DIETARY INTAKES FROM RURAL, COMMUNITY-BASED ELDERLY AS A DETERMINANT OF FOOD AVAILABILITY

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ABSTRACT

The fact that people are living longer has heightened awareness of the elderly and many of their special needs. Due to this trend, experts have begun to more closely investigate caloric and nutrient needs of the elderly as well as factors that may alter dietary intake. Forty-two older persons in Lincoln County, West Virginia agreed to participate in research designed to explore the relationship between dietary intake and food availability among rural, community-based elderly. Participants completed a 38 item telephone questionnaire which provided information on demographics, grocery shopping habits, and dietary intakes. A second survey addressed food availability at all grocery stores that where indicated as those "most frequently shopped" by the sample. Upon completion of data collection, both surveys were coded, and data were input into the computer. Descriptive statistics and multiple regression were utilized in data analysis as determined by the main frame version of the Statistical Package for the Social Sciences. Results of the dietary intake survey indicated that the majority of the participants were Caucasian (n=42, 100.0%), female (n=29, 69.0%), and over the age of 75 (n=36, 85.7%). Most were overweight, and many reported no history of chronic disease. Overall, the sample was relatively healthy, which is atypical for the elderly population. Eight grocery stores were surveyed for food availability. One hundred percent of the stores provided fresh meats, poultry, fruits, and vegetables for purchase. Foods for a healthy diet were readily available for purchase in all grocery stores. A comparison between dietary intakes and food availability disproved the hypothesis as only two relationships of significance were found. This indicated that the dietary intake of participants was based on preference without regard to availability.

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CHAPTER I

INTRODUCTION

In 1995, nearly two million people celebrated their sixty-fifth birthday. During the same year, only 1.7 million who were 65 or older died, bringing about a net gain of 352,000 elderly in one year (Fowles, 1996). Experts have suggested that the older population will continue to grow as the next millennium approaches. As this population increases, a growth of America's rural elderly can also be expected, as the aged are more concentrated in rural areas (National Center for Health Statistics, 1993). By 2030, it is expected that the elderly will be nearly 70 million in number, doubling the count from 1990 (Fowles, 1996). Simply stated, people in the United States are living longer.

Approximately three decades ago, the federal government first anticipated the growth of the elderly populace. At this time, the need to establish programs promoting general health and well being among this group was also identified. These realizations resulted in the development of two programs that changed the lives of older people from that point forward. They are as follows: 1) the establishment of the Administration on Aging (AoA), and 2) the passage of the Older Americans Act (OAA). Both of these occurred in 1965 (Greenburg, 1995).

The AoA serves as a liaison between the federal government and America's elderly. The purpose of this agency is to aid the states in developing and coordinating

extensive family and community based service systems for the elderly (Fowles, 1996). For example, the AoA, in conjunction with the U.S. Department of Heath and Human Services, evaluates the Elderly Nutrition Program (ENP) established through the OAA (Fowles, 1996).

The OAA of 1965 confirmed that adequate nutrition was essential to the general health of the elderly. Title III-C of this document established guidelines and funding for congregate nutrition services (C-1) and home-delivered nutrition services (C-2) (Greenburg, 1995). Collectively, these programs are known as the ENP.

The ENP grants funding to support the requirement of providing daily meals at either a congregate or home-delivered site. These services are available to persons age 60 and over with special concern placed on those with the highest degree of economic and/or social needs (Ponza, et al., 1996). On average, one million older American's are provided meals on a daily basis through the ENP. Meals prepared for each congregate or home delivered site must be in compliance with the Dietary Guidelines for Americans and must meet at least thirty-three percent of the Recommended Dietary Allowances (RDA) (Greenburg, 1995).

Following the development of the AoA and OAA in the mid-sixties, evolvement of additional elderly nutrition programs halted for approximately 20 years. A steady decrease in the average annual growth rate for this population since the midpoint of the century might have been a contributing factor (U.S. Census Bureau, 1997). Despite earlier declines, a dramatic increase in the elderly populace is anticipated as baby boomers reach the age of 65. This rapid expansion is expected to occur between 2010 and 2030 (Fowles, 1996).

With the inevitable population increase, the United States government again realized a need for the emergence of new programs to further benefit America's elderly. Two such programs, introduced approximately seven years ago, addressed this need. The Nutrition Screening Initiative (NSI) and Healthy People 2000 (HP 2000) introduced the concept of health promotion and disease prevention. Both focused on improving the nutritional status of the geriatric population.

The NSI was a collaborative effort of the American Academy of Family Physicians (AAFP), The American Dietetic Association (ADA), and the National Council on Aging (NCA). These groups recognized that the formation of suitable nutrition screening and assessment methods were long overdue and resolved to develop a protocol for nutrition screening (Dwyer, 1991). The NSI was designed as a five-year diversified effort to promote improved nutrition care and regular nutrition screening in America's health care system (NSI, 1991-b). Elderly were the focus of this program due to their increased risk of poor nutrition (NSI, 1991-a).

At the same time, HP 2000 had emerged with the main purpose of generating programming for improved health of all Americans. The three main goals of HP 2000 were: 1) to increase the span of healthy life for Americans, 2) to reduce health disparities among Americans, and 3) to achieve access to preventative services for all Americans (Goldstein, 1996). This program was designed to reach the American people on national, state, and local levels. The originators of HP 2000 realized that nutrition and diet play a critical role in health promotion and disease prevention.

Throughout the years, these four programs have proven to be effective on a large scale. For example, Ponza and his associates (1996) found that persons who receive ENP

meals have higher daily intakes of several essential nutrients than do non-participants. Also, in a midcourse review of HP 2000, the U.S. Public Health Service (PHS) determined that 50 percent of the objectives were moving toward their target goals (National Health Information Center [NHIC], 1997).

In spite of the successes of these programs, limited research performed on rural, community-based elderly has shown many of their diets deficient in calories, fiber, and several vitamins and minerals (Walker, Lucas, Linnenkohl, & Sohrabi, 1995; Lee, Templeton, & Wang, 1996). In 1995, Walker identified a need for additional research to "further define the nutrition profile of rural, community-based elderly". From this need, arose an important question: how can this profile be further defined?

Factors that may influence food availability could be identified through a survey of items obtainable for purchase in grocery stores. A group from the University of Washington first realized the importance of examining food availability in stores. Lengthy research was performed through funding from the Henry J. Kaiser Family Foundation (Cheadle, et al., 1990, 1991, 1993, 1995). Cheadle and his associates suggested that assessment of grocery stores and their buying trends may be an adequate measure of the dietary habits of individuals in a community (Cheadle, et al., 1995).

One means of answering this question is to compare dietary intakes and food availability among rural, community-based elderly. It is critical to focus on the local and/or community level to determine factors that may influence dietary intake and food availability (Wardlaw, 1997). It is here where people live and function on a daily basis (WV Department of Health & Human Resources [WVDHHR] & WV Bureau of Public Health [WVBPH], 1990).

Given the research population from Walker's study, three-day dietary intakes were re-examined and food availability was assessed through grocery store surveys. Self-reported dietary intakes of the elderly were collected to compare with findings of food availability. Intakes were examined relative to one's overall health status and adherence to the Food Guide Pyramid. The results of this study were beneficial in further defining the nutritional profile of the rural, community-based elderly.

Research Question

Does food availability in preferred rural grocery stores provide healthy choices; is the food available consistent with the reported dietary intake of selected elderly persons in Lincoln County, West Virginia?

Objectives

1. To describe the dietary intake of a sample of rural, community-based elderly utilizing a food frequency assessment tool.
2. To identify the availability and volume of selected foods in preferred rural grocery stores.
3. To compare food availability in selected rural grocery stores with the dietary intakes of the study populace.

Hypothesis

There will be a significant relationship between dietary intakes of participants and foods available for purchase in preferred grocery stores.

Assumptions

1. The sample was representative of this age group throughout Lincoln County.
2. Participants provided honest and accurate information to the material utilized in the questionnaire.
3. Participants had resources to purchase healthy foods.
4. Area of residence had an impact on food availability and dietary intakes.

Limitations

1. The number of elderly in the original research sample diminished greatly over time.
2. The small sample size; it consisted of only forty-two.
3. Only pre-selected residents in a single county, Lincoln County, West Virginia, were surveyed. The results may not be generalized for a population of this age group in rural counties throughout the United States.
4. The sample was not randomized. To be eligible for participation, a three-day dietary intake must have been completed during previous studies of the Geriatric Research Program in Lincoln County.
5. Income of the sample was limited because all are over the age of 65.
6. Instruments were formulated from samples found in previous research.
7. Selected grocery stores were surveyed on various days and at different times. Stock availability and sale items varied according to the date and time of survey.

Operational Definitions

Anytime Foods- The backbone of the diet; foods are low in fat and saturated fat and have no serious flaws (Center for Science in the Public Interest [CSPI], 1993).

Baby Boomers- The generation born after World War II, from 1946-64 (Compton's Interactive Encyclopedia, 1997).

Dietary Intake- Record of foods consumed by members of the research sample.

Elderly- All persons 65 years of age or older; three specific subgroups include: young-old (65 – 74 years old), old (75 – 84 years old), and oldest old (85 years and older) (American Dietetic Association [ADA], 1996).

Food Availability/Security- Addresses the degree of access for various foods which will provide a nutritionally adequate, culturally compatible diet to a given population (ADA, 1996).

Near-Poor- Income between poverty level and 125 percent of this level (Fowles, 1996).

Poverty Level- $9,212 for an elderly couple household or $7,309 for an older person who lives alone (Fowles, 1996).

Preferred Grocery Stores- Stores identified by the research sample as "preferred" for purchasing most of their food items.

Seldom Foods- Foods which are high in fat and saturated fat; these should be eaten only two or three times per week (CPSI, 1993).

Sometimes Foods- Foods containing moderate amounts of fat and a few are high in unsaturated fat, sodium, cholesterol, and added sugar; foods in this category should be limited to two or three servings per day (CPSI, 1993).

Three-Day Dietary Intake- The average of daily calories and nutrient values obtained from the food consumed by an individual for three consecutive days.

CHAPTER II

REVIEW OF LITERATURE

The Current State of the Elderly

Technological and scientific advances in recent years are two of the reasons why people are living longer. For the first time in the history of most countries, more than ten percent of the population consists of those over the age of 65 (Rossman, 1997). Rossman (1997) refers to this trend in the United States as "the graying of America" and states that this "has awakened interest in the consequences of aging and the care of the elderly".

Demographic Information.

In the United States today, one out of every nine people is age 65 or older, and experts have predicted that this number will double within the next three decades (Havala, 1997). In West Virginia alone, 14 percent or greater of the state's total population is comprised of those age 65 or older (U.S. Census Bureau, 1997). The United States Census Bureau (1997) reports that only eleven other states have an elderly population of this magnitude. In Lincoln County, West Virginia, the elderly population accounts for approximately 12.5 percent of the county's population as a whole (Libbey, 1996).

A review of literature suggests that the elderly population in the United States is arranged into three subgroups: the young-old (65 to 74 years old), the old (75 to 84 years old), and the oldest old (85 years or older) (ADA, 1996). The elderly are the fastest growing portion of the American population, and among these subdivisions, the oldest old is increasing the most rapidly (Chernoff, 1996; Schlenker, 1993). In 1994, the oldest old numbered three million; this number is ten percent of the elderly and just over one percent of the population as a whole (U.S. Census Bureau, 1997). By 2010, the percentage of oldest old among the elderly is expected to have increased to 15.5 percent (Berg & Cassells, 1990).

One rationale for the growth of the oldest old segment of the population is the increase of average life expectancy. When the United States was founded in 1776, the life expectancy at birth was a brief 35 years (U.S. Census Bureau, 1997). By the year 1900, average life expectancy had increased to 47 years; it then leaped to 68 years in 1950, and in 1991, the average life expectancy stood at 76 years (Schlenker, 1993; U.S. Census Bureau, 1997). Currently, mean life expectancy has remained at approximately 76 years since 1991 (Fowles, 1996).

Differences exist in average life expectancy among the male and female population. In 1991, the life expectancy for women was 79 years, but only 72 years for the men (U.S. Census Bureau, 1997). In general, women are expected to outlive men by an average of seven years. This discrepancy in life expectancy among the genders has received much attention in the scientific community; researchers attribute this difference in life span to both genetic and environmental factors (Schlenker, 1993).

