). Similarly, in Mulhall, "they don't really need [sidewalks]…they don't really need them, and the kids, they play…in the street, there's no heavy traffic" (V).

Lack of Knowledge

The second barrier recognized in regards to support of healthy lifestyles was the lack of awareness for local opportunities to engage in healthy eating and active living. Within Logan County, this barrier was comprised of the lack of knowledge concerning opportunities to buy local foods and learn how to use them, as well as the lack of knowledge concerning bike safety within town.

During discussion, one participant mentioned that local growers did not know that the County encouraged farm stands, stating, "We allow farm stands, we encourage [them]…I just don't think that there's a lot of knowledge that people can do that" (V). When local growers are not knowledgeable that this is allowed within the community, or when the community does not recognize that these opportunities are available (i.e. that farm stands exist), it creates a barrier for residents to actively procure produce. This lack of knowledge on the part of community residents acts as a barrier to supporting healthy eating opportunities.

Another participant's photo depicted the food co-op drop off location with the accompanying statement: "…most people don't know about this" (PL) (Figure 3). During discussion of this photograph, one participant mentioned: "I didn't know about the [food co-op] until I did this [PhotoVoice project]" (V), it's a great idea "that we could use as a resource that's being under-utilized" (V). Thus, similarly, the lack of knowledge about the presence of a food co-op in Logan County also acted as a barrier to supporting healthy eating and overall healthful lifestyle choices within the community.

Active living is deterred through a lack of knowledge within the community about bike safety. Both children and adults share mutual feelings of a lack of safety while biking within town. In Guthrie specifically, individuals take measures themselves to feel safer, such as riding bikes on sidewalks instead of sharing the road and going the wrong way in traffic. One participant attributes this to a lack of knowledge and stated during discussion that this is "something we just have to do more education about" (V).

CHAPTER V

DISCUSSION & CONCLUSION

The purpose of the present research was to identify the environmental factors that promote and hinder healthy eating and physical activity specific to Logan County, Oklahoma. By identifying themes that encourage healthy lifestyle choices and incorporating them into the particular community, it could potentially reduce the effects of unhealthy lifestyles, such as overweight, obesity, and the occurrence of chronic disease. This research is important because it extends the knowledge on what is known about the effects of the built environment as it pertains to healthy eating and active living from the perspective of residents, and it generates pertinent information for the endorsement of change in Oklahoma communities with the goal of making the healthy choice the easy choice.

The objectives of this research entailed (1) engaging the community in visual perceptive and objective research to identify factors affecting healthy lifestyle behavior

initiation, (2) identifying specific facilitators and barriers to healthy eating and active living, and (3) empowering residents to affect change in their communities based on their findings. Participants were engaged in this research by using the participatory research methods of PhotoVoice and Participatory Geographic Information Systems, together known as Participatory Photo-Mapping.

Results of this study indicated three important themes that act as either facilitators or barriers to healthy eating and active living opportunities within Logan County, Oklahoma. These are (1) Access, (2) Finance, and (3) Social Support.

The built environment is a key factor determining the potential behavioral choices of a community, and the Social Ecological Model depicts this interplay between an individual and their environment (Walton, 2014). Li & Rukavina (2012; p.572) describe this interchange as a "[cycle] of mutual influence." However an individual chooses to interact with their environment on an interpersonal, organizational/community, and/or policy-level influences their health outcomes (Li & Rukavina, 2012; Walton, 2014). Thus, when the built environment is conducive to healthy eating and active living, by such mechanisms as access, available public finances, and overall support, among others, the community surrounding this environment is encouraged and motivated towards healthy lifestyles (Walton, 2014).

Healthy Eating

Access to healthy eating opportunities was facilitated by having a wide selection of available foods including fresh produce, local ordinances supporting locally-grown

food sales, as well as public transportation to obtain foods. Financial facilitators to healthy eating opportunities included donations, fundraisers and governmental financial support (i.e. through WIC and SNAP). Facilitators to healthy eating by means of social support included community interest and local ordinances regarding small animals and locally-grown food sale.

