

THE AVAILABILITY OF HEALTHY FOOD OPTIONS IN FAST FOOD OUTLETS
IN SIX RURAL COUNTIES

A Thesis

by

JENNIFER SUE CREEL

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

December 2006

Major Subject: Nutrition

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ABSTRACT

The Availability of Healthy Food Options in Fast Food Outlets in Six Rural Counties.

(December 2006)

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Obesity is an increasingly prevalent problem and many chronic diseases are associated with excess body fat. Understanding factors which contribute to excess body fat is a primary step in curtailing the obesity epidemic. An individual's environment can play a role in food choice as food selection may be limited to those foods available in the environment. Rural environments may have less availability of healthy foods due to unique characteristics of these areas. Fast food establishments usually offer convenient meals but healthy choices at these restaurants may be limited. The number of healthy options may vary among types of fast food outlets.

The study area for this project included six rural counties. Fast food outlets within the counties were identified from the Brazos Valley Food Environment Study. Store types included fast food, grocery, and convenience stores. Store menus were analyzed with a survey instrument for healthy options which would allow consumers to meet dietary guideline recommendations.

A total of 222 fast food outlets were identified within the study area; 98 were primarily fast food stores, 112 were convenience stores with fast food, and 12 were grocery stores with fast food. Healthy options for breakfast meals were available in

22.4% of fast food stores, 8.9% of convenience stores, and 50% of grocery stores.

Healthy options for lunch entrees were available at 67.3% of fast food stores, 35.7% of convenience stores, and 75% of grocery stores. For lunch/dinner options, national chain fast food stores were more likely than other fast food stores to offer healthy options (78.9% v. 42.4%, $p<0.001$). National chain fast food stores were also more likely than other fast food stores to offer healthy breakfast options (26% v. 13.9%, $p=0.032$).

Analyzing healthy options from fast food stores only may exclude the outlets that are the predominant sources of fast food in these areas. Although the national chains offer some healthy options, the majority of fast food outlets in rural areas may be regional and local chains that offer few healthy options. These findings may indicate a limitation in the ability of rural populations to consume healthy foods.

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INTRODUCTION AND BACKGROUND

Current reports from the Centers for Disease Control indicate approximately 65% of Americans are either overweight or obese, defined as having a Body Mass Index (BMI) ($\text{weight}/\text{height}^2$), of 25 or higher.¹ The increasing prevalence of excess body weight among Americans is demonstrated in reports from the National Health and Nutrition Examination Surveys (NHANES). These reports show the percentage of obese American adults ages 20 to 74 almost doubled between NHANES 1976-1980 and NHANES 1999-2002 from 15% to 30%.² These trends are particularly alarming considering the myriad of adverse chronic conditions associated with obesity. Excess weight is associated with increased incidence of many diseases including type 2 diabetes, hypertension, dyslipidemia, cardiovascular disease (CVD), osteoarthritis, and some cancers.³ The prevalence of several common comorbidities that are often interrelated and associated with obesity has led a condition identified as the metabolic syndrome. The National Cholesterol Education Program's Adult Treatment Panel III identified the following conditions as elements of the metabolic syndrome: abdominal obesity, atherogenic dyslipidemia, elevated blood pressure, insulin resistance (with or without glucose intolerance), a proinflammatory state, and a prothrombotic state. Cardiovascular disease is a major clinical outcome of the metabolic syndrome and is also the number one cause of morbidity and mortality among Americans.⁴

This thesis follows the style of American Journal of Preventive Medicine.

Due to the severity of this outcome, the associations between adverse chronic diseases and excess body weight, combined with the fact that obesity is also an independent risk factor for CVD,⁵ curtailing the obesity epidemic has been a major research focus. This topic is an especially strong interest in light of recent reports of considerable health care costs attributable to obesity.⁶

It is widely accepted that excess body weight is a result of a positive energy balance involving greater energy intake than energy expenditure. The development of obesity is often regarded as a multifactorial process with the major factors being biological (genetic) and environmental. Given the rapid increases in obesity prevalence over a relatively short period of time, researchers suggest that an alteration in genotype is not a likely cause for the current obesity rates. In fact, many current investigations point to environmental aspects as major contributors to a predisposition for positive energy balance.^{7,8} The two broad categories of environmental factors that have been identified as contributors to energy imbalance are the availability of energy-dense foods and a reduction in work-related physical activity.⁹ These environmental aspects appear to have pivotal interactions with lifestyle factors, specifically physical activity and dietary intake, which influence energy intake and energy expenditure. Studies have shown alterations in these lifestyle behaviors can successfully decrease weight and other CVD risk factors.^{10,11}

Many governing and organizational bodies have developed general recommendations and guidelines for food intakes for the population in an effort to educate consumers and aid in the process of making healthy food choices.¹² For

example, the U.S. Department of Health and Human Services and the U.S. Department of Agriculture jointly appointed a Dietary Guidelines Committee for review and revision of the Dietary Guidelines for Americans.¹³ Additionally, many organizations have developed lifestyle guidelines specific to certain diseases, such as the American Heart Association's Diet and Lifestyle Recommendations intended to aid in reducing CVD in the population.¹⁴ General recommendations of these guidelines include limiting intake of fat, cholesterol, and added sugars while consuming two cups of fruit and two-and-a-half cups of vegetables per day, three or more servings of whole-grain products a day, and three cups of fat-free or low-fat milk or dairy products per day.¹³ Development of these guidelines can be viewed as an effort to curtail the broad issue of excess energy intake that is currently so prevalent in society. Such guidelines serve as educational material and measurable boundaries for consumption but despite this information, obesity rates continue to rise. It is possible that many people may remain unaware of the guidelines and others still may simply chose not to follow them.

A large body of evidence suggests several factors play a role in promoting excessive energy intake. Research has shown diets high in fat are usually calorically-dense and may lead to increased caloric intake.¹⁵ Other studies suggest that while mechanisms of caloric over-consumption are not completely understood, weight status is a result of excess energy intake without equivalent energy expenditure regardless of macronutrient composition.¹⁶ Thus, obesity prevention programs must begin with a thorough understanding of influences on energy consumption and factors related to

energy expenditure in order to provide a comprehensive view of how they relate to nutritional end points.