In 1994, elderly women in the United States outnumbered men 20 million to 14 million; this is a ratio of 3 to 2. The ratio increased to 5:3 among the oldest old (U.S. Census Bureau, 1997). The significant difference in the number of elderly women to men is one reason why more elderly men are married. A review of literature found that approximately 77 percent of older men are married; this is true for only 43 percent of the women (Fowles, 1996; U.S. Census Bureau, 1997).

Living arrangements of the elderly are most often determined by gender, age, and marital status (Schlenker, 1993). The United States Census Bureau reported in 1990 that 95 percent of elderly lived in the community while only five percent were institutionalized. In 1994, approximately 30 percent of the non-institutionalized elderly lived alone. (Fowles, 1996) The majority of those living alone were women (Davis, Murphy, Neuhaus, & Lein, 1990; Schlenker, 1993; U.S. Census Bureau, 1997).

Living arrangements of the elderly greatly concern experts in the field of geriatrics. Elderly who live alone are at higher risk to suffer from loneliness, social isolation and/or depression (Chernoff, 1991; Walker & Beauchene, 1991). Each of these three, in turn, increases the risk of dietary inadequacies. Ryan and Shea (1996) suggested that those elderly who suffer from depression also frequently experience decreased dietary intake, weight loss, and poor appetite. Social isolation has also been indicative of lower nutrient intakes in several studies (Chernoff, 1991; Natow & Heslin, 1986; Walker & Beauchene, 1991).

Resources.

Generally, people over the age of 65 have lower levels of income than other segments of the population. In 1995, the median income of the elderly population was $16,484 for males and $9,355 for females (Fowles, 1996). Cash income is typically decreased at the onset of retirement; at this time, many older persons become dependent on Social Security or live on a fixed income (Natow & Heslin, 1986; Schlenker, 1993).

A decrease in income among the elderly promotes an increase in poverty. Fowles (1996) suggested that approximately 3.7 million older Americans fell below the poverty level in 1995 while another 2.3 million were categorized as near-poor. These statistics indicate that nearly 20 percent of elderly people are poor or near-poor (Wellman, Weddle, Kranz, Brain, 1997). Elderly women who live alone, are part of a minority group, reside in the South, did not receive a high school diploma, or are ill or disabled are most likely to be poor (ADA, 1996; Fowles, 1996; U.S. Census Bureau, 1997).

West Virginia Regional Health Profiles (1997) indicate that 19.7 percent of the state's total population fell below the poverty level. The same research, utilizing data from the 1990 census, found that 16.8 percent of those age 65 or older were considered poor. The incidence of poverty was greater in Lincoln County than in the state as a whole. The total number falling below the poverty line in Lincoln County was 33.8 percent; the percentage of elderly living below poverty level was 24.9 percent (West Virginia Department of Health and Human Resources [WVDHHR], Bureau of Public Health [BPH], Office of Epidemiology and Health Promotion, & Health Statistics Center, 1992).

Poverty is a serious problem among America's elderly, and the relationship between indigence and nutritional status cannot be ignored. The American Dietetic Association (1996) and Chernoff (1991) reported that poverty is a strong indicator of malnutrition risk. When funds are scarce, elderly often reduce food intake to provide extra money for things such as medication. The reduction of dietary intake puts them at higher risk for malnutrition (ADA, 1996). One study described by Chernoff (1991) suggested that over half of the respondents did not have enough money to purchase all the foods that they needed.

General Health.

The general health of humans often changes gradually throughout the aging process. Heckheimer (1989) suggested a decline in various body functions begins around age 30 at which time persons can expect a further reduction of about one percent each year. The preceding statements provide a rationale for the decrease in health status as people approach the later years in life.

Approximately 28.5 percent of elderly surveyed in two different studies reported their health status as fair or poor (Fowles, 1996; Schlenker, 1993). This nearly triples the number of the total population who reported the same health status. Factors such as inability to perform activities of daily living (ADLs), presence of chronic disease, and decreased dietary intake contribute to a decline in health status.

In 1986, 23 percent of the home-dwelling elderly had difficulty performing one or more ADLs; the majority of these were women (Fowles, 1996). ADLs measure capability in six functions: bathing, continence, dressing, feeding, toileting, and transfer

(Berg & Cassells, 1990). The oldest old had the highest percentage (45 percent) among elderly in difficulty performing ADLs due to some health difficulty (Fowles, 1996).

Four of five persons aged 65 or older suffer from one or more chronic diseases (Schlenker, 1993). Heart disease, cancer, and cerebrovascular disease are the leading causes of death in the United States. These three chronic diseases are responsible for 75 percent of deaths in persons over 65 years of age according to the United States Census Bureau (1997).

Currently, heart disease ranks as the overall leading cause of death in both West Virginia and the nation as a whole (WVDHHR, BPH, & Office of Epidemiology and Health Promotion, 1993). Risk factors often associated with heart disease are primarily linked to diet and lifestyle choices such as exercise and cigarette smoking; hypertension and diabetes are also associated with increased risk for heart disease (Wardlaw, 1997).

Data from Lincoln County, West Virginia presents heart disease as the number one killer among residents according to data from the 1990 census. Prevalence of several risk factors for cardiac disease is also high in the county. The percentage of Lincoln countians who suffer from diabetes, hypertension or obesity, smoke cigarettes regularly, and lead a sedentary lifestyle is higher than the national average (WVDHHR, BPH, Office of Epidemiology and Health Promotion, Health Statistics Center, 1992).

Cancer is the second leading cause of death in the United States and among the elderly. In the mid-eighties, Natow and Heslin (1986) predicted that the number persons suffering from cancer would increase throughout the next decade; their prediction was quite accurate. Experts have now projected that cancer will replace heart disease as the number one cause of death by the turn of the century (Wardlaw, 1997). In Lincoln

County, the number of deaths from all types of cancer is greater than the national mean according to 1990 census information (WVDHHR, BPH, Office of Epidemiology and Health Promotion, & Health Statistics Center, 1992).

Life-style factors often associated with incidence of cancer are cigarette smoking, dietary habits, and obesity. Cigarette smoking has received much attention as a risk factor for cancer, but the relationship between diet, obesity, and cancer has only recently been explored (Schlenker, 1993). Fats, alcohol, and nitrites are potential carcinogenic agents and should be avoided in large amounts; vitamins A, E, and C, folate, selenium, dietary fiber, and calcium are thought to protect the body against cancer (Wardlaw, 1997).

Cerebrovascular disease, or stroke, is the third leading killer nationwide as well as West Virginia. The incidence of cerebrovascular disease increases with age, as is the case with most chronic diseases. In 1988, 87 percent of deaths from a stroke were among the elderly population; the percentage was 89 percent in West Virginia according to 1991 statistics (WVDHHR, BPH, & Office of Epidemiology and Health Promotion, 1993).

Risk factors associated with cerebrovascular disease closely mimic those for heart disease. Diet, exercise, and cigarette smoking are behaviors that may be controlled by individuals. Those who suffer from diabetes mellitus are also at a greater risk of developing cardiovascular disease independent of lifestyle practices (WVDHHR, BPH, & Office of Epidemiology and Health Promotion, 1993).

The prevalence of chronic disease and various other conditions among the elderly is the primary reason for large health care expenditures among this age group. Persons age 65 and older visit physicians more often, use more prescription medications, and are

hospitalized more frequently than any other segment of the population (Schlenker, 1993). In 1987, the elderly comprised 12 percent of the total United States population but accounted for 36 percent of health care expenses; these expenditures totaled 162 billion dollars for one year (Fowles, 1996).

Food and Nutrition Issues for the Elderly

Caloric and Nutrient Needs.

Knowledge concerning the caloric and nutrient needs of the elderly has been limited. Until recently, little research has been performed regarding effects of the aging process on the body's ability to absorb, digest, and retain nutrients (Havala, 1997; United States Department of Agriculture [USDA], 1993). Many questions have arisen concerning the nutrient needs of those age 65 or older. Although many questions have remained unanswered, experts have agreed that physiological and functional changes in later life alter the caloric and nutrient needs of the elderly (ADA, 1996).

The Recommended Dietary Allowances (RDAs) (Appendix A) have served as nutrition standards for an adequate intake of protein, vitamins, and minerals. The 1989 RDA table, the latest revision, separated adults in two categories: 1) age 25 to 50 and 2) age 51 and greater. No recommendations specific to the elderly were made (National Research Council [NRC], 1989). Although the caloric and nutrient needs of the aged do not differ greatly from those of younger adults, scientists have gathered sufficient data on distinct elderly nutrition needs and several recommendations have been formulated (Russell, 1997).

A review of literature suggested that energy requirements are an important nutritional consideration among the elderly. Roe (1992) suggested two reasons for a reduction in caloric intake during the last stage of the life cycle. The reduced intensity of physical activity and the slowing of the body's metabolism have been cited as reasons for reduction in energy expenditure thereby reducing caloric needs.

The 1989 RDAs (NRC, 1989) estimated the average caloric needs of all persons. For those over the age of 50, the estimates recommended a daily caloric intake of 2,300 calories for men. Women in the same age group required 1,900 calories per day. A comparison of these figures with the estimated needs of those age 25 to 50 indicated a 600 calorie reduction among men and 300 for women.

Total calories have been derived from the three macronutrients: protein, fat, and carbohydrates. These have been firmly established as the three energy nutrients. Of the three, protein was the only one given a RDA value to assure that an adequate intake was identified. The suggested intake for adults was 0.8 g/kg in 1989. This did not vary for the recommendations of the elderly (NRC, 1989).

Research has found that protein-energy under-nutrition increases morbidity and mortality (ADA, 1996). This finding prompted experts to increase the protein requirement among the geriatric population to 1.0 g/kg (Ahmed, 1992; ADA, 1996; Chernoff, 1991). Most recently, the ADA (1996) has suggested a range of 1.0 to 1.25 grams of protein per kilogram to meet the needs of elderly at risk for malnutrition.

A review of literature indicated that fats, the second energy nutrient, were the most concentrated source of food energy in the diet (Mahan, & Escott-Stump, 1996). The American Heart Association established guidelines concerning the amount of fat

necessary in the diet. The suggestion was consistent for all adults and suggested that no greater than 30 percent of daily caloric intake come from fat with less than ten percent of intake derived from saturated fat (Chernoff, 1991).

The recommendation for fat intake called for a reduction in fat consumption as the average American consumes at least 34 percent of daily calories from fat (Mahan, & Escott-Stump, 1996). Regional and ethnic factors have been determined as factors that influence fat intake. A diet high in fat has been associated with an increased risk of heart disease, stroke, and some forms of cancer (USDA, 1993).

Recommendations have also been made with regarding carbohydrates, the third and final energy nutrient. The Committee on Diet and Health of the National Academy of Sciences recommended that greater than 55 percent of total caloric intake should come from carbohydrates (Schlenker, 1993). This group also suggested that three-fourths of this percentage should consist of complex carbohydrates such as starch and fiber, while the remaining one-fourth should consist of simple carbohydrates or sugar.

Among the carbohydrates, special recommendations have been made for fiber. The NRC (1989) stated that a diet plentiful in fiber reduces the risk of cardiovascular disease, colon cancer, and diabetes. Most experts have agreed that a range of 20 to 30 grams of fiber per day is an adequate amount with regard to disease prevention (USDA, 1993).

Guidelines have been established for the macronutrients, vitamins, and minerals as deficiencies and interrelationships have been revealed. The 1989 RDAs provided a two-thirds safety margin as a level for vitamins and minerals as listed in Appendix A.

Again, the RDAs were not specifically formulated for the elderly. This portion of the population was considered in the 51 plus age category.

Experts have determined a need for the formulation of age categories specific to the geriatric population in future RDAs (Schlenker, 1993). Research has indicated that current RDAs for the elderly are too low for riboflavin, vitamin B-6, folic acid, vitamin B-12, vitamin D, and calcium (ADA, 1996). Other reports have implied that the RDA for vitamin A is too high (Russell, 1997).

Walker's research (1995) in Lincoln County, West Virginia discovered that 28 percent of the sample group's diets were deficient in calories using the RDA average energy expenditure. Approximately 20 percent, or 17, of the elderly sample had insufficient intake of protein; this is an intake below 12.5 percent of total calories. Thirty-one percent consumed less than the recommended amount of carbohydrates which was 57.5 percent of total calories. Fiber intake was inadequate in 43 percent, or 35, of the group. Nearly half of the diets were low in calcium, and an average of 41 percent of intakes did not meet 66 percent of the RDAs for vitamins A and B-12.

Food Availability.