In this study, limited access to healthy foods due to distance, cost, or complete lack thereof, acted as barriers to healthy living. Previous research has found evidence to support that when access to health promoting resources is limited, it can negatively impact health in communities (Robinson et al., 2014). In 2009, research by Morland & Evenson distinguished that the accessibility of certain types of food outlets, including supermarkets, convenience stores, grocery stores, and restaurants, had an impact on the community's food choices and their consequential diet-related health outcomes. Their research indicated that the closer one's proximity to a supermarket, the healthier their BMI tended to be (Morland & Evenson, 2009).

The lack of financial resources to advertise healthy foods, as well as the high cost of fresh produce to community residents, were viewed by participants as barriers to healthy eating and active living. In Logan County, five grocery stores were identified in the year 2007 and four in the year 2011, a 20% decrease over a period of four years (ERS USDA, 2014). In the 2014 PPM project, participants identified only three grocery stores during discussion, highlighting another potential decrease in store options. One finding of this study was recognition that the residents in Logan County felt an overall lack of access to healthy foods, due to both distance to a grocery store and cost of food itself; yet, data for Logan County's Food Environment Index records a score of 7.3 out of 10, with a

higher score indicating better access to food sources (Robert Wood Johnson Foundation, 2014). Furthermore, 10% of the Logan County population has limited access to healthy foods, whereas Oklahoma overall is lower at 9% with limited access to healthy foods (Table 1; Robert Wood Johnson Foundation, 2014). These two findings are inconsistent with one another. One explanation may be that 55% of Logan County consists of rural households, yet the three major grocery stores are clustered in the community of Guthrie and Crescent and not elsewhere (Robert Wood Johnson Foundation, 2014).

Research has found that close proximity to supermarkets is associated with "higher produce consumption, fewer purchases of sugary beverages, less fast-food intake, overall healthier diets, and healthier weights" (Lucan, 2015, p.209); but when food environment research exclusively focuses on select types of food outlets and disregards alternate food sources, the food environment of a community can be easily misinterpreted and misrepresented (Lucan, 2015). Lucan (2015) mentions that the food environment of a community can be misrepresented due to altering definitions of "exposure", "access", or "proximity" to food sources. Although physical distance is a key variable to access to a grocery store, one must take into account, when quantifying a Food Environment Index, the actual travel route that must be taken to get to the food source. As Lucan (2015) mentions, the travel route is not always a straight line.

According to Curtis & McClellan (1995), affordability of conventional food outlets is an indicator of food insecurity, determining a community's general ability to eat healthfully. Similarly, previous research has found that income level is an indicator of an individual's ability to obtain and maintain a healthy diet, demonstrating the importance of reasonably priced and affordable healthy foods (Curtis & McClellan, 1995). In Logan

County, according to U.S. Census data from 2009-2013, the median household income was $53,591, compared to $45,339 in Oklahoma overall (United States Census Bureau, 2015). The percentage of persons below poverty level between the years 2009-2013 was 13.1%, compared to 16.9% state-wide; and 14% (compared to 17% state-wide) are food insecure (Robert Wood Johnson Foundation, 2014; United States Census Bureau, 2015). Although Logan County appears to be better off than Oklahoma in general, a large portion of their population may still be deterred from a healthy diet due to lack of funds and perceived affordability to purchasing healthy foods.

Health messages in everyday life are abounding, and so a lack of knowledge within the community regarding healthy lifestyle choices may appear counter-intuitive. Adamson & Benelam (2013) contend that "knowledge" is less straightforward than it may seem, determining that for a healthy behavior change to occur, an individual must have the "capability, opportunity, and motivation to take action" (p.2). In regards to health education, the message to "eat more vegetables" should also be followed by why it is good to eat them, where to purchase them, how to select them, and how to prepare and cook them (Adamson & Benelam, 2013). In this manner, true knowledge may actually be gleaned. Logan County currently has a small group affiliated with the county health department that is willing to give canning workshops and use the community garden as a "teaching garden" (V), yet there is a lack of "neighborhood buy-in" (V), or community interest, that halts county improvement in health knowledge.