It appears that certain populations are at greater risk for adverse nutritional outcomes than others. Reports from NHANES 2003-2004 indicate no significant difference in obesity prevalence between sexes;¹⁷ however, other research has shown a difference on the impact of health related quality of life between genders which seems to increase with age.¹⁸ It is well documented that older individuals are at greater nutritional risk due to many factors which include physiologic changes associated with aging.¹⁹ Research also indicates ethnic minorities experience greater nutritional disparities with higher prevalence of obesity¹⁷ and other cardiovascular disease risk factors.²⁰ Differences in nutritional knowledge among ethnic groups have also been documented.²¹ Additionally, research shows an association between educational level and nutrition. One study found individuals with lower education attainment were more likely to be overweight and have atherogenic diets than individuals with higher educational attainment.²²

In addition to the previously mentioned demographic characteristics, researchers have also investigated the association of nutritional and health outcomes with neighborhood of residence. One study found a 40% increase in risk of CVD mortality for individuals residing in economically disadvantaged neighborhoods.²³ Ellaway et al.²⁴ found statistically significant differences in BMI, waist-to-hip ratio, and waist circumference depending upon neighborhood of residence. Another study found individuals living in more deprived neighborhoods to be at greater risk for obesity

independent of socioeconomic status, age, and sex.²⁵ Similar studies have revealed higher prevalence of self-reported hypertension and self-rated fair to poor health in rural regions than in the rest of the country.²⁶ These findings suggest perhaps individuals who have lived in some geographic locations for a significant period of time are less able to participate in lifestyle activities that promote health. One such activity is likely consumption of a healthy diet. Data from the Behavioral Risk Factor Surveillance System (BRFSS) 2000-2001 shows obesity prevalence is higher in populations of rural adults than in their urban counterparts with a prevalence of 23.0% and 20.5% , respectively.²⁷ In fact, some research does indicate that adherence to healthy dietary guidelines varies among geographic regions with different characteristics which may include socio-economics, culture, and food supply.²⁸ One study measuring dietary intakes revealed higher intakes of total fat, cholesterol, and added sugar as well as lower intakes of some vitamins and minerals in rural adult populations when compared to a national sample.²⁹

Given these findings, examining cultural and structural aspects of environments as they relate to food choice has recently become an important focus in understanding barriers to a healthy diet and the consequential adverse health outcomes. The culture of an environment may play a part in determining what types of foods are available as well as the physical, structural characteristics (including food outlets) of a particular region. As Popkin, Duffey, and Gordon-Larsen³⁰ point out, the relationship between a population and the physical environment is complex but it seems that environmental factors such as location and density of food resources do influence energy balance.

Other researchers agree that while a limited amount of information obstructs the current understanding of this concept, environmental aspects such as convenience and availability of calorically-dense food sources are likely contributing factors to current obesity rates.³¹ One proposed mechanism for these findings is that the caloric-density of these foods overwhelms human appetite control systems which results in accidental over-consumption of calories and consequential weight gain.³² Existing literature on this topic is somewhat incongruent in terms of measurement and definition. Popkin et al.³⁰ refer to the concept of the built environment which includes “patterns of human activity at various scales of geography within the physical environment.” Other researchers contend that a comprehensive study of environmental influences on food choice must consider different levels of nutrition environments.³³ An accurate measure of the food environment as it relates to healthful eating would likely account for influences at each level of the Social-Ecological Model which include: individual, interpersonal, institutional/organizational, community, and policy.³⁴

The levels of the Social-Ecological Model interact to create a complex system in which food selection is made. For example, food choice may be influenced by an individual’s nutritional knowledge, role as a provider in the family, or operational hours of food stores. It seems that time constraints influence food choice such that limited time leads to a great value in the convenience of the food source and the convenience of consuming the food.³⁵ Additionally, increased incomes also reflect an increase in expenditure of foods away from home.³⁶ These aspects have likely contributed to a shift in food source. Differences in food source from 1977-88 and 1994-96 reflect a

significant increase in calories consumed from away-from home versus home-prepared food.³⁷ Unfortunately, many of the foods designed for convenience are nutrient-poor, energy-dense and may allow for over-consumption of calories.^{37, 38}

A major focus has been placed on variables which contribute to food selection at the community level. Examples of these environmental factors which influence food choice are affordability, availability, and accessibility. Affordability refers to the purchasing power of individuals and the price of foods. In a comparison of energy density of foods (MJ/kg) to the energy cost of foods (\$/MJ) Drewnowski et al.³⁹ have shown energy-dense diets to be lower in cost than nutrient-dense diets. This study revealed a lower daily diet cost with higher levels of fats and sweets and an increase in daily diet cost with higher intakes of fruits and vegetables.³⁹ Other research on food expenditure patterns indicates that low-income groups purchase fewer amounts of fruits, vegetables, and milk products than higher-income groups.⁴⁰ These findings may be explained by an attempt to extinguish hunger with palatable foods while conserving monetary resources, thus purchasing foods such as inexpensive sources of fats and sweets which are often calorically-dense.³⁹ One study examining body weight and food insecurity reveals an increased risk of obesity among food insecure women.⁴¹ Townsend et al.⁴² found similar results with an increased prevalence of overweight in mildly and moderately food insecure women. A proposed hypothesis for this occurrence is that food insecure individuals are subjected to cyclic food acquisition patterns in which resources for food are available at certain times and not available in other times. This may lead to excess caloric intake of less expensive, calorically-dense foods when

resources are available in an attempt to compensate for the previous period of inadequate food supply.⁴² Additional factors contributing to the purchase of these foods may be low access or reduced availability to these products in lower-income areas.⁴⁰

Some studies show that availability influences food choice. One Canadian study found food-outlets in lower-income neighborhoods offered fewer fresh produce items and fewer healthy foods in general.⁴³ Another study conducted by Baker et al.⁴⁴ used geospatial information with an analysis of available foods in supermarkets and fast food restaurants. This study showed a higher availability of food choices which enabled individuals to meet recommended intake guidelines in higher-income, primarily white communities than in higher-poverty, primarily African American communities.⁴⁴

Access can be considered in terms of spatial location of food outlets or other environmentally-related aspects such as transportation. One study measuring individual access to food-stores found less access to fresh produce for individuals residing in economically disadvantaged neighborhoods.⁴⁵ Similar research measuring the following three aspects of access: car ownership, travel time, and food-outlet information, showed households with greater access to supermarkets consumed more fruits and vegetables than those without access.⁴⁶ Other research describes differences in food-store type between different neighborhood characteristics which may also influence access to food types. Morland et al.⁴⁷ found a greater amount of fast food restaurants and fewer supermarkets in lower-income neighborhoods compared to higher-income neighborhoods. One study indicates fewer large supermarkets and grocery stores in rural areas and contends that food access in these areas is compromised by several

factors. These accessibility factors are not limited merely to a decreased number of supermarkets and grocery stores in rural areas as compared to urban areas but also to fewer food selections in rural food outlets and greater transportation costs due to greater distances to food outlets.⁴⁸

Considering the current research findings on food affordability, availability, and accessibility, it seems evident that certain populations are at a disadvantage for selecting healthy foods. These factors combined with high values of convenience for acquiring food may be contributors to a recent trend in increased consumption of away from home food. As previously mentioned, national food consumption data indicate caloric intakes of away-from home food have dramatically increased in the past several decades.³⁷