The American Dietetic Association (1996) found that 2.5 to 4.9 million elderly in the United States experience some type of food insecurity meaning that 8 to 16 percent do not always have access to foods that will provide a nutritionally adequate diet. Experts have determined that a great number of Americans suffer from food insecurity, but research specifically related to food availability is limited. No research has been found on food availability among the elderly population.

Cheadle and his associates first realized a need for research in the area of food availability. The group's investigations concentrated on examining food availability through grocery store surveys. Literature on the results of Cheadle's research was published over a five-year period beginning in 1990. The following paragraphs summarize four collective studies on this topic.

Early grocery store research concentrated on surveys of product displays to determine the following: 1) the amount of health education materials provided and 2) the shelf space allotted to healthy food products (Cheadle, et al., 1990). Fresh produce, meat, milk, and bread were the product areas studied in each store. All areas were investigated for the presence or absence of health promotion items and dimensions of display area. The series of surveys recorded in the 1990 research served as a pilot test for grocery store assessment.

In 1991, Cheadle, et al. evaluated the association between food availability in grocery stores and individual dietary habits. Telephone surveys were conducted to determine dietary intakes of individuals in 12 communities. Grocery store surveys were administered in the same manner as the pilot research. At the conclusion of the research, Cheadle and his associates determined a positive, statistically significant correlation between dietary intakes and food availability.

A follow-up to the 1991 research was performed to investigate the effectiveness of a grocery store survey in tracking changes in community dietary behaviors (Cheadle, et al., 1993). Very similar methods were used for data collection in both cases. Findings revealed that a significant correlation remained between dietary intakes and food availability, but changes over time in the two measures were not statistically significant.

Cheadle, et al. (1995) examined the possibility that grocery store surveys could provide an alternative to individual dietary intake surveys when evaluating community-based nutrition programs. One outcome determined that grocery store surveys were more cost effective than individual telephone surveys. While other results proved to be somewhat inconclusive, the need for further investigation of grocery store surveys was established.

Nutrition Standards and Tools for the Elderly

Dietary Guidelines and the Food Guide Pyramid.

The United States Department of Agriculture (USDA) and Department of Health and Human Services (USDHHS) have defined the Dietary Guidelines for Americans (Appendix B) as a group of recommendations that provide healthy Americans with advice regarding food choices for health promotion and disease prevention (USDA, & USDHHS 1995). These guidelines are revised every five years with the last revision in 1995. The seven 1995 guidelines advocated a diet with most calories coming from whole grain products, vegetables, fruits, low-fat milk products, lean meats, fish, poultry, and dry beans (USDA, & USDHHS, 1995).

The Food Guide Pyramid (Appendix C) was designed in conjunction with the 1990 revision of the Dietary Guidelines to serve as a daily food guide for Americans (Gambera, Schneeman, & Davis, 1995). Its purpose was to assist Americans when putting the Dietary Guidelines into practice. During development of the pyramid, the USDA and USDHHS performed a great deal of research to provide a pictorial image that would be both memorable and understandable to a wide variety of audiences

(Achterberg, McDonnell, & Bagby, 1994). The three messages highlighted within the pyramid are as follows: 1) dietary variety, 2) moderation of fats, oils, and sugars, and 3) proportionality (Schuette, Song, & Hoerr, 1996).

Different dietary assessment tools are utilized to rate the nutritive quality of various individuals. Food frequency checklists were commonly utilized when assessing compliance with the Dietary Guidelines or Food Guide Pyramid. Food frequencies are used to record the amount of times a person chooses a certain food or group of foods during a predetermined amount of time (Zemen, & Ney, 1988).

Recommended Dietary Allowances.

The RDAs were first published by the Food and Nutrition Board in 1943 with the purpose of providing "standards to serve as a goal for good nutrition" (NRC, 1989). The NRC (1989) officially defined the RDAs as "the levels of intake of essential nutrients that, on the basis of scientific knowledge, are judged by the Food and Nutrition Board to be adequate to meet the known nutrient needs of practically all healthy persons". Revisions of the recommendations are made as science advances and nutrition knowledge expands; the most recent revision was published in 1989.

The RDAs were based on six different kinds of evidence. These were as follows: 1) studies of a sample population provided a diet containing deficient levels of a nutrient, followed by a correction of the deficit, 2) studies that measure nutrient status with regard to intake, 3) biochemical measurements of tissue saturation related to nutrient intake, 4) nutrient intakes of healthy people, 5) epidemiological observations of nutritional status in various populations, and 6) extrapolation of data from animal experiments (NRC, 1989).

The RDAs have served as a useful guide for determining the nutrient requirements of people in all age categories, but are not infallible. The final age category of 51 years or older has been a subject of debate in recent literature. Most experts have agreed that the elderly category should be further defined for specific elderly subgroups (Russell, 1997).

As a component of nutrition assessment, specific nutrients have often been analyzed through three-day dietary intake studies (Walker, 1995). When this method is employed, dietary intakes are broken down into many of the macro and micronutrients to analyze diet adequacy. RDAs are most often utilized as a measure of nutritional adequacy. A variety of these tools should be utilized for a comprehensive assessment.

Food and Nutrition Programs for the Elderly

The United States government realized a need to establish food and nutrition programs for the elderly as early as the mid-sixties. Over the 30-year span of time, several programs have evolved which have been very beneficial to elderly throughout the country. The three major programs were: 1) the Elderly Nutrition Program (ENP), 2) Healthy People 2000 (HP2000), and 3) the Nutrition Screening Initiative (NSI).

The ENP was initiated through the Older Americans Act (OAA) of 1965. The OAA stated that adequate nutrition for the elderly was fundamental and established guidelines for funding nutrition programs benefiting the older population (Greenburg, 1995). Title III-C of the OAA established congregate and home-delivered nutrition services.

Literature reviews suggested that approximately one million elderly are served meals on a daily basis through the ENP (Greenburg, 1995). The program guidelines have required that elderly participants in the ENP receive a minimum of one meal per day at least five days a week (Chernoff, 1991). Each meal must provide at least one-third of the RDAs.

While the ENP has proven quite effective among some elderly, others have not been able to reap its benefits. Lack of transportation and long waiting lists for home-delivered meals were two problems of the ENP cited by the ADA (1996). This lack of accessibility has been a major concern for elderly in the rural areas where a smaller amount of funding may be allocated for nutrition programs.

HP 2000 first introduced the concept of health promotion and disease prevention in 1990. Goldstein (1996) stated the three main goals of this program as: 1) increasing the span of healthy life for all Americans, 2) reducing health disparities among all Americans, and 3) achieving access to preventative services for all Americans. Objectives were formulated as a directive for health care providers to reach the goals set forth by the end of the twentieth century. As a positive role, these objectives, both statewide and nationally, focused on the entire range of the age spectrum, including the elderly.

The NSI was created through a collaborative effort of The American Dietetic Association, the American Academy of Family Physicians, and the National Council on Aging. These groups recognized the increased risk of poor nutrition among the elderly. Because of this, criteria were compiled to screen the home-dwelling elderly (NSI, 1994). Seven risk factors associated with poor nutrition and health status were identified to

detect those elderly at risk (Sahyoun, Jacques, Dallal, and Russell, 1997). The NSI (1994) stated its goal as encouraging routine nutrition screening and intervention among all healthcare disciplines that serve the elderly population.

Summary

Interest in the elderly has increased due to the simple fact that people are living longer. This trend has caused experts to further explore the caloric and nutrient needs of the elderly as well as investigate factors that may cause food insecurity among this segment of the population. Existing nutrition standards for the elderly have been scrutinized and, in the future, may be altered as more research data is gathered. Food and nutrition programs to benefit the elderly have been firmly established in the United States and serve approximately one million older people on a daily basis.

CHAPTER III

METHODOLOGY

Research on a select sample of elderly was initiated in Lincoln County, West Virginia (Appendix D) as early as 1989. A grant to focus on rural, community-based elderly was awarded to Walker and his associates at that time through the Benedum Foundation. Participants for the study were enlisted through several means. Part of the sample consisted of patients at the Lincoln Primary Care Center. Those who attended the local senior citizen's center were also considered for the sample. Finally, a newspaper advertisement was utilized to attract the remaining participants in the study.

The research sample consisted of a study and a control group that totaled 143 persons at its onset. All who agreed to participate were given a one-time stipend of $50. The study group also received a complete physical examination by a qualified physician. This rural, community-based elderly sample has been surveyed many times over the past nine years; unfortunately, the sample size has decreased dramatically over time.

All research performed through the Benedum Grant was approved by the Marshall University Institutional Review Board. Permission to conduct research on the Lincoln County sample was granted by the Chairperson of the Human Subjects Subcommittee. (Walker, 1997)

Research Design

This research was designed as a descriptive study of dietary intake and food availability. A pre-selected sample of the elderly population in Lincoln County, West Virginia, served as the participants. Two surveys were administered to evaluate dietary intakes of the participants as well as food availability in the area. The first was a telephone survey of participants. The second consisted of an observational survey of preferred grocery stores.

General demographic data were obtained on each member of the sample and all preferred grocery stores. Dietary intakes were gathered utilizing telephone interviews and a food frequency tool. The availability of those foods was then assessed through a survey of preferred grocery stores. Regression analysis was performed to examine the relationship between dietary intakes and availability.

Sample

The sample was comprised of individuals age 66 or greater who reside in Lincoln County, West Virginia. All persons who were interviewed for the nutrition study by Walker, Lucas, Linnenkohl, and Sohrabi (1995) were eligible. Three-day dietary intakes for Walker's study were collected in the summer of 1993 among those remaining from the 143 members of the original sample. Eighty-four sets of data were collected.

Since 1993, the following has transpired among the sample: 20 are deceased, four have entered long-term care facilities, seven have moved out of the area, contact has been lost with three, and one is no longer able to communicate. The remaining 49 persons

were contacted regarding participation in the study, and 42 agreed to take part in this research. Forty complete sets of data were obtained for analysis.

Research Instruments

Validated and reliable instruments were not accessible due to the limited amount of research performed on dietary intakes and food availability among rural, community based elderly. Two new instruments were developed after an extensive review of available literature regarding health status and nutritional needs of the elderly, food availability, and dietary intakes. The instruments were developed by incorporating various concepts discovered in existing surveys and/or questionnaires.

Dietary Intake Survey.

The 38 question telephone survey (Appendix E) was developed utilizing earlier validated questionnaires as models. The three-part questionnaire focused on the following topics: 1) general descriptive data, 2) grocery store information, and 3) dietary intakes per a food frequency checklist. Information regarding income was not gathered, because previous research by Beene, Walker, and Lucas (1995) revealed that the majority of the sample fell near or below the poverty level. No suitable existing survey was found that encompassed all three areas mentioned above. This created the need to develop a new survey which was piloted on the sample population.

Part one consisted of general demographic data relating to the Lincoln County participants. Thirteen questions examined gender, age, race, height, weight, family medical history, and current and past medical history. Questions related to diet were also

included in this section. These questions were concerned with current diet, length of time following a particular diet, and reliable sources of nutrition and diet information.

Part two of the dietary intake survey consisted of nine questions related to grocery stores and grocery shopping habits. In this section, participants were asked to identify the store where they most frequently shop. This information was then utilized in the second part of the research. Other questions in this segment were concerned with who shops in each household, frequency of visits to the grocery store, and availability of certain foods. A five-point Likert Scale was used to determine the degree of satisfaction among variety, quality, and cost of available foods.

Parts one and two of the dietary intake survey were created primarily utilizing concepts from a telephone survey designed by researchers at the University of Washington (Cheadle, et al., 1991, 1993). A letter was written to the project's primary researcher requesting the full context of the survey and permission for usage in this research (Appendix F). Written permission was granted by Cheadle to use any pertinent information from their survey (Appendix G). The nutritional questionnaire by Fanelli and Abernathy (1986) was also used in the development stages as well as a survey by the Research Council of the State Health Education Council of West Virginia (SHEC) (1995).

The final part of the survey contained a food frequency checklist to determine dietary intakes. The Center for Science in the Public Interest's (CSPI) (1993) Food Guide Pyramid was utilized to decide which foods would be included on the checklist. Choices from each of the six sections of the pyramid were divided into anytime, sometimes, and seldom foods as determined by the CPSI. Given a list of particular foods,

participants would indicate the frequency of consumption of foods within that group. The answers were categorized as: rarely/never, three or less servings per week, and four or more servings per week.

The first draft of the survey (Appendix H) was evaluated by a panel of four experts in the fields of nutrition, family and consumer science, and medicine. All experts had previously worked with the sample population in some capacity. After this review, modifications were made in the wording and content of several questions, and the final draft of the survey was produced.