Active Living

Facilitators to active living regarding access and social support included available and unlocked physical activity areas, such as tracks, schoolyards, and parks, public transportation, the presence of bike racks and bike lanes, and the donation of park space to the community (i.e. the Masonic Lodge). The presence of financial resources to construct sidewalks and maintain physical activity areas also facilitated active living. When these factors were limited or altogether unavailable, they acted as barriers to physical activity.

Physical activity has been shown to increase among community residents when the built environment surrounding a neighborhood or community presents attractive destinations nearby (Berke et al., 2007). Therefore, not only is physical activity and overall active living a personal choice, but it is also a choice dependent upon the built environment (Ferdinand et al., 2012).

The importance of having sidewalks, bike lanes, and available access to recreational facilities has been observed to promote physical activity levels (Adams et al., 2013). Affordable public transportation was found to have less of an influence on physical activity than the aforementioned factors, but previous research has found that it still plays a small role in supporting active living by transporting individuals to physical activity areas (Adams et al., 2013). Likewise, walkable destinations have been found to be positively associated with physical activity, while, on the contrary, the presence of sidewalks is not always associated with increasing physical activity in a community (Robinson et al., 2014). Despite the fact that sidewalks are an important resource to

active living, it is essential to first consider whether there is an initial need for sidewalks within a community. Participants in this study indicated that not all communities need sidewalks in Logan County due to an overall rural environment and scattered housing zones. One might infer that the lack of walkable destinations in rural environments is more likely to act as the initial barrier to active living, opposed to lack of sidewalks alone.

The lack of community interest, in combination with a lack of overall knowledge about how to live healthfully, were regarded as barriers to active living within Logan County. Previous research has indicated that, alongside the built environment, the social environment of a community holds an important position in respect to population health, influencing obesity prevention measures (Walton, 2014; Kegler et al., 2012). Social support is a key factor to physical activity adoption and maintenance (Becofsky, Baruth, & Wilcox, 2013). According to Kegler et al. (2012), "greater alignment of health messages, social milieus, and built environments to support healthy behaviors in…settings in which people live, work, and play would greatly impact the health of community residents" (p.809). Therefore, when the community shows interest in healthy lifestyles by supporting various activities, they are supporting and facilitating both healthy eating and active living measures.

Recommendations for Increasing Healthy Lifestyles

Healthy Eating:

1. **Increase selection of healthy foods near community centers.** By having healthy foods available within the boundaries of each community, it increases accessibility and decreases the financial cost of travelling outside of town for healthy foods.
2. **Increase community awareness of the existence of farm stands, farmers' markets, and the food co-op.** Aside from word-of-mouth, the county could advertise the existence of these opportunities on their website, in newspapers, and at local events.
3. **Increase healthy food advertising on billboards.** This may increase local support for eating healthfully.

Active Living:

1. **Build sidewalks in combination with any new building projects.** Sidewalks are an expensive addition to existing properties. If policy mandates that sidewalks are built in conjunction with new building projects, the price may be more feasible. The second part of this recommendation would be to consider building walkable destinations linked with sidewalk connectivity.
2. **Formalize access to school playgrounds and tracks by creating Joint-Use agreements between local schools and the community.** Joint-Use agreements indicate the school district's willingness to support the health and well-being of the community as a whole.

3. **Seek out funding resources to update public swimming pools.** Public swimming pools need to be ADA accessible so that they can remain open and available to each member of the community. County leaders should discuss methods to finance the maintenance of the pool, aside from increasing the entrance or membership fees.
4. **Add bike lanes to large width roads, and increase the number of permanent bike rack installations located at key points within the community.** By making a community more bicycle-friendly, it supports an environment conducive to active living.
5. **Advertise bike rules through pamphlets, brochures, or other means.** It is important for community residents to recognize that there are measures in place to enhance and protect their safety on the roads.