Away-from home food sources are comprised of various different types of food outlets; however, current literature offers rather inconsistent terms for categorization of types of away-from home foods. One study divides food sources into either “home food” which include foods purchased at a retail store and prepared at home or “away food” which includes foods prepared at foodservice establishments. The “away food” category is then subdivided into a) restaurants, b) fast-food and carry-out establishments, c) other (which includes cafeterias, bars, grocery stores, and community food programs), and miscellaneous.³⁷ Other studies use a predetermined coding system such as the North American Industrial Classification System (NAICS).^{47, 49-51} The NAICS is developed by the U.S Census Bureau and is a classification system of industries for analytical purposes. The 2002 NAICS contains 36 subcategories within the Accommodation and Food Services category.⁵² The incomplete understanding of food environments, which is

likely partially due to various classifications used in current literature, is highlighted in a report on measures and concepts of nutritional environments. Glanz et al. claim “Although there are an increasing number of reports of various dimensions of nutrition environments, there is no guidance in the literature on how best to measure nutrition environments in a comprehensive manner.”³³

Though definitions and measurements vary, some research findings on this topic suggest that food prepared away from home is less healthful than food prepared at home. For example, one study found “away food” to be lower in dietary fiber, iron, and calcium and higher in calories, total fat and saturated fat when compared on a per-calorie basis to “home food.”³⁷ Another study reports similar findings on food content as well as an increase frequency of consuming commercially prepared meals to be a positive predictor of BMI in women.⁵³

Research indicates a general increase in reliance on away from home foods but recent literature examines how certain populations may be forced to rely on these food sources more than others. One study identifies differences in not only the location of food stores but also types of foods offered among neighborhoods. These results appear to be associated with poverty rates and racial distribution.⁴⁴ A particular interest in this field is the growing dependence on meals from fast food restaurants⁵³ which often provide excessive portion sizes and high-energy density foods.⁵⁴

Currently literature on fast food is similar to that of away-from home food literature in terms of relatively unstandardized measures and a variety of loosely defined terms. Several studies on fast foods lack a definition of fast food. Definitions in the

current literature pertaining to fast food include categorization based on the presence or absence of wait service,⁴⁴ payment before or after eating.⁵⁵ and predetermined codes such as the NAICS^{47, 49-51} or USDA Continuing Survey of Food Intakes by Individuals (CSFII) codes. Still other researchers have limited fast food measurements to those establishments that represent a national franchise⁵⁶ and some studies further limit samples to include small numbers of different national franchises⁵⁷⁻⁵⁹ or only a single franchise.⁶⁰ Other studies are void of a definition on fast food and merely measure types of restaurant categories such as fried chicken, burger, pizza, Chinese, Mexican, fried fish, and “other.”³⁴ Burdette and Whitaker developed specific criteria for fast food categorization and prefaced the description with the following statement: “We were unable to identify established criteria for defining a fast food restaurant.”⁶¹ These findings represent some of the challenges in comparing fast food studies and the continually changing nature of its descriptive terms. One emerging term in this literature is “Home Meal Replacements” (HMR’s) which refer to ready-prepared entrees and side dishes which more closely resemble home-cooked meals than the typical “hand-held” fast food items. These foods are becoming increasingly prevalent in food outlets such as supermarkets. Unlike frozen meals these types of foods are ready for immediate consumption or can be refrigerated for reheating later.⁶²

Despite discrepancies in concepts, measurements, and definitions within current fast food literature, the impact this food source has on the overall food environment and individual intakes cannot be ignored. The fast food industry is growing rapidly and represents a portion of away from home foods that is increasingly popular among

consumers.⁶² In 1980 fast food sales accounted for 29% of all away-from home food sales. This number rose to 38% of away-from home food sales by 1995.⁶³

More studies are measuring various outcomes of fast food intakes. Bowman and Vineyard conducted a study which showed higher intakes of energy, total fat, carbohydrate, added sugar, and protein among individuals who reported eating fast food versus those who did not eat fast food.⁶⁴ A study conducted by McCorry et al. revealed similar findings with a positive association between frequency of fast food consumption and total energy and total fat intake. This study also showed a positive association between frequency of fast food consumption and body fatness.⁶⁵ Another study showed an association between frequency of visits to fast food restaurants and insulin Resistance.⁶⁶

Some studies evaluating the distribution of food sources have labeled geographic regions with lower socioeconomic status where affordable, healthy food is unavailable as “food deserts.” Many rural areas may be considered “food deserts” due to a lack of grocery stores where individuals can purchase fresh fruits and vegetables.⁶⁷ Geospatial analysis of fast food locations and how these food outlets relate to the food environment has become an emerging focus of research in the area of fast food.⁴⁴ One study showed a spatial distribution of fast food outlet clusters was more abundant around schools than would be expected if the restaurants were evenly distributed throughout the city.⁶⁸ Another study revealed a positive association between black and low-income populations and density of fast food outlets in New Orleans.⁵⁶ Similar findings were demonstrated in an Australian study which showed higher density of fast food outlets in

neighborhoods of lower socioeconomic neighborhoods when compared to the density of fast food outlets in higher socioeconomic neighborhoods.⁵⁹ A third study of this type found a greater number of one specific fast food franchise restaurant per 1000 people in more deprived areas of Scotland and England.⁶⁰ At least three studies that examined geospatial data and fast food outlets have not found a significant association between proximity to fast food outlet and BMI.^{61, 68-70} However, research conducted by Jay Maddock⁵⁸ shows a correlation between state obesity levels and number of residents per fast food restaurant.

Early research in the restaurant industry suggests that location is a key component for restaurant success. One author explains that selecting a favorable restaurant location must take into consideration several accessibility and population variables which include socioeconomic, environmental, and cultural characteristics. Additionally, restaurant location must correspond with the consumer's goal for seeking food at that particular outlet. While consumers may have more than one goal in restaurant selection, it has been suggested that one of two goals is usually most prominent: 1) fueling the body and 2) fueling the soul. Fueling the body refers to a basic need to consume food in order to alleviate hunger often within restraints for time and convenience. Fueling the soul refers to the consumer's perception of the overall restaurant experience and includes aspects such as ambiance, service and reputation of the food. Fast food restaurants are usually those designed for body-fueling.⁷¹ Given the characteristics with rural communities, this may be a common goal for these consumers and thus the desire to meet this goal is met by fast food outlets in rural locations.