Grocery Store/Food Availability Survey.

The second questionnaire (Appendix I) was created to assess the availability of food. Any store listed as preferred by participants in the dietary intake survey was considered for this part of the research. The four-part instrument included: 1) general descriptive data, 2) health promotion items, 3) food costs, and 4) food availability.

The first part contained questions that provided general descriptive information on the grocery store. Questions were concerned with ownership of the store, dimensions, and number of checkout stands. Part one also contained a checklist to determine if the following foods were available: fresh fruits, fresh vegetables, fresh meats, fresh poultry, and fresh fish. Another question addressed the availability of a delicatessen.

Part two of the food availability survey investigated any health promotion items found in the store. This section provided space to list any promotion item along with a brief description of the item. In addition, space was also allocated to list the area in which an item was located and the rate visibility of the item. For example, health

promotion items found in the fresh produce department of several stores were bags that contained the "5-A-Day" logo of the National Cancer Institute and nutrition information on various fruits and vegetables. The surveyor listed visibility of this item as excellent, good, fair, or poor.

Part three of the questionnaire dealt with food costs. A list of selected items was modified from Cheadle's research, and prices were obtained on 14 foods. Items surveyed for cost were: whole wheat bread, white bread, apples (per pound), fresh broccoli and cauliflower (per bunch), whole milk, two percent milk, skim milk, ground beef and chuck (per pound), skinless/boneless chicken (per pound), 12 pack of Pepsi, 12 pack of Coke, and 12 pack of store brand beverage.

Finally, part four of the survey dealt with food availability and paralleled the food frequency checklist from the dietary intake questionnaire. All foods listed on the checklist were assessed for availability at each grocery store. Availability was assessed by three categories: greater than one of each available, one of each available, and less than one of each available.

The instruments discussed in research by Cheadle, et al. (1990, 1991, 1993, 1995) were obtained and were the only referral sources available for grocery store surveys. Cheadle again granted written permission to use any information relative to the research in Lincoln County. The new instrument closely resembled surveys obtained from Cheadle.

Data Collection

Dietary Intake Survey.

Data for the dietary intake questionnaire were collected utilizing a telephone survey. This portion of the research was conducted over a five-week period from the Lincoln Primary Care Center in Hamlin, West Virginia. Forty-nine people were contacted regarding participation in the study, and 42 agreed to take part in the research.

The dietary intake survey was pilot tested on six participants at the beginning of the five-week period. The pilot test was conducted to determine if a telephone survey was appropriate for the elderly sample group. An estimate of 15 minutes was given to the participant for completion of the survey. No problems were incurred during testing, and data collection proceeded as planned.

Three interviewers were utilized to collect information for the dietary intake survey. All participated in an orientation where instructions for administration of the questionnaire were given. Importance was placed on conducting the interview exactly as written in the survey's text to assure consistency and accuracy.

A master list of all prospective sample members was available from the Lincoln Primary Care Center. The list included a name, telephone number, and participant code for each prospective sample member. The four digit participant code was enlisted to assure anonymity of the subjects.

Thirty-two sets of data were obtained utilizing the telephone method of survey. Ten subjects were incapable of completing the telephone survey due to some type of hearing impairment. After subsequent attempts, three potential sample members were unable to be contacted, and four chose not to participate.

Home visits were arranged for the ten participants who suffered from hearing impairment increasing the sample size to 42. These visits were conducted in the same manner as the telephone survey with one exception. The word "calling" was replaced with "visiting" in the introductory paragraph of the dietary intake survey on all home visits.

Grocery Store/Food Availability Survey.

Ten stores were listed as "most frequently shopped" by participants in the dietary intake study. Eight were clearly identified for further data collection. Store management at each of the eight grocery stores agreed to take part in the research.

Initial contact was made through a letter distributed to each grocery store's general manager (Appendix J). This letter contained a brief description of the research being performed in Lincoln County and solicited the manager's assistance. Permission to conduct the grocery store survey was also requested.

A visit or phone call was made following receipt of the letter to each grocery store. Verbal and written permission to conduct the survey was secured at this time (Appendix K). Arrangements for completing the grocery store/food availability survey were made at management's convenience.

Given the range of food availability and grocery store capacity, a single surveyor was employed. Data was collected over a ten-day period. The information was collected through observation in each grocery store. The answers for questions one and two were obtained from the manager on duty. Surveys took approximately 40 minutes to complete. Stores were visited on different days and at various times.

Data Analysis

The dietary intake and grocery store/food availability surveys were coded, and data were entered into the computer. Statistical analysis was attained through utilization of the main frame version of the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were obtained on the research participants and eight grocery stores.

Multiple regression was used to determine the relationship between dietary intakes and food availability. All food groups listed on each survey were categorized as good, better, or best choice. This was in accordance to the number of times foods were eaten per week on the dietary intakes. The number of items available determined the ranking on the grocery store/food availability questionnaire. A significance level of $p < .05$ was used for data analysis.

CHAPTER IV

RESULTS AND DISCUSSION

Dietary Intake Survey

A 38-item telephone survey was administered to 42 elderly individuals in Lincoln County, West Virginia. The questionnaire consisted of three parts: 1) general descriptive data, 2) grocery store information, and 3) a food frequency checklist. Survey data were collected to develop a nutrition profile of the rural, community-based elderly participants.

General Descriptive Data.

The research sample can be described as 100 percent (n=42) Caucasian, predominately female (n=29, 69.0%), and over the age of 75 (n=36, 85.7%) (Table 1, p.36). Race, gender, and age were obtained through a chart review of each participant. Height and weight ranges were completed through self-reported data.

Information regarding weight was obtained on 41 of the participants; one was bedfast with no current weight available. Nearly half or 47.6 percent (n=20) of the sample was greater than 160 pounds. As indicated in Table 1, one person reported a weight of less than 100 pounds with all other weights being relatively evenly distributed throughout the range.

TABLE 1

GENERAL DESCRIPTIVE DATA OF SAMPLE

Criteria From Sample	n	%		n	%
Gender (n=42):					
Male	13	31.0	Female	29	69.0
Age (n=42):					
66-75 years	6	14.3	> 75 years	36	85.7
Height (n=42):					
< 5'2"	5	11.9	5'5" to < 5'8"	13	31.0
> 5'2" to < 5'5"	15	35.7	> 5'8"	9	21.4
Weight (n=41):					
< 100#	1	2.4	131# to 145#	4	9.9
101# to 115#	5	11.9	146# to 160#	6	14.3
116# to 130#	5	11.9	> 160#	20	47.6

The sample group accurately represented the gender ratio of Lincoln County's elderly as the majority (69.0%) were female (WVDHHR, BPH, Office of Epidemiology and Health Promotion, & Health Statistics Center, 1992). The large number of female participants may explain why 28 (66.7%) reported a height greater than 5'2" to less than 5'5" tall. Seventy-nine percent (n=33) of the sample was less than 5'8". Using the Hamwi equation (100 pounds for 5' + 5 pounds per additional inch), this would suggest an ideal body weight of 140 pounds or less. Zeman and Ney (1988) recommended that ten percent should be added to the ideal body weights of persons over the age of 50 resulting in a top weight of 154 pounds. Results indicated an overwhelming 47.6 percent

(n=20) weighed greater than 160 pounds. This implied that many participants' weight exceeded ideal body weight for height. (Table 1, p.36)

Two questions focused on the topic of chronic disease. First, participants were questioned with regard to prevalence of chronic disease in family. Another question pertained to any chronic disease for which members of the sample are currently or have sought treatment.

Table 2 indicates that more than half of the sample stated a family history of hypertension (n=31, 73.8%), heart disease (n=27, 64.3%), and cancer (n=21, 50%). Nineteen (45.2%) reported incidence of diabetes. Heart disease and hypertension were the most prevalent chronic diseases among family members of the sample. Six (14.3%) reported other chronic diseases such as polio, cirrhosis, epilepsy, Alzheimer's, arthritis, and tuberculosis. Only 9.5 percent (n=4) reported no family history of chronic disease.

As indicated in Table 2, 95.2 percent (n=40) reported no past or current history of cancer, and 32 (76.2%) stated no history of diabetes. Nearly half (n=19, 45.2%) did not or have not suffered from heart disease, and 40.5 percent (n=17) report no incidence of hypertension. Nine (21.4%) members of the sample indicated that they have received or are receiving treatment for ulcers, gout, polio, asthma, and arthritis. Only six (14.3%) suffered from no chronic disease.

Chronic disease data indicated that the sample was healthy which is not typical for members of the elderly population. Because nearly all participants have developed a good rapport with their primary care physician, they appear to be healthier than average. Evolvement of a good, working relationship between patient and physician could increase number of doctor visits as well as patient compliance, thus improving overall health.

TABLE 2

PREVALENCE OF CHRONIC DISEASE

Disease By Prevalence	Yes		No	
	n	%	n	%
Family Prevalence:				
Cancer	21	50.0	21	50.0
Diabetes	19	45.2	23	54.8
Heart Disease	27	64.3	15	35.7
Hypertension	31	73.8	11	26.2
Other	6	14.3	36	85.7
None	4	9.5	38	90.5
Self Prevalence:				
Cancer	2	4.8	40	95.2
Diabetes	10	23.8	32	76.2
Heart Disease	23	54.8	19	45.2
Hypertension	25	59.5	17	40.5
Other	9	21.4	33	78.6
None	6	14.3	36	85.7

The majority (n= 30, 71.4%) of the sample followed no special diet for a medical condition. Twelve (38.7%) of those who did not follow a special diet indicated that no diet modifications had ever been recommended by a health professional. Twenty-three (54.8%) members of the sample stated that consumption of no specific foods has ever been recommended. This information remains consistent with the healthy sample group.

Most participants (n=22, 52.4%) followed a regular diet with no restrictions. If a modified diet was stated, it most often included a restriction of sodium (n=12, 28.6%) or fat and cholesterol (n=15, 35.7%). The number of those consuming a diet low in sodium, fat, and cholesterol was expected to be higher as heart disease and hypertension were the two main chronic diseases suffered by the sample. Four (9.5%) consumed a no sugar diet

while no one indicated use of a high fiber diet. Sixty-nine percent (n=29) of the sample reported following the indicated diet for greater than five years.

When questioned regarding sources of nutrition information, participants most often indicated a medical doctor (n=23, 54.8%) as a means for obtaining nutrition information. This data may not reflect the norm as, once again, most sample members have an excellent rapport with their primary care physician. Twelve (28.6%) reported receiving information via printed materials and the television. Only 19.0 percent (n=8) stated a dietitian or nurse as a source of nutrition information.

Grocery Store Information.

The second part of the questionnaire searched for data regarding grocery stores and shopping habits. Forty participants provided information. Two of the original 42 asked to be excluded after part one of the survey. They were not included for data analysis in the second section of the questionnaire. One indicated that he/she was tired and wanted to hang up the telephone.

Eight grocery stores were clearly identified as those "most frequently shopped" by participants. Of these eight stores, 62.5 percent (n=5) were located in Lincoln County with the remaining stores in the surrounding counties of Cabell and Logan. Shopping for groceries at these stores occurred more than three times per month (n=34, 85.0%).

Over half (n=21, 52.5%) shopped for their own groceries regularly. The remaining 47.5 percent were dependent on someone else. Five listed a daughter and another five listed a home healthcare worker as the person who shops for the household.

Three listed their wife as the primary shopper. Others mentioned by participants included husband, son, and other family members.

Most of the research sample (n=37, 92.5%) were able to find foods to meet their diet needs in the grocery store where they shopped. Participants identified several foods they wanted to purchase, but were not able to find in the store. Fresh vegetables were a common item not found in preferred grocery stores by five participants. Four were unable to find fresh fruits, and two could not locate either bread/cereals or chicken/turkey. Only one person listed fish as an unavailable food. Twenty-eight subjects stated that all foods they desired to purchase were readily available.

The research sample indicated degree of satisfaction with variety, quality, and cost of foods available for purchase at preferred grocery stores. A Likert Scale was utilized. Table 3 reveals the results.

TABLE 3

DEGREE OF SATISFACTION WITH AVAILABLE FOODS

Criteria	very satisfied	satisfied	neutral	dissatisfied	highly dissatisfied	no reply
Variety	12	28	0	0	0	0
Quality	12	22	0	6	0	0
Cost	5	10	4	16	4	1

(n=40)

All (n=40) were either very satisfied or satisfied with the variety of foods available for purchase. Fifty-five percent (n=22) indicated satisfaction with the quality of foods, and 12 (30.0%) were very satisfied. Six (15.0%) reported dissatisfaction with regard to quality of foods. Many (n=20, 50.0%) were either dissatisfied or highly dissatisfied with the cost of foods. (Table 3, p. 40)

Food Frequency Checklist.