Limitations and Strengths

Possible limitations to this study included participant bias, partial inability to generalize data, and potential lack of follow-up by participants. First, participant bias occurred in this study because participants were recruited based off personal interest in the study. They included local decision-makers and stakeholders, community members, and the *Communities of Excellence in Physical Activity and Nutrition* partners and coalition members associated with the Tobacco Settlement Endowment Trust. The community group involved, although a part of the community itself, may not actually be representative of the community as a whole. Likewise, considering that this research was

undertaken at the county level, it is important to consider the possible differences between rural versus urban sectors of the county, and how rural versus urban residents view facilitators and barriers to healthy eating and active living. There may have been potential bias, therefore, if the participants of the research study were not balanced in regards to urban and rural community members. It is important to recognize, therefore, that the findings of this research are the outcome of a specific group of residents who are interested in bringing about change within the county.

Second, there was a potential threat to external validity by the possibility of not being able to fully generalize data for use in other communities and areas, on a national scale. As mentioned previously, considering that the built environment, social norms, and culture differ from one community to another, it may not be possible to conclude that facilitators and barriers to healthy choices in one community are the same as those in another. To minimize any error that may occur in attempts to generalize data, it is crucial to identify that research findings from this specific community should be used with caution in other communities. To address this limitation, other counties should consider similar research within their respective communities.

Lastly, there was a potential limitation to the benefits of this research due to participants in some communities choosing not to follow-up with local decision-makers. Empowering community residents to effect change within their county was the last objective of this research, but if participants chose not to follow-through, then this objective will remain incomplete. Although a county now has specific information on facilitators and barriers to healthy eating and active living, they may not choose to make an effort to change if the community is not actively advocating for change. To minimize

this potential limitation, it is important for the research group to continually encourage the active involvement of the community in effecting change, even once research is complete.

Although limited by certain variables, this study had multiple strengths; most notable among them being community participation, the key factor in participatory research. With community involvement, the research group was able to obtain a better representation and understanding of the social norms and culture of the community, including the context behind the nature and use of their built environment, thereby increasing the potential development of the most appropriate place-based interventions and initiatives for healthy living within this specific community. The development of appropriate place-based interventions and initiatives for Logan County increases community buy-in and aides in the effort to make the healthy choice the easy choice, based on established community culture.

Increased community buy-in to healthy lifestyles was visible by the project continuing within the community, even after the OSU research group was finished. Logan County is composed of six separate communities, along with numerous unincorporated areas. Only five communities were included in this analysis; Langston was excluded per the decision of the Logan County participants, owing to its large differences when compared to the five other communities. Langston is home to Langston University; it appears to largely be considered a college town. Participants of the Photo-Mapping project decided to replicate the same process within Langston as a separate entity. One of the college classes at Langston University replicated the Photo-Mapping project, spreading it out over a period of two semesters (two separate student groups).

The first semester students participated in data collection and analysis. The second semester students will use the data collected previously and create practical avenues of change to inspire healthy lifestyles pertaining to Langston University, presenting their findings to the Administration Department located there.

Community participation alone was a strength of this study, but more specifically, the community residents who participated were an additional strength. One participant held an influential position regarding the health aspects available within Logan County, and another participant held a teaching position at Langston University. Including participants with these job positions enables and encourages information dissemination and project implementation.

The use of smartphones for data collection was an additional strength to this study. Considering that multiple locations and environments influence an individual's lifestyle decisions, it was important for the mapping process to have a lightweight, easy to use GPS available (Kerr et al., 2011). Enabling GPS utilization through smartphones allowed for the association of a location with specific content, i.e. photographs, on the mobile device (Boone, 2012). Participants in the study were taught how to use the GPS available on their smartphone during training; when they took photographs using their smartphone during data collection, the location was immediately embedded to the specific photograph.