A recent trend in the fast food industry has been the addition of healthy options to menus as well as menu identification of healthy options. Research conducted by Burton et al. has shown that consumers tend to greatly underestimate the caloric and fat content of menu items.⁷² A second study from the same research team revealed a decrease in purchase intention and choice for less healthful items when nutrition information was available.⁷² Conclusions drawn from this finding would be that providing nutritional information would influence consumers against selecting menu items that may be more likely to contribute to excess weight and thus negative health outcomes. Although identifying healthy options and providing nutrition information on menu does seem to be an emerging trend within the food industry, a great deal of variability exists between food outlets and available nutrition information. One study examining 14 restaurants within nine zip codes found that only three restaurants provided nutritional information. Furthermore, each of these three used different methods for identifying healthy options (symbols, separate menu section, and specific preparation method) and none of the menus surveyed provided exact nutrition information such as calorie or fat content.⁷³ This study highlights another factor which adds to the complexity of the issue of nutritional information offered in restaurants which is the variability in availability and type of nutritional information. Wootan et al. conducted research which examined McDonald's restaurants in Washington, DC. This study found that 72% of the McDonald's stores offered nutritional information but nutritional information on a majority of menu items was only available at 59% of stores. Additionally, the researchers found that nutritional information was not readily available

for consumers at the point-of purchase as it was necessary to ask two or more employees if the information existed and where it could be located in 62% of the McDonald's stores surveyed.⁷⁴ One study suggests that providing nutritional information for fast food at the point of purchase, such as listing it on the menu, may have a limited influence on consumer choice⁷⁵ but evidence does exist to suggest that point of purchase information has a positive effect on consumer item selection.⁷⁶

Some reports indicate offering healthy options seems to have mixed acceptance among consumers.⁷⁷ In addition to the uncertainty of acceptance of these options at fast food restaurants, research in this area is quite limited. Studies in full service restaurants have been conducted to analyze different promotional methods for healthy options.^{76, 78,}⁷⁹ A menu audit was conducted in one investigation to assess opportunities to select healthy options in restaurants in Los Angeles. The audit included observational information on the restaurant as well as availability, quality, and preparation methods of foods based on menus. Results from this study showed that restaurants in more affluent areas were more likely to offer healthy options, identify healthy options, and offer healthy preparation methods than restaurants in less affluent areas.⁴⁹ Another study utilizing an audit tool analyzed supermarket food selections and menus from fast food corporate websites and assigned a composite score to each store and restaurant which was based on the total number of healthy options. The scores were divided into tertiles which were compared to geospatial and demographic data. This study reports decreased access to healthy food options in poorer and minority communities. It is unclear whether these accessibility differences may be due to inability within the food industry to supply

healthy food to these populations or if this finding is a result of low demand for healthy food by the populations and thus not offered by food outlets.⁴⁴ While these studies do provide measurable insight to conceptualizing the fast food environment, limitations exist which should be addressed to provide a more comprehensive understanding of this topic. For example, each of these studies was conducted in an urban area.

Evidence indicates an increased dependence on food away from home as well as growth of the fast food industry. These trends likely have an influence on the food environment and the selections offered at these locations may have an influence on food choice for consumers living in these environments. Fast foods outlets often sell food items high in fat in calories and may have limited selections for healthy choices. Assessing the foods offered at fast food service locations may offer insight to help curtail prevalence of obesity and other related health outcomes. Most of the previous research which has assessed healthy choices in fast food restaurants has been conducted in urban areas. Additionally, most of these studies have only looked specifically at national chain fast food restaurants and have neglected to assess fast food options at other types of stores such as convenience and grocery stores. These study methods may not accurately portray the healthy choices available at fast food outlets in rural areas.

In light of the complex interaction between environment, nutritional intakes, and health related outcomes, it would be prudent to pursue a deeper understanding of factors influencing food choice. The aspects of rural communities offer characteristics that are distinct from urban locations and food access and availability in these areas may require unique measures. Individuals in these areas may travel farther distances to acquire food

than individuals in urban areas. Additionally, rural locations have fewer food outlets that typically offer fresh foods and large selections. The current trend towards greater reliance on food away from home prominent in rural areas and may even be exacerbated by these unique environmental factors. A measure of healthy food options offered at away from home food sources in rural environments will bring attention to this situation and aid in a more comprehensive conceptualization of food environments.

The Brazos Valley Health Partnership (BVPH), a community partnership of stakeholders in the seven Brazos Valley counties (6 rural counties and Brazos County), and the Center for Community Health Development – A Prevention Research Center at the School of Rural Public Health recently conducted a community health assessment of the entire region. More than 1500 of the 2500 respondents were from the six rural counties. Results showed that in the rural areas, 34% of respondents were overweight and another 34.5% were obese. Compared to respondents from the urban Brazos County, rural residents were more likely to be obese (34.5% compared with 29.2%). In addition, 18.4% of rural respondents reported that they consumed fast food meals at least three times per week.⁸⁰

PURPOSE

The purpose of this study is to determine the extent to which fast food outlets in the six rural counties of the Brazos Valley offer healthy food options. The hypothesis is that in rural areas, national chain fast food outlets are more likely to offer healthy options than other fast food outlets. Additional research questions to be investigated include determining if fast food outlets are the predominant source of fast food items in rural areas, assessing the variability of healthy food options among meal types in fast food stores, determining if the availability of healthy fast food options differs by type of food store, and determining what types of food stores are more likely to offer healthy fast food options.

METHODS

Study Area

Using a systematic “drive-around” approach, the Brazos Valley Food Environment Study identified all food stores and food service places in the six rural counties of the Brazos Valley in 2005. These counties included the following: Burleson, Grimes, Leon, Madison, Robertson, and Washington. This study included all outlets for fast food such as, fast food stores, convenience stores, and grocery stores, in the six counties. A variety of food outlets offering these types of options were observed in the study. These food outlets included: fast food franchises and locally-owned fast food restaurants as well as convenience stores, gas stations, and grocery stores that offered fast food items, had fast food stores within the store or were attached to fast food stores.

Measurement

In order to examine the availability of healthier options offered by fast food restaurants, an observational audit tool was developed, based on prior restaurant audits.⁴⁹ The audit tool was designed for surveying the outside as well as inside of stores and captured broad descriptors store characteristics which included store type, preparation stage of food, store hours, store exterior (parking lot and building), condition of the parking lot, store access modalities, ads or promotions identifying fast food, ads or promotions for healthy foods, store and restroom cleanliness, store size (number of booths and tables), and number of cash registers. The survey instrument also included an assessment of menu items, identification of nutritional information, and preparation

methods. Menu items included entrees, side dishes, beverages, and desserts. In addition, information was collected on the availability healthier options for each of the menu items. Healthier options were based on the recommendations from the 2005 Dietary Guidelines for Americans¹³ and included fruits, vegetables, low-fat milk, low-fat items, 100% whole wheat items, items without added sugar, and foods that have been prepared using healthful methods such as baking, steaming, and grilling. This definition is similar to definitions of healthy choices previously operationalized in existing literature.^{44, 54}

In this study the measurement was based on visual observation and information from the menu. Assessment of preparation methods offered within the food store was based on menu descriptions and visual observation of displayed food items. Nutritional information was only assessed by menu descriptions or by specific comments regarding items not listed on the menu from employees. Only those comments that were offered without questioning by the surveyor were included in this measurement. No standard questions were asked of store employees or managers.