Forty-one participants answered questions regarding dietary intake for a typical week. A food frequency form was utilized for information gathering. All food groups were coded as good, better, and best food choices for assessment purposes.

As indicated in Table 4, 95.1 percent (n=39) of participants received four or more servings per week from the bread, cereal, rice, and pasta group. This was the most desirable choice. Distribution among the consumption of dessert items was evenly distributed throughout the scale.

Produce consumption revealed that the majority of the sample consumed four or more servings per week of vegetables and fruits. Twenty-nine (70.7%) consumed the most desirable amount of vegetables as did 63.8% (n=28) with fruits. Only 7.3 percent (n=3) of the participants rarely or never ate vegetables. Five (12.2%) reported little to no fruit intake.

TABLE 4

DIETARY INTAKE/ FOOD FREQUENCY CHECKLIST

Food Categories	Rarely/ never		3 or less servings/ week		4 or more servings/ week	
	n	%	n	%	n	%
Breads:						
Assorted breads, cereal, rice, pasta	0	0.0*	2	4.9**	39	95.1***
Dessert items	14	34.1***	12	29.3**	15	36.6*
Produce:						
Vegetables	3	7.3*	9	22.0**	29	70.7***
Fruits	5	12.2*	8	19.5**	28	68.3***
Milk/Dairy:						
Fat-free items	30	73.2*	9	22.0**	2	4.9***
Low-fat items	12	29.3*	3	7.3***	26	63.4**
Regular items	13	31.7***	18	43.9**	10	24.4*
Meats:						
Fish & poultry	9	21.4*	29	69.0**	3	7.1***
Beef, pork, lamb	8	19.0*	27	64.3***	6	14.3**
Processed	12	29.3***	20	48.8**	9	22.0*
Fats, Oils, Sweets:						
Fat-free items	34	82.9**	4	9.8***	3	7.3*
Fats from oils, sugar items	8	19.5**	16	39.0***	17	41.5*
Solid fats	12	29.3*	11	26.8***	18	43.9**
Carbonated beverages	21	50.0***	10	23.8**	10	23.8*
Alcohol	41	100.0***	0	0.0**	0	0.0*

*denotes good choice, ** denotes better choice, *** denotes best choice
(n=41)

Milk and dairy products were divided into three categories: 1)fat-free, 2) low-fat, and 3) regular items. Thirty (73.2%) rarely or never consumed fat-free products and only two (4.9%) chose fat-free products four or more times per week. Most participants (n=26, 63.4%) chose low-fat milk and dairy products four or more times per week. Only three (7.3%) chose three or less servings, the most desirable choice. Regular dairy products were rarely or never chosen by 13 (31.7%). Most frequently (n=18, 43.9%), regular items were consumed three or less times per week, and 24.4 percent consumed the least desirable amount in a typical week. (Table 4, p. 42)

Meat intake of each participant was considered. Twenty-nine (69.0%) ate fish and poultry three or less times per week with nine (21.4%) consuming rarely or never. The majority (n=27, 64.3%) chose beef, pork, or lamb products three or less times, the best choice. Processed meats were rarely or never chosen by 39.3 percent (n=12) of the research sample. Nearly half (n=20, 48.8%) consumed processed meats three or less times per week as seen in Table 4.

Fats, oils, and sweets were the final category on the food frequency checklist. Fat-free products were chosen rarely or never by 82.9 percent (n=34) of the sample. Fats from oils and sugar items were consumed by 17 (41.5%) participants four or more times per week with 39.0% (n=16) eating these products three or less times, the most desirable choice. Mayonnaise and margarine are examples of fats from oils. Solid fats such as lard and butter were most frequently (n=18, 43.9%) consumed four or more times per week by participants. Eleven (26.8%) chose three or less servings per week of solid fats, the best choice. Solid fats should be consumed in the diet due to the need for essential fatty acids. (Table 4, p. 42)

Fifty percent (n=21) of the sample rarely or never drink carbonated beverages with remaining 20 split evenly among the other two categories. Surprisingly, all (n=41, 100.0%) of the research sample reported little or no alcohol use as seen in Table 4. The food frequency checklist indicated that participants had relatively healthy diets overall, but changes could be made to improve current dietary intake practices.

Grocery Store/Food Availability Survey

Eight grocery stores were surveyed. Stores chosen for survey were those that participants identified as "most frequently shopped". The questionnaire consisted of four parts: 1) general descriptive data, 2) health promotion items, 3) food costs, and 4) food availability.

General Descriptive Data.

Of the eight stores surveyed, 87.5 percent (n=7) were independently owned and operated with only one (12.5%) chain store in the group. The grocery store dimensions ranged in size from 8,000 to 33,000 square feet with a mean of 14,625 square feet. The number of checkout stands at each store ranged from two to seven. The mean was 4.25 checkouts. All checkout stands, including those not in operation at time of survey, were recorded by the surveyor.

One hundred percent (n=8) of the stores provided fresh fruits, vegetables, meats, and poultry for purchase. Fresh fish was available for purchase at only two (25.0%) grocery stores. Six (75.0%) of the eight stores provided a deli department for the convenience of their customers.

Health Promotion Items.

All stores were surveyed for presence or lack of health promotion items. One hundred percent (n=8) of the grocery stores had at least one health promotion item displayed. Criteria for rating items was amended from Cheadle, et al (1990, 1991, 1993, 1995) with ratings for visibility as excellent, good, fair, or poor. A brief description of all items was recorded as well as the department in which items were displayed. A total of fifteen health promotion items were located throughout the eight grocery stores. Most (n=14, 93.3%) were discovered in the fresh produce department. A summary of health promotion items may be found in Table 5.

TABLE 5

SUMMARY OF HEALTH PROMOTION ITEMS

Health Promotion Item	Location	Frequency
• "5 a Day for Better Health" produce bags	Produce	5
• Fruit/ vegetable nutrition information posters	Produce	4
• Nutrition information cards for fruits/ vegetables	Produce	3
• California strawberries promotional poster	Produce	1
• "5 a Day" advertisement cards for specials	Produce	1
• Bags for fresh meat	Meat	1
	TOTAL:	15

"5 a Day" produce bags were found in five stores. The bag contained the "5 a Day" logo of the National Cancer Institute with nutrition information for commonly purchased fruits and vegetables. Bags were very colorful and appealing with excellent

visibility. Nutrition information posters were common to four grocery stores. These typically contained pictures of common fruits and vegetables in conjunction with nutrition information. Visibility of this item varied from poor (n=2) to excellent (n=2) in the stores. As indicated in Table 5, three stores displayed nutrition cards for fruits and vegetables which typically consisted of only nutrition information. Writing on the cards was often small and difficult to read. The plastic bags designed for meat in one store were an excellent concept. The bags contained information on retail cuts of meat and were designed to decrease the spread of foodborne illnesses.

Food Costs.

Prices of several common foods were gathered from each of the eight grocery stores. Cost of items varied considerably from store to store. This could be attributed to advertised specials.

The average cost of one loaf of whole grain bread was $1.47 as opposed to $1.18 for one loaf of white bread. This indicated that whole bread, the more healthy choice, is 29 cents more expensive per loaf on the average. White breads were more readily available than whole grain breads.

Cost information was gathered for three produce items: apples, broccoli, and cauliflower. Both one pound of apples and a bunch of broccoli averaged $1.04 in price. The mean of cauliflower was $1.61 per bunch. One store had no cauliflower available for purchase. (Table 6, p. 47)

TABLE 6

SUMMARY OF FOOD COSTS

Food Categories		Mean Price		Mean Price
Bread (per loaf):				
	Whole grain	$1.47	White	$1.18
Produce:				
	Apples (per lb.)	$1.04		
	Broccoli (bunch)	$1.04	Cauliflower (bunch)	$1.61
Milk (per gallon):				
	Whole	$2.67	Two percent	$2.37
	Skim	$2.42		
Meat (per lb.):				
	Ground beef	$1.25	Ground chuck	$1.75
	Chicken breast	$3.32		
Soft drinks (12 pack):				
	Pepsi	$3.93	Coke	$3.65

Prices per gallon were obtained for whole, two percent, and skim milk. On the average, two percent milk was the cheapest at $2.37 per gallon; it was also the most readily available milk product at all eight stores. Table 6 indicated that whole milk averaged $2.67 per gallon, making it the most expensive. Skim milk was not available at one store; its mean price was $2.42 per gallon.

A comparison of ground beef and chuck revealed that ground beef was, on the average, 50 cents cheaper per pound. The low-fat boneless, skinless chicken breast was available at seven (87.5%) stores. The mean price of chicken was $3.32 per pound as indicated in Table 6.

Twelve packs of Pepsi and Coke products were surveyed with regards to cost. Table 6 reveals that Coke is an average of 28 cents cheaper than Pepsi. All grocery stores (n=8, 100.0%) had both Coke and Pepsi products available for purchase. Three (37.5%) also had a store brand soft drink in stock. Store brand soft drinks were the cheapest with a mean price of $2.59 for a twelve pack.

Food Availability.

All foods listed on the food frequency checklist were included in the food availability portion of the grocery store survey. Each group of foods was surveyed to determine the quantity available for purchase. Results are summarized in Table 7 on the page that follows.

Breads, cereals, rice, pasta, and dessert items were all (n=8, 100.0%) readily available. More than one variety of each was in stock at the time of survey. This indicates that the high in fat and sugar dessert items were as plentiful as the bread group. Fresh, frozen, and canned vegetables offered more than one choice of each for purchase in all eight (100.0%) stores. All varieties of fruits were not available because several (n=3, 37.5%) stores offered only one choice of frozen fruit.

Milk and dairy products were also included in the food availability segment of the survey. Fat-free products were available in abundance at seven (87.5%) grocery stores. One store did not offer any fat-free cheese choices. Six (75.0%) provided more than one of each low-fat item listed for purchase. The remaining two stores had no cream cheese or only one variety of this product. The high fat or regular dairy items were readily available with many choices of each in all eight (100.0%) stores. (Table 7, p. 49)

TABLE 7

SUMMARY OF FOOD AVAILABILITY SURVEY

Food Categories	> one of each avail.		one of each avail.		< one of each avail.	
	n	%	n	%	n	%
Breads:						
Assorted breads, cereal, rice, pasta	8	100.0***	0	0.0**	0	0.0*
Dessert items	8	100.0*	0	0.0***	0	0.0**
Produce:						
Vegetables	8	100.0***	0	0.0**	0	0.0*
Fruits	5	62.5***	3	37.5**	0	0.0*
Milk/Dairy:						
Fat-free items	7	87.5***	0	0.0**	1	12.5*
Low-fat items	6	75.0*	1	12.5***	1	12.5**
Regular items	8	100.0*	0	0.0**	0	0.0***
Meats:						
Fish & poultry	7	87.5***	1	12.5**	0	0.0*
Beef, pork, lamb	0	0.0*	0	0.0***	8	100.0**
Processed	7	87.5*	0	0.0**	1	12.5***
Fats, Oils, Sweets:						
Fat-free items	7	87.5***	0	0.0**	1	12.5*
Fats from oils, sugar items	8	100.0**	0	0.0***	0	0.0*
Solid fats	7	87.5**	0	0.0***	1	12.5*
Carbonated beverages	8	100.0*	0	0.0**	0	0.0***
Alcohol	0	0.0*	0	0.0**	8	100.0***

*denotes good choice, ** denotes better choice, *** denotes best choice
(n=8)

Fish and poultry products were considered with regard to food availability. Seven (87.5%) stores provided more than one choice of each in this group according to Table 7. One store, however, had only one type of fish and seafood available for purchase. Processed meats were readily available in 87.5% (n=7) of stores. Less than one choice of beef, pork, and lamb were available as a group in all eight stores. This is due to the fact that none of the stores surveyed had lamb in stock.

Fats, oils, and sweets were the last category to be surveyed. Fats from oils, sugar items, and carbonated beverages were readily available in 100.0% of the grocery stores. Fat-free products offered more than one variety of each in seven (87.5%) of the stores with one store offering no fat-free mayonnaise. Most (n=7, 87.5%) grocery stores provided a plethora of solid fat items for purchase, but one store did not have butter. Several choices of lard were available in a variety of sizes at each store. One type of beer product was available at a single grocery store. The remaining seven grocery stores did not sell any alcoholic beverages. (Table 7, p. 49)

Hypothesis Testing

The relationship between dietary intake and food availability was explored through the use of multiple regression. Dietary intake of each participant, the dependent variable, was considered with regard to availability of foods. Other independent variables such as cost were taken into account, but no relationships of significance were found to exist. A significance level of .05 was utilized for data analysis.