Future Research and Practice

Future research using Participatory Photo-Mapping protocols should stress advertising for project recruitment. It is ideal that research is completed by a diverse pool of community residents holding different positions within the community, particularly local leaders and decision-makers, as well as residents from both urban and rural areas, if applicable. The project objectives and purpose should be presented and advertised in such a way that reaches county key informants and county leadership.

To aide in discussion facilitation and story narration, participants in future research should be asked to narrate two-five photographs before the determined date of the group PhotoVoice discussion. This narration should follow the SHOWeD framework. This addendum to the Participatory Photo-Mapping protocol would be expected to add depth to the group discussion story narration, as well as help participants identify the ideal format for narration during group discussion.

Conclusions

Overall, Participatory Research methods, specifically Participatory Photo-Mapping, is a useful tool to assess the built environment of a community to determine its effects on local healthy living. PPM enables the local community to become researchers themselves, identifying more accurately how the built environment of a community effects healthy living from the perspective of local residents' culture, beliefs, and values. Specifically in relation to Logan County, Oklahoma, it was found that the primary barriers to healthy eating and active living could be attributed to deficient resources

regarding access, finance, and support. County and community leaders should act on their findings by exploring opportunities to enhance healthy eating and active living, such as increasing healthy food selection and advertising, as well as awareness of locally-grown food sale; seeking additional funding prospects to build sidewalks, update, and maintain public physical activity areas; and formalizing joint-use agreements at each school site.

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APPENDICES

Appendix A: Oklahoma State University Institutional Review Board Approval

Oklahoma State University Institutional Review Board

Date:	Wednesday, January 22, 2014
IRB Application No	HE141
Proposal Title:	Participatory Photo-Mapping - Built Environment Community Assessment for Healthy Eating and Active Living
Reviewed and Processed as:	Exempt

Status Recommended by Reviewer(s): Approved Protocol Expires: 1/21/2017

Principal Investigator(s):

Kevin Fink
180 Colvin Center
Stillwater, OK 74078

Deana Hildebrand
315 HES
Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

X The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval. Protocol modifications requiring approval may include changes to the title, PI advisor, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms
2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of the research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Dawnett Watkins 219 Cordell North (phone: 405-744-5700, dawnett.watkins@okstate.edu).

Sincerely,

Shelia Kennison, Chair
Institutional Review Board

Appendix B: Oklahoma State University Institutional Review Board Modification Approval

Oklahoma State University Institutional Review Board

Date:	Monday, March 24, 2014	Protocol Expires:	1/21/2017
IRB Application No:	HE141		
Proposal Title:	Participatory Photo-Mapping - Built Environment Community Assessment for Healthy Eating and Active Living		
Reviewed and Processed as:	Exempt **Modification**		

Status Recommended by Reviewer(s) **Approved**

Principal Investigator(s):

Kevin Fink
180 Colvin Center
Stillwater, OK 74078

Deana Hildebrand
315 HES
Stillwater, OK 74078

The requested modification to this IRB protocol has been approved. Please note that the original expiration date of the protocol has not changed. The IRB office MUST be notified in writing when a project is complete. All approved projects are subject to monitoring by the IRB.

☐ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

The reviewer(s) had these comments:

Modification to incorporate feedback from volunteers and program coordinator into training presentation

Signature :

Shelia Kennison, Chair, Institutional Review Board

Monday, March 24, 2014
Date

Appenidx C: Adult Consent Form

ADULT CONSENT FORM

OKLAHOMA STATE UNIVERSITY

PROJECT TITLE: Participatory Photo-Mapping Project

INVESTIGATORS:
Kevin J. Fink, PhD, Oklahoma State University
Deana A. Hildebrand, PhD, RD, SNS, LD, Oklahoma State University
Christi Erwin, MS, Oklahoma State University
Nancy M. Betts, PhD, RD, Oklahoma State University