The NAICS specifies a category for food service and drinking places and uses a sub-category for limited-service eating places. Limited-service eating places are described as "...establishments primarily engaged in providing food services where patrons generally order or select items and pay before eating. Most establishments do not have waiter/waitress service..." Fast food restaurants are placed within this subcategory.⁵² For the purposes of this study a fast food restaurant is defined as an establishment in which the primary business is in selling meal-option foods that are

ready for immediate consumption either on premises or for take-away without wait-service where customers pay before eating. This type of establishment will be referred to as “fast food.”

Due to the expected availability of fast foods (defined as mentioned above) within other types of establishments, this study also surveyed two types of establishments with primary businesses other than fast foods. Stores primarily engaged in selling gasoline and or convenience food items (such as snacks and sodas), but also offering fast foods were included in the study and shall be referred to as “convenience stores.” Establishments primarily engaged in selling grocery items but also offering fast foods were also be included and will be referred to as “grocery stores.” Fast food stores within convenience stores and grocery stores were included in the study and will be identified as “fast food” if the fast food store has an outside entrance that leads directly into the fast food store. Fast food stores within convenience stores and grocery stores that do not have an outside entrance and thus can only be accessed through the entrance of the grocery or convenience store will also be identified as “fast food” with a separate identification and survey for the convenience or grocery store.

Data Collection

The fast food audit was pre-tested at approximately 15 food outlets which included three store types offering fast food (fast food, convenience, and grocery) within an urban area. After the pre-test, the survey was modified to increase the ability of the survey to capture possible food options which were identified in the pre-test. Following

survey modification, the author began systematic data collection one county at a time. Data were collected over a four week period (August to September 2006). All fast food restaurants, convenience stores, and grocery stores in the study area were surveyed using the observational survey methodology. Survey completion took approximately 12 minutes per store. Data were collected on hard copy and entered into a relational database.

Statistical Analysis

Statistical analyses were performed using Stata version 8 (Stata Corp, 2003). For each type of fast food outlet, availability of healthy entrée options, availability of health side order options, and overall availability of healthy options were calculated. Student t test was used to compare the mean availability of healthy food options between entrees and side orders and between national-chain fast food outlets and other fast food outlets. Multiple variable regression models were used to identify the correlates of the availability of healthier options.

RESULTS

The original data sample consisted of 280 food stores. This sample included 286 fast food outlets, convenience stores, and grocery stores/supermarkets that were identified from the 2005-2006 Brazos Valley Food Environment Project (BVFEP) and 12 “new” food stores identified during this study. At the time of the in-store survey, 12 fast food stores (6 fast food and 6 convenience) were closed and no longer open for business, 43 stores did not sell fast food items (32 convenience stores and 11 grocery stores/supermarkets), and 3 sites were considered as refusals to the in-store survey. One store refused to participate because upper management was meeting with store staff at the time of the audit. Two stores were closed due to limited hours at the time of the audit therefore making the menus unavailable for the in-store survey. This provided a final sample of 222 stores that sold fast food (98 primary fast food outlets, 112 primary convenience stores, and 11 primary grocery stores/supermarkets). The total study area in which fast food outlets were surveyed included over 4,500 square miles.

Eleven fast food outlets were connected to a convenience store, eight of which had access from within the convenience store in addition to a separate outside entrance for the fast food outlet. More than half of the fast food outlets were national chain stores (57.1%, $n = 56$) and another 4 (4.1%) were regional chains. Almost 10% of convenience stores ($n = 11$) housed a complete fast food store without an exterior entrance within the convenience store and the balance sold fast food items. Food was already prepared in 68.5% ($n = 152$) of the sample: 41.8% ($n = 41$) of fast food outlets, 88.4% ($n = 99$) of convenience stores, and 100% ($n = 12$) grocery stores/supermarkets. Hours of operation

varied with 10.8% (n = 24) always open: 5.1% (n = 5) of fast food outlets, 16.1% (n = 18) of convenience stores, and 8.3% (n = 1) of grocery stores/supermarkets. As a rough measure of seating capacity, the number of booths or tables may serve as an indicator of the size of the store. For food stores with seating available, the median number of booths was 5 (range 1 to 23) and the median number of tables was 6 (range 1 to 30).

Table 1 depicts other store characteristics captured by the survey by store type.

Table 1. Store Characteristics by Store Type (n = 222)			
	Fast Food (n = 98) % (n)	Convenience (n = 112) % (n)	Grocery (n = 12) % (n)
Trash (parking lot or side of building)	6.12 (6)	16.07 (18)	16.7 (2)
Trash or Vandalism (building exterior)	2.04 (2)	0.89 (1)	0 (0)
Drive-through access	53 (52)	0.89 (1)	25 (3)
Fast Food Ads/Promotions in front of store	63.3 (62)	28.6 (32)	8.3 (1)
Healthy Ads in front of store	11.2 (11)	18.7 (21)	25 (3)
Cleanliness rated fair/poor	18.4 (18)	41 (46)	16.7 (2)
Tables/Booths for seating	92.9 (91)	53.6 (60)	41.7 (5)

Promotional ads for healthy foods placed outside the store were found in 14 of the fast food outlets. Of these 14 stores, 100% offered at least one healthy option. An additional 101 stores also offered at least one healthy option but did not have any promotional advertisements for healthy options outside the store.

Table 2 depicts the distribution of fast food outlets by primary business and county. Variability existed within each county with regard to distribution of type of fast food outlet. For example, fast food stores within the counties ranged from 55% to 31.43% of food store types within the counties. Convenience stores selling fast food ranged from 60% to 40% of store types within the counties. In three of the six counties businesses classified primarily as convenience stores but also offered fast foods were more prevalent than businesses classified primarily as fast food stores and the overall study revealed more convenience stores selling fast foods than fast food establishments. Washington County had a greater number of all store types when compared to the other five counties and Madison County had the fewest establishments offering fast foods. The counties ranged in size from 470 sq miles to 1,702 sq miles. Fast food density within each county (data not shown) showed a range of one fast food outlet per every 10 sq miles to one fast food outlet per every 27.5 sq miles.

Table 2. Distribution of Fast Food Outlets by Primary Food Business and County
(n = 222)

	Fast Food (n = 98) % (n)	Convenience (n = 112) % (n)	Grocery (n = 12) % (n)
Burleson	15.3 (15)	11.6 (13)	8.3 (1)
Grimes	16.3 (16)	18.7 (21)	8.3 (1)
Leon	16.3 (16)	17.9 (20)	25 (3)
Madison	11.2 (11)	7.1 (8)	8.3 (1)
Robertson	11.2 (11)	18.7 (21)	25 (3)
Washington	29.6 (29)	25.9 (29)	25 (3)

Table 3 shows menu identification of healthy options within each store type using the previously mentioned identification methods. Among the three types of stores surveyed, fast food establishments identified the greatest number of healthy options on the menu and no grocery store menus identified healthy options.

