THE DIET-HEALTH ISSUES OF BEEF CONSUMPTION AND

THEIR REFLECTION ON THE BUYING BEHAVIOR

OF OKLAHOMA EXTENSION HOMEMAKERS

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TABLE OF CONTENTS

LIST OF TABLES

Table   Page

CHAPTER I

INTRODUCTION

The free enterprise system that exists so strongly in America has spawned a nation of consumers. As consumers, we Americans have become very conscientious on how our money is spent and what we get for our money. Consumer advocacy groups exist to help us make better choices and to warn us about potential hazards, however, Americans have become keen shoppers on their own. They are using the tools available to become better informed. Magazines, newsletters and government agencies are available for consumers to turn to when making decisions. Consumers are also demanding quality products and honest, dependable service so they can get the most for their money.

Because of the impact that consumers have on any market, consumer behavior is closely monitored by manufacturing companies. Consumer attitudes, characteristics, and preferences are gathered and analyzed so that products developed will fulfill the needs of prospective consumers. In any sector of any market, trends can sweep in and dramatically affect consumer decisions. Currently, America is experiencing such a trend in the fitness and health industry that has developed during the 1980s. The desire to be slim and physically fit has created a whole new set of consumer demands for that industry. Health spas and clubs, gyms, aerobic centers, and video tapes plus all of the equipment necessary to participate are in high demand. Along with the interest in

exercise, a great deal of attention has been focused on good nutrition and what constitutes a healthy diet.

Unfortunately, a great deal of misleading information on nutrition has been given to the public. Wonder diets that melt away fat or cure illness have been published in popular women's magazines. Often foods are labeled as "bad for you" such as eggs, red meat, dairy products, sugar, salt and bacon and get a reputation as being unhealthy. These labels inspire consumers to go to extremes and totally exclude these items from their daily diets.

A survey completed in the fall of 1979 reported some of beginning evidence of how Americans were altering their diets due to health concerns. The survey was conducted by the department of Agriculture's Economics and Statistics Service (ESS) ("Health-Related Food," 1982). The survey was comprised of interviews in 1,353 households. Here are some of the results.

- 16% had reduced their use of beef in the previous three years

- 15% to 20% reduced their use of bacon and sausage, hot dogs or luncheon meats, eggs, and fresh pork due to concern about fat and cholesterol

- 11% changed the type or combination of types of milk

- 92% substituted a low-fat milk for milk with higher fat content

- 25% increased use of fruits and vegetables

- 22% reduced the use of salty foods and snacks

- 3 in 10 sample households reduced use of sugar and sugary foods

- 1 in 7 reduced the use of soft drinks

- 43% of the households that responded cited weight control as the reason for dietary changes

- 10% stated that they made changes to reduce intakes of pre-
servatives, colorings, or other additives

Of particular interest to this study is the concern that has risen
over the consumption of beef. Consumers in Oklahoma have been surveyed
to see if their consumption of beef has been affected by health con-
cerns. They were asked about their attitudes towards beef, their
purchasing habits, their actual consumption and their cooking habits.
It is the purpose of this study to establish if it exists, a correlation
between a concern about health and the decreased consumption of beef
among Oklahoma consumers.

It should be noted that other factors besides diet-health issues
have been identified as deterrents to the demand for beef. Economic
status and life-style changes along with smaller households are among
these. The trend of dining out more often and the expansion of fast-
food chains also have an effect on beef demand. As population growth
slows down and the median age of the general population grows older,
the demand for beef is projected to decline.

Problem Statement

There are two problem statements to be analyzed in this study.
They are as follows. 1) How have diet-health related issues affected
the actual consumption of beef? 2) What were used as selection criteria
in purchasing beef?

Purpose of the Study

The purpose in this study was to identify what attitudes and
opinions Oklahoma homemakers had towards beef. The data collected

were analyzed to see how these attitudes affected their purchasing
habits as well as the demand for beef in Oklahoma. Sources of nutrition
information currently used were also studied.

Objectives

1. To describe the attitudes and opinions of Oklahoma consumers
about beef as a food item.

2. To ascertain the factors impacting on the demand for beef as
a commodity item and discern the actual consumption of beef by Oklahoma
consumers.