An analysis of the data revealed only two correlations between dietary intake and food availability. A significance of .038 was found when multiple regression was

performed on consumption of fat-free mayonnaise and salad dressing versus availability of the same items. As verified in Table 8, as the availability of fat-free mayonnaise and salad dressing increases, consumption increases as well. A relationship of significance ($p=.032$) was also shown between consumption and availability of soft drinks. Table 9 on page 53 reveals that consumption increases with an increase in availability of soda.

Research findings indicated that price and food availability were not related to dietary intakes among the Lincoln County elderly sample. It appears that participants consumed certain foods based solely on preference without regarding availability. The research hypothesis was rejected, because there was no significant relationship between dietary intake and food availability in the sample.

TABLE 8

MULTIPLE REGRESSION 1

DEPENDENT VARIABLE:

Dietary Intake: DRESSING

Unstandardized and (Standardized) Regression Coefficients

INDEPENDENT VARIABLE:	
OIL	0.283*
	(.39)

R squared = 15.1%

Adjusted R squared = 11.9%

n = 41

*.05

TABLE 9

MULTIPLE REGRESSION 2

DEPENDENT VARIABLE:

Dietary Intake: SODA1

Unstandardized and (Standardized) Regression Coefficients

INDEPENDENT VARIABLE:	
SODA18	2.20*
	(.42)

R squared = 20.8%

Adjusted R squared = 14.2%

n = 41

*.05

CHAPTER V

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

"The graying of America" provides an accurate description of the United States as average life expectancy continues to increase and people are living longer (Rossman, 1997). Technological and scientific advances provide two explanations for the growth of the elderly population. Fowles (1996) projected that the elderly will number approximately 70 million by 2030 nearly doubling the count from 1990. Elderly are the fastest growing segment of the population and provide a nutritional challenge as appetite, dietary intake, and nutrient needs are often altered with an increase in age.

Limited research has been preformed on rural, community-based elderly in the United States despite the fact that the majority of the elderly are non-institutionalized and reside in rural areas (National Center for Health Statistics, 1993). The research in Lincoln County focused on developing a nutrition profile for rural, community-based elderly through a comparison of dietary intakes and food availability. Dietary intake was assessed utilizing a food frequency tool while the availability of selected foods was considered through a survey of grocery stores.

The research sample was comprised of 42 elderly persons who reside in Lincoln County, West Virginia. The majority of the participants were female and over the age of 75. Most were also overweight. Many members of the sample reported no current or past medical history of a chronic disease and were following no special diet. Results of

data collection revealed a relatively healthy elderly sample which is somewhat atypical for members of the elderly population.

Details of the dietary intake survey identified that over half of the elderly sample were consuming an adequate amount of assorted breads (n=39, 95.1%), vegetables (n=29, 70.7%), and fruits (n=28, 68.3%). Twenty-six (63.4%) were consuming low-fat dairy products four or more times per week. Meat consumption was nearly evenly distributed throughout the low to higher fat choices, and intake of fats, oils, and sweets was not alarmingly high. Overall, the diets of participants were healthy for their age group.

A summary of the food availability survey revealed that nearly all foods included were readily available for purchase in each of the eight grocery stores where participants most often shopped. Lamb and alcohol were the only items not available for purchase in the grocery stores. All foods needed to achieve and maintain a healthy diet were available to the elderly, Lincoln County sample.

Conclusions

Those who participated in this research comprise a very unique sample in that they are quite healthy for their age. Most have developed an excellent rapport with a primary care physician which greatly contributes to the superb health status of the sample. The majority of sample members consumed an adequate, healthy diet. This could be an indication that inadequate or poor dietary intake has contributed to the reduction of the original sample through death over the past several years.

Results of the research found that foods for a healthy diet were readily available in Lincoln County and that availability was not related to the dietary intake of

participants. Due to the uniqueness of the participants and small sample size, generalizations may not be made about other elderly in West Virginia or the nation as a whole.

Implications

1. Additional research on dietary intakes and food availability of the elderly is needed on a larger scale.
2. Recommendations for improvement of the Dietary Intake questionnaire include: 1) ask question regarding average food cost per week or month, 2) consider home-canned foods as a source of fruits and vegetables as this is very common in Appalachian areas, and 3) format of the food frequency checklist should be changed to improve readability and increase user friendliness.
3. A suggestion for further study among this sample is to consider cost and determine the influence, if any, that it has on food selections of the elderly.
4. Information gathered in Lincoln County should be shared with the West Virginia Bureau of Public Health.
5. Members of the Nutrition Screening Initiative should actively support legislative efforts to maintain and improve nutrition programs for the elderly, especially in rural areas.
6. More information concerning nutrition standards of the elderly is needed in support of generating RDAs specific to the elderly population.

7. A comprehensive data base of all Title III participants should be initiated and monitored which would contain information regarding demographics, nutritional and social needs, and health status of the elderly.

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APPENDICES

APPENDIX A

RECOMMENDED DIETARY ALLOWANCES

(National Research Council, 1989)

FOOD AND NUTRITION BOARD, NATIONAL ACADEMY OF SCIENCES—NATIONAL RESEARCH COUNCIL

RECOMMENDED DIETARY ALLOWANCES,[a] Revised 1989

Designed for the maintenance of good nutrition of practically all healthy people in the United States

							Fat-Soluble Vitamins				Water-Soluble Vitamins							Minerals						
Category	Age (years) or Condition	Weight[b] (kg)	(lb)	Height[b] (cm)	(in)	Protein (g)	Vitamin A (μg RE)[c]	Vitamin D (μg)[d]	Vitamin E (mg α-TE)[e]	Vitamin K (μg)	Vitamin C (mg)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg NE)[f]	Vitamin B_6 (mg)	Folate (μg)	Vitamin B_{12} (μg)	Calcium (mg)	Phosphorus (mg)	Magnesium (mg)	Iron (mg)	Zinc (mg)	Iodine (μg)	Selenium (μg)
Infants	0.0–0.5	6	13	60	24	13	375	7.5	3	5	30	0.3	0.4	5	0.3	25	0.3	400	300	40	6	5	40	10
	0.5–1.0	9	20	71	28	14	375	10	4	10	35	0.4	0.5	6	0.6	35	0.5	600	500	60	10	5	50	15
Children	1–3	13	29	90	35	16	400	10	6	15	40	0.7	0.8	9	1.0	50	0.7	800	800	80	10	10	70	20
	4–6	20	44	112	44	24	500	10	7	20	45	0.9	1.1	12	1.1	75	1.0	800	800	120	10	10	90	20
	7–10	28	62	132	52	28	700	10	7	30	45	1.0	1.2	13	1.4	100	1.4	800	800	170	10	10	120	30
Males	11–14	45	99	157	62	45	1,000	10	10	45	50	1.3	1.5	17	1.7	150	2.0	1,200	1,200	270	12	15	150	40
	15–18	66	145	176	69	59	1,000	10	10	65	60	1.5	1.8	20	2.0	200	2.0	1,200	1,200	400	12	15	150	50
	19–24	72	160	177	70	58	1,000	10	10	70	60	1.5	1.7	19	2.0	200	2.0	1,200	1,200	350	10	15	150	70
	25–50	79	174	176	70	63	1,000	5	10	80	60	1.5	1.7	19	2.0	200	2.0	800	800	350	10	15	150	70
	51+	77	170	173	68	63	1,000	5	10	80	60	1.2	1.4	15	2.0	200	2.0	800	800	350	10	15	150	70
Females	11–14	46	101	157	62	46	800	10	8	45	50	1.1	1.3	15	1.4	150	2.0	1,200	1,200	280	15	12	150	45
	15–18	55	120	163	64	44	800	10	8	55	60	1.1	1.3	15	1.5	180	2.0	1,200	1,200	300	15	12	150	50
	19–24	58	128	164	65	46	800	10	8	60	60	1.1	1.3	15	1.6	180	2.0	1,200	1,200	280	15	12	150	55
	25–50	63	138	163	64	50	800	5	8	65	60	1.1	1.3	15	1.6	180	2.0	800	800	280	15	12	150	55
	51+	65	143	160	63	50	800	5	8	65	60	1.0	1.2	13	1.6	180	2.0	800	800	280	10	12	150	55
Pregnant						60	800	10	10	65	70	1.5	1.6	17	2.2	400	2.2	1,200	1,200	300	30	15	175	65
Lactating	1st 6 months					65	1,300	10	12	65	95	1.6	1.8	20	2.1	280	2.6	1,200	1,200	355	15	19	200	75
	2nd 6 months					62	1,200	10	11	65	90	1.6	1.7	20	2.1	260	2.6	1,200	1,200	340	15	16	200	75

[a] The allowances, expressed as average daily intakes over time, are intended to provide for individual variations among most normal persons as they live in the United States under usual environmental stresses. Diets should be based on a variety of common foods in order to provide other nutrients for which human requirements have been less well defined. See text for detailed discussion of allowances and of nutrients not tabulated.

[b] Weights and heights of Reference Adults are actual medians for the U.S. population of the designated age, as reported by NHANES II. The median weights and heights of those under 19 years of age were taken from Hamill et al. (1979) (see pages 16–17). The use of these figures does not imply that the height-to-weight ratios are ideal.

[c] Retinol equivalents. 1 retinol equivalent = 1 μg retinol or 6 μg β-carotene. See text for calculation of vitamin A activity of diets as retinol equivalents.

[d] As cholecalciferol. 10 μg cholecalciferol = 400 IU of vitamin D.

[e] α-Tocopherol equivalents. 1 mg d-α tocopherol = 1 α-TE. See text for variation in allowances and calculation of vitamin E activity of the diet as α-tocopherol equivalents.

[f] 1 NE (niacin equivalent) is equal to 1 mg of niacin or 60 mg of dietary tryptophan.

APPENDIX B

DIETARY GUIDELINES FOR AMERICANS

DIETARY GUIDELINES FOR AMERICANS

1. Eat a variety of foods.

2. Balance the food you eat with physical activity-maintain or improve your weight.

3. Choose a diet with plenty of grain products, vegetables, and fruits.

4. Choose a diet low in fat, saturated fat, and cholesterol.

5. Choose a diet moderate in sugars.

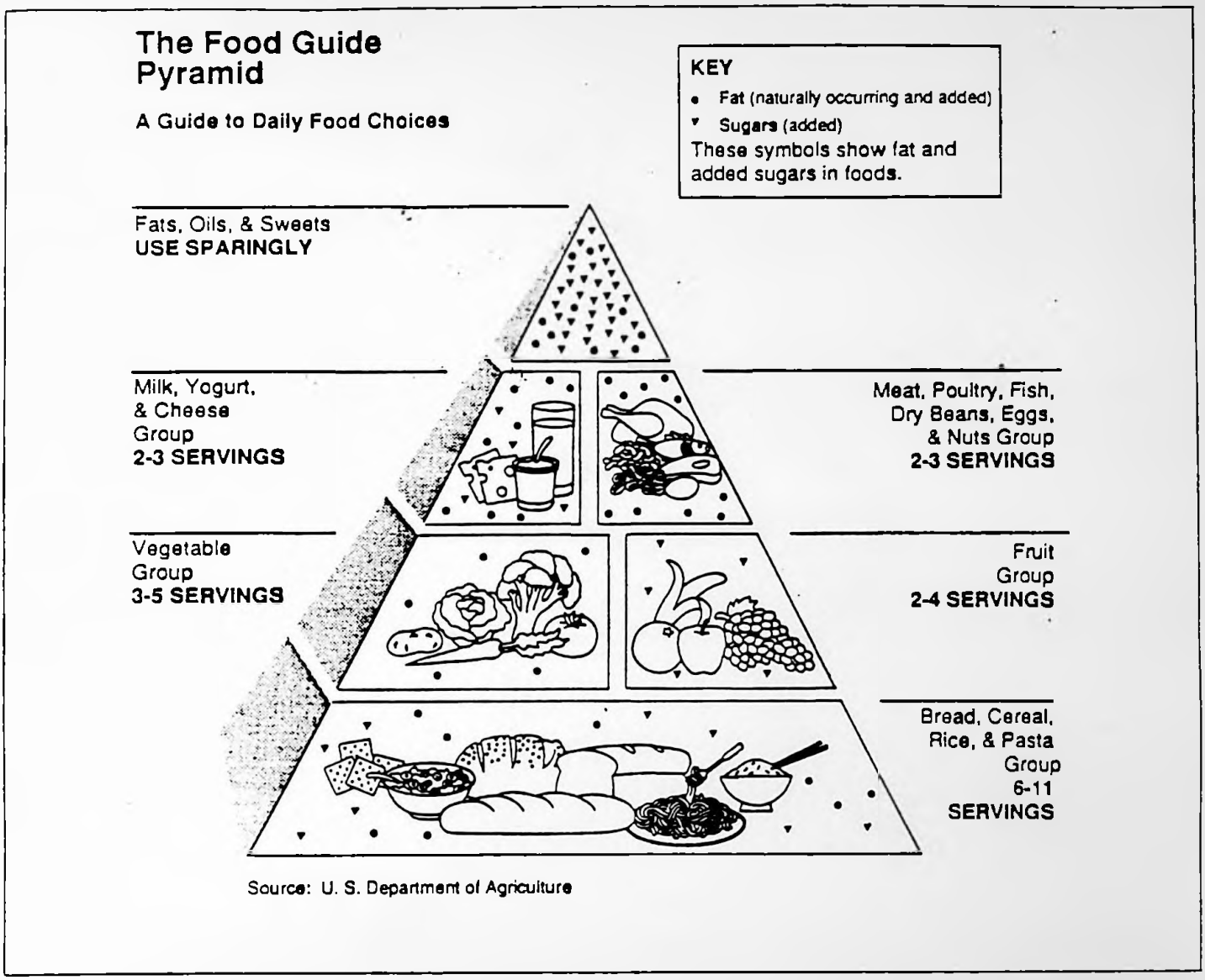
6. Choose a diet moderate in salt and sodium.