Table 3. Menu Identification of Healthy Options, Nutrition Information, and Preparation Methods (n = 222)

	Fast Food (n = 98) % (n)	Convenience (n = 112) % (n)	Grocery (n = 12) % (n)
Identify healthy options	13.3 (13)	1.8 (2)	0
Nutrition information	10.2 (10)	0.9 (1)	0
Symbols or logo	10.2 (10)	0	0
Healthy entrée options	11.2 (11)	0.9 (1)	0
Healthy	1.0 (1)	0	0
Low fat	10.2 (10)	0	0
Light	0	0.9 (1)	0
Nutrition information	15.3 (15)	1.8 (2)	0
Total calories	0	0.9 (1)	0
Fat (grams or %)	13.3 (13)	1.8 (2)	0
Sodium content	0	0	0
Sugar content	2.0 (2)	0	0
Preparation method	36.7 (36)	31.2 (35)	83.3 (10)
Baked	2.0 (2)	0.9 (1)	8.3 (1)
Broiled	1.0 (1)	0	0
Fried	16.3 (16)	17.9 (20)	75 (9)
Grilled or barbequed	13.3 (13)	12.5 (14)	16.7 (2)
Roasted	2.0 (2)	0	8.3 (1)
Processed lunch meats	11.2 (11)	6.2 (7)	0
Boiled/steamed	0	0	0

Two categories of meal types were assessed within all three store types which included breakfast entrees and lunch/dinner entrees. Healthy options were assessed as identified by the menu within each category. Breakfast items classified as healthy options included a breakfast sandwich with at least one of the following: lean meat, 100% whole wheat/whole grain bread, or low fat cheese; a breakfast taco with at least one of the following: lean meat, 100% whole wheat/whole grain tortilla, or low fat cheese, a breakfast meal with at least one of the following: lean meat, eggs without cheese, or 100% whole wheat/whole grain bread; and a breakfast pastry identified as either 100% whole wheat/whole grain or low fat. Table 4 shows the percentage of healthy breakfast entrée options by type offered at each store type. The highest percentage of healthy options came from eggs without cheese from all three store types. Additionally, of the 39 fast food stores offering a breakfast sandwich, approximately 15% (n = 6) offered two healthy options which included lean meat and low fat cheese.

Table 4. Menu Identification of Breakfast Entrees and Percent of Each Entrée with a Healthy Option (n = 222)			
	Fast Food (n = 98) % (n)	Convenience (n = 112) % (n)	Grocery (n = 12) % (n)
Breakfast sandwich	39.8 (39)	56.3 (63)	75 (9)
Lean meat	15.4 (6)	0	0
Whole wheat or whole grain	0	0	0
Low fat cheese	15.4 (6)	0	0
Breakfast taco	36.7 (36)	28.6 (32)	58.3 (7)
Lean meat	0	3.1 (1)	0
Whole wheat or whole grain tortilla	2.8 (1)	3.1 (1)	0
Low fat cheese	0	0	0
Breakfast meal	15.3 (15)	8.0 (9)	50 (6)
Lean meat	0	0	0
Eggs without cheese	100 (15)	88.9 (8)	100 (6)
100% wheat or whole grain bread	0	0.9 (1)	0
Breakfast pastry	27.5 (27)	12.5 (14)	16.7 (2)
Wheat or grain	0	0	0
Low fat	0	0	0

Lunch and dinner entrees were also assessed for healthy options as identified by menu descriptions. Lunch/dinner entrees classified as healthy options included hamburgers with at least one of the following options: grilled, lean meat, or 100% whole wheat/whole grain bread; chicken described with at least one of the following: not fried, not breaded, no skin, or whole grain bread; fish described as either not fried or not breaded; other cooked meats with at least one of the following options: lean cut (loin,

round), not breaded, 100% whole wheat/whole grain, or no sauce or gravy; cold cuts or meat salads with at least one of the following options: lean cuts of meat, low fat dressing, or 100% whole wheat/whole grain bread; pizza with at least one of the following options: whole wheat crust, lean meat/chicken, low fat cheese, or vegetable; Mexican food with at least one of the following options: low fat cheese, lean meats/chicken, 100% whole wheat/whole grain tortillas, or baked chips; Asian food with at least one of the following options: brown rice, lean meat/chicken/fish, low fat sauce, no sauce option; salad as an entrée with at least one of the following options: low fat/fat free dressing, non-breaded chicken, or no added fat in the salad (such as cheese, bacon bits or an onion ring); hot dogs with at least one of the following options: lean hot dog, turkey or chicken, 100% whole wheat/whole grain bun; or wrap sandwiches with at least one of the following options: grilled or roasted meat, low fat or light dressing, or 100% whole wheat/whole grain wrap. A depiction of healthy options for each entrée type within all the store formats is found in Table 5.

Table 5. Menu Identification of Lunch/Dinner Entrees and Percent of Each Entree with Healthy Options (n = 222)

	Fast Food (n = 98) % (n)	Convenience (n = 112) % (n)	Grocery (n = 12) % (n)
Hamburger	42.9 (42)	56.2 (63)	50 (6)
Grilled	0	0	0
Lean meat	0	0	0
Whole grain bun	0	0	0
Chicken	60.2 (59)	64.3 (72)	91.7 (11)
Not fried	79.7 (47)	45.8 (33)	81.8 (9)
Not breaded	79.7 (47)	45.8 (33)	81.8 (9)
No skin	67.8 (40)	38.9 (28)	36.7 (4)
Whole grain bun	0	0	0
Fish	24.5 (24)	16.1 (18)	17.6 (9)
Not fried	4.2 (1)	0	0
Not breaded	0	0	0
Other cooked meats	36.7 (36)	52.7 (59)	66.7 (8)
Lean cuts (loin, round)	0	5.1(3)	12.5 (1)
Not breaded	52.8 (19)	88.1 (52)	75 (6)
100% whole wheat or whole grain bun/bread	0	0	0
No sauce or gravy	2.8 (1)	16.9 (10)	0
Cold cuts/meat salads	20.4 (20)	58.9 (66)	75 (9)
Lean cuts	60 (12)	1.5 (1)	0
Low fat dressing	45 (9)	1.5 (1)	0
100% whole wheat or whole grain bread	0	1.5 (1)	0
Pizza	16.3 (16)	19.6 (22)	8.3 (1)
Whole wheat crust	0	0	0
Lean meat/chicken	18.7 (3)	4.5 (1)	0
Low fat cheese	0	0	0
Vegetable	56.3 (9)	18.2 (4)	0