3. To identify the Oklahoma consumers' beef buying behavior.

4. To identify the preparation techniques used by Oklahoma home-
makers to prepare beef.

Hypotheses

1. There will be no significant association between the attitudes
and opinions of Oklahoma consumers about beef as a food, and selected
personal variables:

      a) Age

      b) Education

      c) Marital Status

      d) Ethnic Identification

      e) Income

      f) Employment Status

      g) Who the Primary Shopper is

      h) Who the Primary Food Preparer is

      i) Size of Community

2. There will be no significant association between factors impacting on the demand for beef as a commodity item or the actual consumption of beef by Oklahoma consumers, and selected personal variables as stated in Hypothesis One.

3. There will be no significant association between the Oklahoma consumers' beef buying behavior, and selected personal variables as stated in Hypothesis One.

4. There will be no significant association between the preparation techniques used by Oklahoma homemakers to prepare beef and selected variables as stated in Hypothesis One.

Limitation

For the purpose of this study, members of Oklahoma's Extension Homemakers Council will be used from which to draw the random sample. These members may or may not be representative of all Oklahoma homemakers.

Definitions

Arteriosclerosis - Thickening of the walls of the arteries with loss of elasticity and contractility. This results in altered function of tissues and organs.

Atherosclerosis - A form of arteriosclerosis characterized by a variable combination of changes of the intima of arteries, not arterioles, consisting of the focal accumulation of lipids, complex carbohydrates, blood and blood products, fibrous tissue and calcium deposits, and associated with changes in the media of the arteries.

Cholesterol - A pearly, fatlike steroid alcohol, crystallizing in the form of leaflets or plates from dilute alcohol, and found in animal fats and oils, in bile, blood, brain tissue, milk, yolk of egg, myelin sheaths of nerve fibers, the liver, kidneys, and adrenal glands. It constitutes a large part of the most frequently occurring type of gall-stones and occurs in atheroma of the arteries in various cysts, and in carcinomatous tissue.

Claudication - Lameness; limping.

Gangrene - A necrosis, or death, of tissue, usually due to deficient or absent blood supply.

Hypertension - A condition in which the patient has a higher blood pressure than that judged to be normal.

Infarct - An area of tissue in an organ or part which undergoes necrosis following cessation of blood supply.

Intima - Innermost coat of a structure, as a blood vessel.

Ischemia - Local and temporary deficiency of blood supply due to obstruction of the circulation to a part.

Mycardial Infarction - Development of an infarct in the myocardium, usually the result of myocardial ischemia following occlusion of a coronary artery.

Oklahoma Extension Homemakers Council - Clubs in Oklahoma communities for homemakers, sponsored by the Home Economics Cooperative Extension, Oklahoma State University, Stillwater, Oklahoma.

Polyunsaturated Fat - A fat containing fatty acid that has more than one double bond in its carbon chain.

Red Meat - Beef, lamb, pork, and veal.

Saturated Fat - One containing fatty acid that has only single bonds in its carbon chain.

CHAPTER II

REVIEW OF LITERATURE

The review of literature will include four major areas. These are
food patterns, the nutritional contribution of beef to the diet,
research related to beef consumption and the diet-health considerations
of beef consumption.

Food Patterns

Historical Food Patterns

Man is an ominvore; he eats both plants and meat. The records of
ancient cultures show evidence of regular meat consumption among members
of the aristocratic class. Homeric epics show meat dishes associated
with heroism in war. Meat rose in preference and esteem over plants
when the early belief that man could acquire the strength of the
organism he ate became wide spread (Gordon, 1983).

As society differentiated into groups with levels of power and
prestige, food began to convey social messages. Meat was reserved for
the upper classes, while peasants ate little more than coarse bread
and porridges. During the Middle Ages the influence of the Church was
great over food patterns. The consumption of meat was limited by long
periods of religious fasting during Advent and Lent and then broken by
feasts at Christmas and Easter (Gordon, 1983).

The diets of modern Europe showed little change. The rural population still ate largely grains such as rye and maize. Potatoes, which were often used as animal fodder, were often consumed. Because of their association with the poor, these staples were shunned by the upper classes (Gordon, 1983). Tea, coffee, sugar and cocoa were introduced, while meat still figured prominently in European diets.