7. If you drink, do so in moderation.

(USDA, & USDHHS, 1995)

APPENDIX C

FOOD GUIDE PYRAMID



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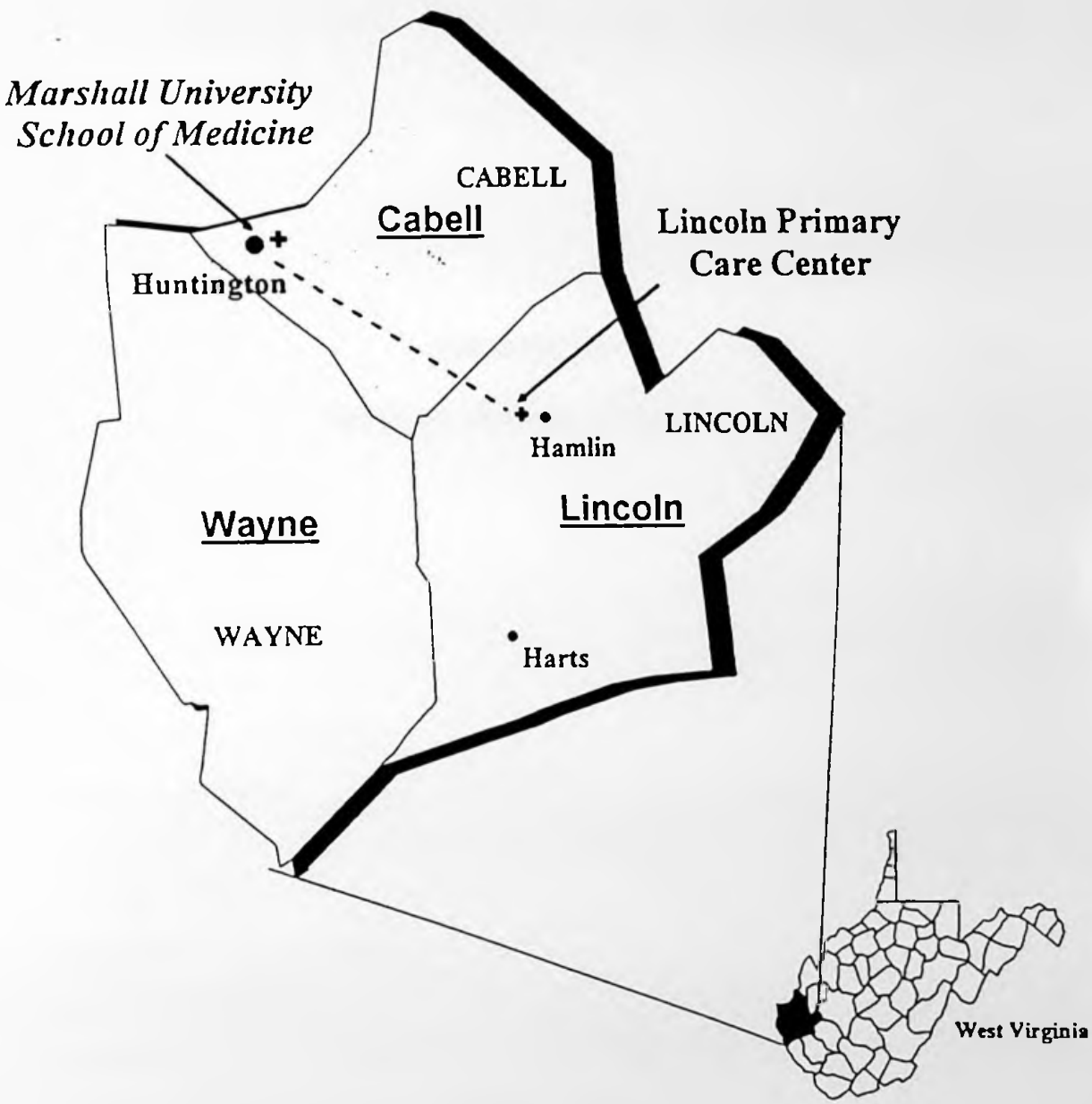
APPENDIX D

MAP OF LINCOLN COUNTY

Lincoln Primary Care Center
Hamlin, WV



APPENDIX E

DIETARY INTAKE SURVEY

Dietary Intake Survey
for Rural, Home-Dwelling Elderly
in Lincoln County, WV

Participant's Code: _____

Interviewer: _____

Date/Time: _____

[To interviewer: Please read the following paragraphs to each participant prior to beginning the interview. Remember to speak slow, clear, and loud. Also, be sure to administer each survey in the same manner. Thanks!]

Hello. My name is __(insert name)__, and I am calling on behalf of the Lincoln County Primary Care Center. You have been a valued participant in many research projects in the past, and we are asking for your help once again. Dr. Bob Walker has been interested in food availability in Lincoln County, and a survey has been designed to take a closer look at this. We would appreciate it greatly if you could spare approximately 10-15 minutes of your time to answer several questions. Your participation will be greatly valued.

[To interviewer: When participant agrees to complete survey, you will read the information that follows.]

This survey is broken down into three parts. The first section will help us to obtain some descriptive information about you, the second will concentrate on food availability in the grocery stores where you shop, and the last will briefly look at your dietary intake. If you are ready, we will now begin. Remember, you may choose more than one answer for some questions.

PART I: GENERAL DESCRIPTIVE DATA

1. What is your gender?

____ Male ____ Female

2. What is your age category?

____ Less than 55 years ____ 66 - 75 years

____ 55 - 65 years ____ Greater than 75 years

3. What is your race?

____ Caucasian/white ____ Other

4. What is your height?

____ Less than 5'2" ____ 5'5" - Less than 5'8"

____ 5'2" - Less than 5'5" ____ Greater than 5'8"

5. What is your usual weight category?

____ Less than or 100 pounds ____ 131 - 145 pounds

____ 101 - 115 pounds ____ 146 - 160 pounds

____ 116 - 130 pounds ____ Greater than 160 pounds

5. What is your usual weight category?

____ Less than or 100 pounds ____ 131 - 145 pounds

____ 101 - 115 pounds ____ 146 - 160 pounds

____ 116 - 130 pounds ____ Greater than 160 pounds

6. What (chronic) diseases have been prevalent in your family?

____ Cancer ____ Heart Disease ____ Other

____ Diabetes ____ Hypertension ____ None

7. Are you currently seeking or have you sought medical treatment from a physician for **[To interviewer: Read list that follows.]**?

____ Cancer ____ Heart Disease ____ Other

____ Diabetes ____ Hypertension ____ None

8. Are you following a special diet for a medical condition?

____ Yes ____ No ____ Not sure

**[To interviewer: If answer to #8 is YES, go to #10.
If answer to #8 is NO or NOT SURE go to #9.]**

9. If you are not following a special diet, has a health professional ever recommended that you do so?

____ Yes ____ No

10. What type of diet do you usually follow?

____ Diabetic/No sugar ____ Regular

____ High fiber ____ Sodium restricted

____ Low cholesterol/low fat ____ Other

[To interviewer: If no particular diet followed, please check REGULAR.]

11. How long have you followed this diet?

____ Less than 1 year ____ 3 to less than 5 years

____ 1 to less than 3 years ____ Greater than 5 years

12. Where do you get most of your information about what you should and should not eat?

____ Dietitian ____ Nurse ____ Printed materials/T.V.

____ Doctor ____ Family/friends ____ Other

13. Have you ever been advised to eat specific foods as part of treatment for a disease? (Low fat, sugar free, caffeine free, and high fiber are all examples.)

____ Yes ____ No ____ Not sure

[To interviewer: Read the following prior to beginning part II.]

We are now beginning the section of survey which is concerned with grocery store information.

PART II: GROCERY STORE INFORMATION

14. What is the name and location of the grocery store where you (caregiver) usually shop?

_____

15. How often do you (caregiver) grocery shop in a typical month?

____ One time or less ____ Three to four times

____ Two times ____ More than four times

16. Do you typically do the grocery shopping in your household?

____ Yes ____ No ____ Not sure

[To interviewer: If answer to #16 is YES, go to #18.
If answer to #16 is NO or NOT SURE, go to #17.]

17. Who does your grocery shopping for you?

____ Daughter ____ Other family member

____ Friend ____ Son

____ Home healthcare worker ____ Wife

____ Husband ____ Other

18. Are you (caregiver) able to find foods to meet your diet needs in the grocery store named above?

____ Yes ____ No ____ Not sure ____ Does not apply

19. Which of the following foods have you (caregiver) wanted to purchase, but were not able to find in the grocery store where you shop?

____ Bread/cereals ____ Fish ____ Milk

____ Beef/pork ____ Fresh Fruits ____ Other

____ Chicken/turkey ____ Fresh vegetables ____ None

____ Convenience items

20. Generally, are you satisfied with the variety of foods you (caregiver) can purchase at the grocery store named above?

____ Very satisfied ____ Neutral ____ Highly dissatisfied

____ Satisfied ____ Dissatisfied

21. Generally, are you satisfied with the quality of foods you (caregiver) can purchase at the grocery store named above?

____ Very satisfied ____ Neutral ____ Highly dissatisfied

____ Satisfied ____ Dissatisfied

22. Generally, are you satisfied with the cost of foods you (caregiver) can purchase at the grocery store named above?

____ Very satisfied ____ Neutral ____ Highly dissatisfied

____ Satisfied ____ Dissatisfied

[To interviewer: Read the following lines prior to beginning the food frequency portion of the survey.]

The last portion of the survey is a food frequency checklist. During this part, you will be read several lists of foods. If you eat any of the foods on a list, please say so at that time. As each list is read to you, please determine how many times you eat any of the foods in a typical week. Your answer choices will be rarely/never, 3 or less servings per week, or 4 or more servings per week. Let's begin.

PART III: FOOD FREQUENCY CHECKLIST

[To interviewer: It is important to circle all foods from each group that a person consumes.]

	Rarely/ never	3 or less servings/ week	4 or more servings/ week
white bread, whole grain bread, cereal, pasta, popcorn, rice			
cake, cookies, pancakes, waffles, pie, doughnuts			
fresh, frozen, or canned vegetables			
fresh, frozen, or canned fruit			
skim milk, fat-free cheese, cottage cheese, or yogurt			
2% milk, frozen yogurt, low-fat ice cream or cream cheese, sherbet			
whole milk, cheese, ice cream, cheesecake			
fish, seafood, chicken breast, turkey, tuna canned in water			
hamburger, ground beef dishes, steak, roast, pork, lamb			
hot dog, luncheon meat, bacon, sausage, processed meats, liver, peanut butter, nuts			
whole egg, egg white, egg substitute			
fat-free mayonnaise, olives, fat-free salad dressing			
fruit snack candies, jelly, syrup, mayonnaise, vegetable oils, pickles, diet margarine			
butter, candy bars, lard, stick margarine			
carbonated beverages such as Pepsi, Coke			
beer, wine, liqueur			

[To interviewer: At conclusion of survey please read the following paragraph.]