Table 5. Continued

	Fast Food (n = 98) % (n)	Convenience (n = 112) % (n)	Grocery (n = 12) % (n)
Mexican food	29.6 (29)	58.0 (65)	33.3 (4)
Low fat cheese	0	0	0
Lean meats/chicken	34.5 (10)	9.2 (6)	0
Wheat/whole grain tortillas	3.4 (1)	0	0
Baked chips	0	0	0
Asian food	3.1 (3)	24.1 (27)	66.7 (8)
Brown rice	0	0	0
Lean meat/chicken/fish	0	0	0
Low fat sauce	0	0	0
No sauce option	0	0	0
Salad as entrée	49.0 (48)	15.2 (17)	66.7 (8)
Low fat/fat free dressing	25 (12)	0	12.5 (1)
Non-breaded chicken	89.6 (43)	47.1 (8)	62.5 (5)
No added fat in salad	33.3 (16)	0	12.5 (1)
Hot dogs	22.4 (22)	51.8 (58)	50 (6)
Lean hot dog	0	0	0
Turkey or chicken	0	0	0
100% whole wheat or whole grain bun	0	0	0
Wrap sandwich	28.6 (28)	4.5 (5)	16.7 (2)
Grilled or roasted meat	75 (21)	20 (1)	100 (2)
Low fat or lite dressing	21.4 (6)	0	0
100% whole wheat or whole grain wrap	0	0	0

No healthy options were identified for hamburgers, Asian foods, or hot dogs in any of the store formats. Only one location offering a 100% whole wheat bread option was identified. Entrée types providing the greatest amounts of healthy options were chicken and entrée salads. Deep fry was identified as a method of preparation for chicken in 88.1% of the 59 fast food outlets offering chicken, 65.3% of the 72 convenience stores with chicken, and 90.9% of the grocery stores offering chicken. Additionally, deep fry was also identified as a method of preparation for fish in 66.7% of the 24 fast food stores offering fish, 77.8% of convenience stores offering fish, and 100% of the 9 grocery stores with a fish entrée.

Healthy options for side dishes were also measured. Table 6 shows these options which included fruit (either without added fat or sugar or 100% fruit juice); vegetables that were either steamed/roasted or not fried; potatoes with at least one of the following options: baked, no fat added, or low fat options; soup identified as either low fat or reduced sodium; baked chips; potato salad with low fat dressing; chili with either lean meat or turkey; corn either without fat or without sauce; or cole slaw with low fat dressing. Healthy options for side dishes were minimal but were greatest within vegetable options. No healthy options were recorded for soup, potato salad, chili, or cole slaw in any of the 222 establishments surveyed.

Table 6. Menu Identification of Side Dishes and Percent of Each Side Dish with Healthy Options (n = 222)

	Fast Food (n = 98) % (n)	Convenience (n = 112) % (n)	Grocery (n = 12) % (n)
Fruit	5.1 (5)	0.9 (1)	0
Without added fat or sugar	100 (5)	0	0
100% fruit juice	0	0	0
Vegetables	17.3 (17)	15.2 (17)	75 (9)
Cooked (steamed or roasted)	41.2 (7)	35.3 (6)	88.9 (8)
Non fried option	47.1 (8)	29.4 (5)	100 (9)
Potato	57.1 (56)	35.7 (40)	83.3 (10)
Baked	10.7 (6)	12.5 (5)	20 (2)
No fat added	1.8 (1)	2.5 (1)	0
Low fat options	0	0	0
Soup	6.1 (6)	0	8.3 (1)
Low fat	0	0	0
Reduced sodium	0	0	0
Chips	23.5 (23)	8.0 (9)	0
Baked	47.8 (11)	0	0
Potato salad	9.2 (9)	6.2 (7)	75 (9)
Low fat dressing	0	0	0
Chili	3.1 (3)	0	8.3 (1)
Lean meat	0	0	0
Turkey	0	0	0
Corn	10.2 (10)	6.2 (7)	33.3 (4)
No fat	0	0	0
No sauce	70 (7)	85.7 (6)	100 (4)
Cole slaw	15.3 (15)	7.1 (8)	66.7 (8)
Low fat dressing	0	0	0

Healthy options were also assessed by type of food business. Table 7 shows the distribution of healthy food options by the three different types of establishments surveyed. As shown by the table, the greatest number of healthy options was found in fast food stores but healthy options for certain items were also found in a high percentage of the grocery stores surveyed. The greatest percentage of healthy options among all the store types for breakfast meals came from eggs without cheese. Again, chicken and salads as an entrées offered the highest percentages of healthy options at all store types among the different selections within the lunch/dinner meal type. Healthy side dish options were offered at 17.3% (n = 17) of fast food stores, 8% (n = 9) of convenience stores and 75% (n = 9) of grocery stores surveyed.

Table 7. Distribution of Healthy Options by Type of Primary Food Business (n = 222)

	Fast Food (n = 98) % (n)	Convenience (n = 112) % (n)	Grocery (n = 12) % (n)
Breakfast entree			
Breakfast sandwich	6.1 (6)	0	0
Breakfast taco	2.0 (2)	1.8 (2)	0
Breakfast meal	15.3 (15)	7.1 (8)	50 (6)
Healthy Breakfast Option	22.4 (22)	8.9 (10)	50 (6)
Lunch/dinner entree			
Hamburger	0	0	0
Chicken	49.0 (48)	29.5 (33)	75 (9)
Fish	1.0 (1)	0	0
Other cooked meats	0	2.7 (3)	8.3 (1)
Cold cuts/meat salads	12.2 (12)	1.8 (2)	0
Pizza	0	0	0
Mexican food	10.2 (10)	5.4 (6)	0
Asian	0	0	0
Salad as entrée	43.9 (43)	7.1 (8)	41.7 (5)
Hot dog	0	0	0
Wrap sandwich	21.4 (21)	0.9 (1)	16.7 (2)
Healthy Lunch/Dinner Option	67.3 (66)	35.7 (40)	75 (9)

Table 7. Continued

	Fast Food (n = 98) % (n)	Convenience (n = 112) % (n)	Grocery (n = 12) % (n)
Side dishes			
Fruit	5.1 (5)	0	0
Vegetable	8.2 (8)	5.4 (6)	75 (9)
Potato	1.0 (1)	0.9 (1)	0
Soup	0	0	0
Chips	12.2 (12)	0	0
Potato salad	1.0 (1)	0	0
Chili	0	0	0
Corn	7.1 (7)	5.4 (6)	33.3 (4)
Cole slaw	0	0	0
Healthy Side Dish Option	17.3 (17)	8.0 (9)	75 (9)

Additional analysis was conducted using logistic regression models. Grocery stores that offered fast food were 5.5 times more likely to offer at least one healthy breakfast option than fast food stores (OR = 5.53 (1.6 – 19.5), $p=0.008$). Fast food stores (OR = 3.7 (2.1 – 6.6), $p<0.001$) and grocery stores with fast food (OR 5.4 (1.4 – 21.1) $p=0.15$) were more likely than convenience stores with fast food to offer at least one lunch/dinner entrée healthy option. Fast food stores (OR 2.4 (1.01-5.67), $p=0.046$) and grocery stores (OR 34.3 (7.9-149.8), $p<0.001$) were more likely than convenience stores to offer at least one healthy option for side dishes.