PURPOSE:
This study will examine the environmental elements of neighborhood environments that support or inhibit active living and healthy eating. The Participatory Photo-Mapping process includes two components: 1) PhotoVoice and 2) GIS. PhotoVoice is a method for eliciting the perspectives and experiences of the community members who live within the community. Seven to ten community members are tasked with photographing their lived experience, which can show a community's assets, needs, and potential opportunities. These community members will select the photo, discussing the importance of the photo; what they see in the photo; and their feelings about the image creating a story and narrative to promote discussion and change. The PhotoVoice process can provide community members with a voice to discuss and engage local decision- and law-makers. The GIS provides the spatial locations of the facilitators and barriers as documented by the community members.

PROCEDURES

1. Community members are gathered through advertisements, coalitions, radio spots, word-of-mouth, and fliers.
2. Participants gather for two trainings and a discussion of an end deliverable: PowerPoint, brochure, news conference, video, PSA, editorial letter, photograph exhibit, etc.
   a. The first training will include:
      1. Complete and submit an informed consent to OSU-E;
      2. Learn about the project;
      3. Learn about the Participatory Photo-Mapping process;
      4. Ask questions about the process;
      5. Learn about the use of cameras; power of a picture; ethics; and safety issues;
      6. Select target audience;
      7. Discuss what the end product will be.
   b. The second training will include:
      1. Learn about **location services** with their **smart phones**;
      2. Learn basic techniques about photography, such as: composition; adjusting for light; moving subjects;
      3. Review previous discussion of the power of photography;
      4. Discuss safety and ethical issues about photographing people and objects;
         - Safety issues;
         - Ethics of photography;
         - Asking permission to take a photo;

- Subject Photo Release Form;

5. Distribute **Photo Log, Photo Release Form;**
6. **Practice photographing a topic:**
7. **Upload** photos to verify **location services** are enabled;
8. **Discussion and Analysis of *selected photos*:**
9. Discuss timespan for photographing;
10. Schedule Selection and Analysis meeting date;
11. **Debrief.**

3. Participants use smart phones to take no more than 20 unique photographs of environmental aspects that support or inhibit healthy living for two weeks.
   a. Location Services must be enabled on the camera to record latitude / longitude data when capturing the photo.
   b. Two photos of each barrier and/or facilitator are captured (e.g., 40 total photographs).
   c. Photo log is completed during photographing.
   d. Photos and photo log are emailed to the researchers.
4. Participants gather and analyze their photos together.
   a. Goal:
      1. Select photographs, &
      2. Create narratives surrounding the selected photographs.
5. Selected photos (and narratives) are mapped using GIS to create a story map through participatory experiences of the community members.
6. Participants use their story map and discoveries to communicate with decision- and law-makers.

RISKS OF PARTICIPATION:
Risks associated with participation in this research study are no different than your normal, routine schedule. You are asked to photograph *environmental elements* that are barriers or facilitators that you encounter daily in your routine schedule.

A brief session on safety will be included in the training for this project, but your sound judgment is paramount to knowing when it is, or is not, appropriate to capture a photograph.

Participation in this research is voluntary. In case of injury or illness resulting from this study, emergency medical treatment will be available (state how and where). No funds have been set aside by Oklahoma State University to compensate you in the event of illness or injury.

BENEFITS OF PARTICIPATION:
The benefits include a final product or display of the selected photographs and their narratives for use in advocating to lawmakers and decision-makers about working toward environmental facilitators for healthy eating and active living in your own community.

CONFIDENTIALITY:
The records of this study will be kept private. Any written results or narrative statements will not include information that will identify you. Because of the small number of participants, however, identity may be discerned; therefore, only limited confidentiality can be guaranteed. Please know that participation in this project is voluntary and that you may choose at any time to not participate.

COMPENSATION:
No compensation is provided for this study.