The colonization of the New World, America in particular, introduced new patterns of consumption. Early settlers in the colonies had a much greater consumption of meat than their European counterparts due to the availability of wild game. As the population grew and the wild game population became depleted, more people began to push West to find more game and land. The large cities that grew on the east coast saw the birth of the industrial revolution which changed the lives of western man. The diet of the early American industrial worker was monotonous and insufficient. Corn and wheat were the main staples. Meat consumed by the poor included salt pork and blood puddings. Towards the end of the nineteenth century, the cycle of famine was broken by a money economy, improved transportation and refrigeration (Gordon, 1983). The start of an American food pattern was emerging. Regional cuisine, mass production, and canned goods all began to shape the good patterns of the twentieth century.

The twentieth century began with the Pure Food and Drug Law of 1906, standardizing food products. With the machine age came new products such as processed cheese, ketchup and tomato sauce. Standardized products helped develop uniform tastes and a national cuisine, as did new cookbooks and the appearance of supermarkets. After World War II and the start of the baby boom, brand name identification

increased and advertising, first in print and later in the electronic media, became big business (Gordon, 1983).

Contemporary food patterns in America show many diversities in our culture. The gap between the social classes is not as severe as in earlier cultures, yet there are social differentiations. Gourmet foods are seldom sold in supermarkets in blue collar neighborhoods (Gordon, 1983). Yet there is rising interest in foreign cuisine across all sections of society. Because of our mobile society, we have created a demand for faster meals that are easier to prepare. "Fast Food" is now a regular part of the American diet. Additives and preservatives play an important role in providing those foods. These same additives, unconsciously asked for by consumers by their demand for fast food, have triggered a cry for a return to more basic, wholesome foods. There is a growing interest in nutrition in this country and many products have been accused of contributing to poor health. Red meat is one such food. This will be discussed in greater length later in this chapter.

Characteristics of Contemporary
American Food Habits

Contemporary American food habits can best be described as complex. We are a vast nation of individual personalities and preferences. We can be swept into faddism and still cling to old standards. Yet there are some specific factors that influence all eating habits. How these factors affect us again becomes individual. Some factors are traditional (they have always been with us), while others are more contemporary. Culture, regionality, habit, and custom are considered traditional influences.

Food can always be defined culturally. The ethnic base of our food consumption patterns contributes homogeneity within a group, diversity between groups, and great tenacity in these patterns (Gibson, 1981). We have been known as the "melting pot" of the world. Emigrants from all cultures have settled on our shores. Food habits become quite deeply imbedded in the personalities of people raised in a particular cultural pattern (Fathauer, 1960). As emigrants spread across our country they take with them their own unique cultural food patterns and influence the area in which they settle. The popularity of Mexican, Chinese, and Italian food among all Americans shows how we influence our surroundings. It also shows how our patterns can be influenced and changed.

Regionality is another factor influencing our food patterns. It operates like ethnicity in that it contributes to the homogeneity of consumption of people from one area (Gibson, 1981). That region can be influenced by any culture. When the Scandinavians moved to Minnesota for example, and brought their food preferences with them, the region developed its own pattern.

Habit and custom, a third traditional factor are predominant in everyday life (Gibson, 1981). As life becomes filled with decisions we rely on habit and custom to ease the load from our minds. Family food habits fall into this category. The influence of the family unit shapes and forms all aspects of our lives. Our food habits are developed early in life. Food can evoke very personal memories. We learn to like how our mothers prepare particular foods and throughout our lives prefer it that way. The family meal situation is one of the most important events in producing morale or a sense of unity (Fathauer, 1960).

There are several contemporary factors affecting food choices. Wealth, or the lack of, affects our ability to provide a variety of food in our diets. How the world is interacting with poverty stricken countries is increasingly determining food consumption patterns (Gibson, 1981).

Technology, along with wealth, define what "availability" means today (Gibson, 1981). Because of technology our food patterns are dramatically different from our forefathers. Modern appliances allow the food preparer to offer a wider variety of food in less time than ever before. Refrigeration, transportation, and advanced preservation techniques allow us to eat food from every region of America and from all over the world. New processing techniques create whole new food items, such as Chicken McNuggets and frozen yogurt. Technology has opened whole new areas of choice and has provided new diversity and change in food habits.