When compared with regional and local fast food stores, national chain fast food stores were more likely to offer at least one healthy option within the lunch/dinner meal type (78.9% v. 42.4%, $p<0.001$). National chain fast food stores were also more likely than regional and local chains to offer at least one healthy option within the breakfast meal type (26% v. 13.9%, $p=0.032$).

DISCUSSION AND SUMMARY

This study contributes to a growing body of research on fast food and food environments. While previous studies on these topics have identified food stores within specified areas, store selection methods have typically been limited to obtaining store sites listed in various databases provided by health services^{45, 49} or online phone books.⁶⁰ No publications identified in the literature review conducted for this study used a “drive-around” method for collecting food store locations. This may have particular implications for assessing food establishments in a rural environment because issues unique to these areas may allow for locations to physically exist and sell food but not be listed in databases or phone books.⁸⁰

Furthermore, this study measured fast food within a variety of store formats. In addition to being offered at establishments where fast food is the primary business fast food is also offered at establishments with other types of primary businesses. As this study indicates, only measuring fast food locations ignores a substantial portion of the fast food available within an environment. This research shows that less than half of the stores surveyed that sold fast food were a business primarily engaged in fast food sales. The greatest percentage of stores offering fast food was stores identified as convenience stores. It is unlikely that this finding is unique to rural environments.

While the study did not measure restaurants or other food acquisition locations, it seems likely that establishments selling fast foods make a significant contribution to the food environment within the areas surveyed. This is not surprising considering the increased reliance on food away from home. The decision to consume food away from

home is cited in many studies as it relates to The Household Production Theory.⁸¹ This theory states that a household is a consumer and a producer of goods.⁸² Thus food can either be produced in the household, which requires money and time for the purchase and preparation of raw goods, or consumed outside of the household which generally requires less time but more money for the purchase of prepared foods and the labor costs to prepare them. This theory suggests that the decision to purchase food away from home or prepare food at home would be weighed by the consumer based on cost in time and money, which commodity is of greater value, and which method of food acquisition allows retention of the commodities. Some studies show that other factors such as demographics and nutritional beliefs play a role in this model.⁸¹ However, for the individual who makes food choices based on time and money, fast food typically offers the consumer a quick meal at an inexpensive price. The Household Production model suggest that people substitute money for time but low income can dictate less expensive food choices.

Some perceptions of American lifestyles seem to be that time is an increasingly valuable commodity for individuals with busy work and recreation schedules. Some researchers suggest that Americans actually have more free time now than in previous years but this free time is spent in relatively unproductive ways⁸³. Nonetheless, time as a commodity may be of even greater value in rural environments where the travel distance between all destinations (including grocery stores for the purchase of raw goods) may be greater than the distances in urban areas. Additionally, demographic and economic factors within rural areas may result in a higher value on money as a

household commodity than in urban areas. It may be possible to conclude that individuals residing in rural areas are more dependent on fast foods than individuals in urban areas due to a greater need to conserve time and money for rural residents than urban residents.

The Household Production Theory⁸² can also be used to explain the emerging prevalence of fast food stores embedded within other types of store formats such as convenience stores and grocery stores. As time as a commodity of a household increases in value, it seems likely that the consumer demand for more services in one location will increase. When fast food is embedded within a store type the consumer must visit for other purposes such as acquisition of gasoline or groceries, the consumer is offered another opportunity to conserve the valuable time and money commodities by purchasing a quick meal at a low cost with no added travel or preparation time than the time allocated for the other task.

Key findings of this study included the prevalence of fast food offered at locations where the primary business was not in selling fast food. Half of the counties surveyed had higher percentages of convenience stores that offered fast food than fast food establishments and one county had an equal number of fast food establishments and convenience stores with fast food. Each county also had at least one grocery store with fast food available.

Menu surveys showed the greatest amount of healthy option identification among fast food locations. Healthy options were also greater in number within meal type categories (breakfast and lunch/dinner) for fast food locations. A large percentage of

grocery stores offered at least one healthy option in both meal type categories but this finding may be off-set by the limited sample size ($n = 12$). Options for chicken and salads provided the greatest percentage of the healthy options identified; however, most of the food outlets that sold chicken also offered the less-healthy option of deep fried chicken. Additionally, it should be noted that data on type of lettuce was not collected but identifying this variable could eliminate some salads from the healthy options category based on our definition of a healthy option. For example, the Dietary Guidelines recommend choosing dark, leafy greens,¹³ if a salad is made primarily with ice-burg lettuce, this may not be considered a healthy option. Likewise, some options collected in the category of “other cooked meats” may have been classified as healthy options based on the identified criteria but would not be classified as healthy options based on the Dietary Guidelines recommendations to choose lean meats.¹³ For example, sausage was available at several locations and was captured in this category. Because it was not breaded and served without sauce in most instances, this option may have been considered “healthy” by our measures although most sausage is extremely high in fat.

While the findings of this study offer insight into the availability of healthy food options at all stores selling fast food within rural areas, further investigation would likely reveal valuable information for increasing healthy options within these stores. For example, it would be beneficial to obtain an understanding of why some stores selling fast food offer healthy options while others do not. Variables which may account for this discrepancy likely include an establishment’s ability to bring in shipments of healthy foods, the ability of the establishment to store and prepare healthy items, and consumer

demands. It would also be helpful to understand why the predominant source of fast food in this rural area was not fast food stores but convenience stores.

Limitations in measurement included an inability to assess exact nutritional information. This information was only collected if it was described by the menu. Due to a lack of nutritional information on menus, it is difficult to assess whether a menu item identified as “low fat” or “light” would actually be considered a healthy option within the recommendation of the Dietary Guidelines.¹³ For example, in most cases exact amounts of calories, fat grams, or % from fat was not described on the menu even when an item was considered a healthy option. Alternatively, some menu items that did not offer a healthy description would not have been classified as “healthy options” even if the item type is typically considered healthy as defined by the Dietary Guidelines.¹³ For example, the “cold cuts/meat salads” entrée category only allowed for classification as a healthy item if the menu stated “lean cut,” “low fat dressing,” or “100% whole wheat.” Although turkey is typically considered a lean meat in this category, it would not have been captured as a healthy option without the menu description as such. While these limitations exist, it should be noted that the information used for assessment would be the same information provided to a consumer and thus represents available information offered to consumers for menu item selection.

The information and options made available to the consumer are likely to play a large role in the selection of food within in a food store location. This study highlights the variability in availability of healthy options among three store types, all selling fast food in rural environments. The study also shows the variability of healthy options

among two meal types and side dish categories. While the influence of consumer demand for various food options cannot be ignored, the lack of available healthy options should be considered as an intervention point for improving the health status of rural populations. Food intake is directly related to weight status which can be associated with negative health outcomes. The environment plays a pivotal role in an individual's food acquisition (and thus intake), as a consumer can only purchase and consume those foods that are made available.

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