This concludes our survey. Thank you so much for taking your time to speak with us. I am confident that the information you provided will benefit us in our study on food availability. Thank you again; good bye!

APPENDIX F

LETTER REQUESTING INFORMATION ON

FOOD AVAILABILITY RESEARCH

MARSHALL UNIVERSITY
Family and Consumer Sciences
400 Hal Greer Boulevard
Huntington, West Virginia 25755-2460
304/696-2386

5 November 1996

Allen Cheadle, Ph.D.
Department of Health Services
University of Washington
Seattle, Washington 98195

Dear Dr. Cheadle:

As a dietetics major in the Department of Family and Consumer Sciences, I am conducting research concerning food availability and dietary intakes of residents in rural West Virginia communities. This research is being designed to study the dietary intakes of area residents as well as food availability in grocery stores throughout the same geographic areas. The study is attempting to answer the question, Does area of residence impact the dietary intake and food availability of those living in a particular region?

After reviewing the literature, I have found very little published research in which food availability is the central theme. If it were not for the work of you and your colleagues, I would have very little substance in my literature review. I feel strongly that food availability is a public health concern that should be further addressed, particularly in rural West Virginia, and this is why I am soliciting your help.

I plan to use a telephone survey to determine dietary intakes of residents and another survey to determine food availability in grocery stores. Since you have performed the only well documented research of this type, I would like to duplicate the phone and grocery store surveys which were utilized by you and your staff. It seems as though no other reliable and/or validated tools exist of this nature. If it is possible, I would appreciate a copy of the surveys used as well as your permission to duplicate them.

I extend my appreciation to you in advance for any assistance that you may be able to offer. Time is precious; thank you for spending yours to aid me in achieving my goal of completing meaningful research in the area of food availability.

Sincerely,

Kelli Jo Hall
Graduate Assistant

APPENDIX G

PERMISSION TO UTILIZE

FOOD AVAILABILITY INSTRUMENTS

November 25, 1996

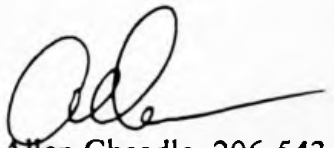
Kelli,

Thanks for your letter. Enclosed are a copy of the grocery store instrument (instrument plus instructions) and a codebook for the telephone survey which has all of the diet questions verbatim.

You might contact Jeff Mayer in St. Louis at 314-977-8124. He is doing a similar study and has a better developed set of protocols for grocery stores (plus convenience stores and restaurants).

Good luck in your efforts, and let me know if you collect any data using our instruments.

Thanks.



Allen Cheadle, 206-543-3736

APPENDIX H

FIRST DRAFT

DIETARY INTAKE SURVEY

Nutrition, Health, and Food Availability
in Lincoln County, West Virginia

1. Which of the following chronic diseases are or have been prevalent in your family?

_____ Cancer
_____ Diabetes
_____ Heart Disease
_____ Hypertension
_____ Other
_____ None

2. For which chronic disease are you currently seeking medical treatment from a physician or have done so in the past?

_____ Cancer
_____ Diabetes
_____ Heart Disease
_____ Hypertension
_____ Other
_____ None

3. Are you currently following a special diet for a medical condition?

_____ Yes
_____ No
_____ Not sure

4. If you are not following a special diet presently, has a health professional ever recommended that you do so?

_____ Yes
_____ No
_____ Does not apply

5. What type of diet do you usually follow? (Please mark all that apply.)

_____ Diabetic/ calorie controlled
_____ High fiber
_____ Low cholesterol
_____ Low fat
_____ Regular
_____ Sodium restricted
_____ Other

6. How long have you followed this diet?

_____ Less than one year
_____ One to less than three years
_____ Three to less than five years
_____ Greater than five years

7. Where do you get most of your information about what you should and should not eat?

_____ Dietitian
_____ Doctor
_____ Family/friends
_____ Nurse
_____ Printed materials
_____ Television
_____ Other

8. Have you ever been told to eat specific or specific types of foods as part of treatment for a chronic disease?

_____ Yes
_____ No
_____ Not sure

9. If so, are you able to find these foods in the grocery store where you regularly shop?

_____ Yes
_____ No
_____ Not sure
_____ Does not apply

10. Which of the following foods have you wanted to purchase, but were not able to find in the grocery store where you shop?

_____ Bread/cereals
_____ Fresh fruits
_____ Fresh vegetables
_____ Meat
_____ Milk
_____ Poultry
_____ Convenience items
_____ Other
_____ None

11. Do you typically do the grocery shopping in your household?

_____ Yes
_____ No
_____ Not sure

12. What is the name of the grocery store where you generally shop?

_____

13. Generally, are you satisfied with the variety of foods you can purchase there?

_____ Very satisfied
_____ Satisfied
_____ Dissatisfied
_____ Highly dissatisfied
_____ Neutral

14. Generally, are you satisfied with the quality of foods you can purchase there?

_____ Very satisfied _____ Dissatisfied _____ Neutral

_____ Satisfied _____ Highly Dissatisfied

15. What is your gender?

_____ Male

_____ Female

16. Into which of the following age categories would you fall?

_____ 51 - 55 years _____ 66 - 70 years

_____ 56 - 60 years _____ 71 - 75 years

_____ 61 - 65 years _____ Greater than 75 years

17. What is your race?

_____ African American _____ Hispanic

_____ Asian _____ Other

_____ Caucasian/white

18. What is your height?

_____ feet _____ inches

19. What is your weight?

_____ pounds

20. How often do you eat hot dogs, luncheon meat, bacon, or sausage in a typical week?

_____ Rarely/never

_____ 3 or less servings per week

_____ 4 or more servings per week

21. How often do you eat red meat such as hamburgers, other ground beef dishes, steak, or roast in a typical week?

_____ Rarely/never

_____ 3 or less servings per week

_____ 4 or more servings per week

22. How many times do you eat chicken, other poultry, fish, or seafood in a typical week?

_____ Rarely/never

_____ 3 or less servings per week

_____ 4 or more servings per week

23. How many eggs do you consume in a typical week?

_____ None

_____ 1 - 2

_____ 3 - 5

_____ Greater than 5

24. Not including fat-free cheese, how many times do you usually eat cheese in a week? Be sure to include cheese on pizza, sandwiches, etc.

_____ Rarely/never

_____ 3 or less servings per week

_____ 4 or more servings per week

25. Which type of milk do you typically consume?

_____ Whole milk

_____ 2% milk

_____ Skim milk

_____ Do not drink milk

_____ Other

26. If 1 serving is equal to 1 full cup of raw vegetables or ½ cup cooked vegetables, how many servings of vegetables do you eat in an average day?

_____ None

_____ One

_____ Two

_____ Three

_____ Greater than three

27. If one serving is equal to 1 full cup of fruit, 1 whole piece of fruit, or ½ cup fruit juice, how many servings of fruit or juice do you have in an average day?

_____ None

_____ One

_____ Two

_____ Three

_____ Greater than three

28. How many times do you consume fried foods in a typical week?

_____ Rarely/never

_____ 3 or less servings per week

_____ 4 or more servings per week

29. How many times do you eat baked goods such as pie, cake, cookies, biscuits, etc. in a typical week?

_____ Rarely/never

_____ 3 or less servings per week

_____ 4 or more servings per week

30. Which type of bread do you typically consume?

_____ 100% whole grain _____ White bread

_____ Grain bread _____ Do not eat bread

* Sometimes the choice of their food has to do w/ their ability to chew. Do they have teeth - partial plate, dentures - upper & lower or just one? Do they eat to chew it?

* Medications will alter food intake - ? Question - On any medications or prescriptions?

* Income plays a factor in their purchasing power.

* Mobility - Are there any restriction in movement - Arthritis in hands, legs. Anything that may prevent them from being able to prepare their own meals? Do they prepare own meals?

* STOH intake?

APPENDIX I

GROCERY STORE/ FOOD AVAILABILITY SURVEY

Grocery Store/Food Availability Survey

Store Name: _____

Location: _____

Surveyor(s): _____

Date/Time: _____

PART I: GENERAL DESCRIPTIVE DATA:

1. Is store a chain or independently owned?

____ Chain ____ Independently owned

2. Store Dimensions

____ Feet across (width) ____ Feet deep (length)

3. Number of checkout stands: _____

4. Are the following available?

Fresh fruits	____ Yes	____ No
Fresh vegetables	____ Yes	____ No
Fresh meats	____ Yes	____ No
Fresh poultry	____ Yes	____ No
Fresh fish	____ Yes	____ No
Deli	____ Yes	____ No

PART II: HEALTH PROMOTION ITEMS:

Please list any health promotion items found throughout the store. Be sure to include description and type of item, area in which item is placed, and visibility of the health promotion item. Visibility should be listed as poor, fair, good, or excellent.

Item #1: _____

_____

_____

_____

Item #2: _____

_____

_____

_____

Item #3: _____

_____

_____

_____

Item #4: _____

_____

_____

_____

Item #5: _____

_____

_____

_____

PART III: FOOD COSTS:

5a. Price of one loaf 100% whole wheat bread: _____

b. Price of one loaf white bread: _____

6. Price of fresh apples per pound: _____

7a. Price of fresh broccoli per bunch: _____

b. Price of fresh cauliflower per bunch: _____

8. Price of milk per gallon:

Whole _____

2 % _____

Skim _____

9. Price of hamburger (ground beef) per pound: _____

10. Price of ground chuck per pound: _____

11. Price per pound of skinless/boneless chicken: _____

12. Price of carbonated beverages:

12 pack Pepsi products: _____

12 pack Coke products: _____

12 pack store brand, if available: _____

PART IV: FOOD AVAILABILITY:

Please circle **ALL** foods in each list that are available for purchase in the store.

	A > one of each avail.	B one of each avail.	C < one of each avail.
white bread, whole grain bread, cereal, pasta, popcorn, rice			
cake, cookies, pancakes, waffles, pie, doughnuts			
fresh, frozen, or canned vegetables			
fresh, frozen, or canned fruit			
skim milk, fat-free cheese, cottage cheese, or yogurt			
2% milk, frozen yogurt, low-fat ice cream or cream cheese, sherbet			
whole milk, cheese, ice cream, cheesecake			
fish, seafood, chicken breast, turkey, tuna canned in water			
hamburger, ground beef dishes, steak, roast, pork, lamb			
hot dog, luncheon meat, bacon, sausage, processed meats, liver, peanut butter, nuts			
whole eggs			
fat-free mayonnaise, olives, fat-free salad dressing			
fruit snack candies, jelly, syrup, mayonnaise, vegetable oils, pickles, diet margarine			
butter, candy bars, lard, stick margarine			
carbonated beverages such as Pepsi, Coke			
beer, wine, liqueur			

APPENDIX J

LETTER TO GROCERY STORE MANAGERS

MARSHALL UNIVERSITY
Family and Consumer Sciences
400 Hal Greer Boulevard
Huntington, West Virginia 25755-2460
304/696-2386

11 June 1997

Dear Store Manager:

Recently, a research study of approximately forty elderly people in Lincoln County was conducted. This study was a joint venture of Lincoln Primary Care Center and Marshall University. The research focused on the eating and grocery shopping habits of this population as well as food availability in the area. During the study, the participants were asked to name the grocery store where they most frequently shopped. I am pleased to inform you that your establishment was the number one choice of several of our participants, and they were well satisfied with your service.

In order to complete the project, we are soliciting your help. With your permission, we would like to conduct a site visit and survey of your store. Our survey will concentrate on all of the food choices that you make readily available for this population. If you agree to participate in the study, we will be happy to share our findings with you.

Thank you in advance for your time and cooperation. Your participation will be vital in helping us learn more about the elderly in Lincoln County.

Sincerely,

Kelli Jo Hall, RD

Kelli Jo Hall, RD
graduate student

Sue Linnenkohl

Sue Linnenkohl, PhD, RD
Dietetic Internship Director, Marshall University

APPENDIX K

PERMISSION SLIP

PERMISSION FOR GROCERY STORE SURVEY

Name: _____

Store Location: _____

I, the undersigned, grant permission for Marshall University dietetic students to conduct a grocery store survey in this establishment.

Signature: _____

Date: _____