CONTACTS :
You may contact any of the researchers at the following addresses and phone numbers, should you desire to discuss your participation in the study and/or request information about the results of the study: Kevin J. Fink, Ph.D., 301 Scott Hall, Dept. of Nutritional Sciences at Oklahoma State University, Stillwater, OK 74078, (405) 744-3841. If you have questions about your rights as a research volunteer, you may contact Dr. Shelia Kennison, IRB Chair, 219 Cordell North, Stillwater, OK 74078, 405-744-3377 or irb@okstate.edu

PARTICIPANT RIGHTS:
I understand that my participation is voluntary, that there is no penalty for refusal to participate, and that I am free to withdraw my consent and participation in this project at any time, without penalty.

CONSENT DOCUMENTATION:
I have been fully informed about the procedures listed here. I am aware of what I will be asked to do and of the benefits of my participation. I also understand the following statements:
I affirm that I am 18 years of age or older.
Preface the signature lines with the following statement (expand if appropriate):
I have read and fully understand this consent form. I sign it freely and voluntarily. A copy of this form will be given to me. I hereby give permission for my participation in this study.

_____ _____
Signature of Participant Date

I certify that I have personally explained this document before requesting that the participant sign it.

_____ _____
Signature of Researcher Date

Appendix D: Photograph Release Form

Use of Photography Release Form

To be completed by the participant (or parents / guardians if participant is under 18 years of age)

I give to **Oklahoma State University Evaluators and partners'** unlimited permission to use and publish any photographs that I take as part of my participation in the **CXPA&N Participatory Photo-Mapping** project. The photographs may be used in, but are not limited to, promotional materials, websites, or public exhibits that are related to this project.

Name of person photographing (please print):

_____

Street address, city, state, and zip code:

_____

_____

_____

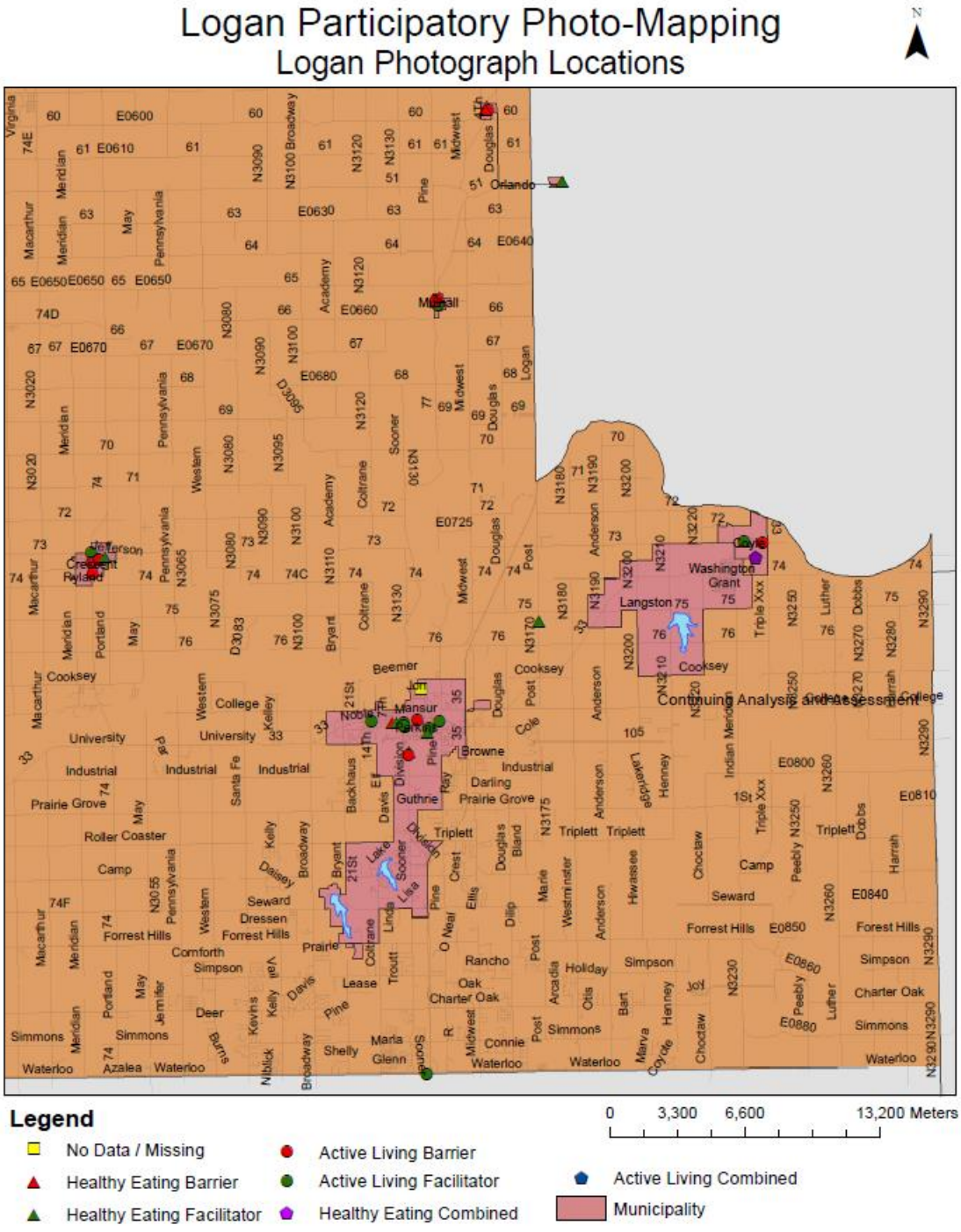
Signature:

_____

Date:

_____

Appendix E: Logan County GIS Map



Appendix F: Example of Photo Log for Picture #1

Participatory Photo-Mapping Photo Log

This photo log is used to identify where the photograph was taken as well as allow you, the photographer, to record your thoughts at the time you take the picture.

Photographer Name: _____

Picture #1

Date: _____

Cross-Streets: _____

Description of Focus: _____

Mark all that Apply:

_____ This picture is of something that prevents me from healthy eating.

_____ This picture is of something that helps me in healthy eating.

_____ This picture is of something that prevents me from active living.

_____ This picture is of something that helps me in active living.

This picture is of:

This picture is important to me because:

Appendix G: Example of a SHOWeD Worksheet

OSU PPM SHOWeD Worksheet

County / Community: _____ Theme / Issue / Priority Area: _____

Photograph Code	What do you SEE here?	What is really HAPPENING here?	How does this relate to OUR LIVES?	Why does this barrier or support exist?	What can we DO to improve or enhance?
1.					
2.					
3.					
4.					

5.

6.

7.

Overall Theme:

Photograph Code	What do you SEE here?	What is really HAPPENING here?	How does this relate to OUR LIVES?	Why does this barrier or support exist?	What can we DO to improve or enhance?

VITA

Kristin Zwerneman

Candidate for the Degree of

Master of Science

Thesis: PARTICIPATORY PHOTO-MAPPING: BUILT ENVIRONMENT COMMUNITY ASSESSMENT FOR HEALTHY EATING AND ACTIVE LIVING

Major Field: Nutritional Sciences

Biographical:

Education:

Completed the requirements for the Master of Science in Nutritional Sciences at Oklahoma State University, Stillwater, Oklahoma in July 2015.

Completed the requirements for the Bachelor of Family and Consumer Science in Nutritional Sciences at Baylor University, Waco, Texas in 2013.

Experience:

Graduate Research Assistantship
- School Wellness Policy
- Participatory Photo-Mapping
- Community Readiness Assessment

Graduate Teaching Assistantship
- Medical Nutrition Therapy
- Nutrition Education

Professional Memberships:
Academy of Nutrition and Dietetics