Time also shapes contemporary food patterns. There is not as much time available to the modern homemaker as there was for their parents or grandparents for meal preparation. Dual-earner families and single individuals are creating a demand for a variety of convenience food items of high quality. They are also responsible for the growth of fast food chains and privately owned restaurants. More time can be spent on leisure activities if food preparation time can be minimized.

Food habits will continue to be reshaped by our modern American culture. America, as a country, is developing food styles uniquely our own. Cajun style food is a good example. Also, as our homes and work places continue to be affected by modern advancements in science and technology, we will be continuously reshaping our food habits to fit our lifestyles.

Nutritional Contribution of Beef to the Diet

Nutrient Value of Beef

The nutrient composition of beef has been the focus of much attention in recent years. Yet, many widely held beliefs about the nutrient content of beef are unfounded. Many consumers believe that beef is high in fat, calories and cholesterol. Today, beef is much more lean than in past years. This has come about because of changes in U.S.D.A. grading standards and modern beef production practices.

The U.S.D.A. standards of grading beef require high grading for a good relationship between marbling (intramuscular fat) and eating qualities. A poorer grade is given to beef carcass with advancing physiological maturity that usually affects taste appeal (Breidenstein, 1987). Because of this, as cattle age, increasing amounts of marbling are required to achieve a given quality grade. This problem has been offset in more recent years. Modern beef production techniques have resulted in cattle reaching market weight at a much younger age than ever before. The U.S.D.A. marbling requirements for choice grade were reduced in 1950 from a minimum slightly abundant amount to a minimum small amount (Breidenstein, 1987).

Each full degree lower of marbling can be expected to be reflected in a change in extractable lipid content of the muscle tissue of about 1.27 percent. A minimum slightly abundant amount of marbling can be expected to reflect an extractable lipid content of the muscle tissue of about 8.1 percent, whereas, a minimum small amount of marbling would be expected to reflect a lipid content of about 4.3 percent (Breidenstein, 1987).

Beef carcass fatness was reduced by about six percent over the last 20 to 25 years (Breidenstein, 1987). How does the above figure into the American diet? The average daily red meat consumption in America is four ounces (American Meat, 1985). Just over two ounces of that comes from beef (Red Meat, A New Look, 1984). The American Heart Association recommends that no more than 30 percent of calories in the diet be from fat (American Meat, 1985). The fat in four ounces of red meat provides 214 calories. In a 2000 calorie diet, this is only 10.7 percent fat (American Meat, 1985). This is well below the recommended 30 percent.

Compare beef with its two strongest competitors (among health conscious individuals), chicken and fish. A three ounce serving of beef has 9.4 grams of fat. Three ounces of chicken has 6.3 grams and cod (3 ounces) has 4.5 grams (American Meat, 1985). Chicken and fish seem healthier but while beef is higher in fat, it still falls way below the recommended level of fat in the diet.

Another claim often heard is that beef is high in cholesterol compared with poultry. Again, in a three ounce serving of beef there is 73 mg of cholesterol, while three ounces of roast chicken has 76 mg (American Meat, 1985), and three ounces of turkey has 72 mg in dark meat and 59 mg in white meat. This claim obviously has no foundation. The American Heart Association recommends a daily diet containing a maximum of seven ounces cooked, lean meats (beef, veal, pork, lamb, poultry, and fish) and 300 mg cholesterol per day (American Meat, 1985). Beef again falls well within the recommended limits. Poultry has practically no advantage over beef when it comes to cholesterol content.

How does beef fare with other nutrients? Beef is considered a "nutrient dense" food, that is, beef is relatively low in calories but

provides a high amount of essential nutrients. Beef (3 ounces) provides 79 percent of the RDA for B_{12} and 19 percent of the RDA for niacin. Roast chicken only provides nine percent of the RDA for B_{12} and flounder provides 31 percent of the RDA for B_{12} (American Meat, 1985). All recommended dietary allowances mentioned above and below are for an adult male.

Beef is also a good source of dietary iron and zinc. Both are very essential and are often deficient in the American diet. Three ounces will provide 26 percent of the RDA for iron and 38 percent of the RDA for zinc (American Meat, 1985). Roast chicken provides 10 percent of the RDA for iron and nine percent of the zinc recommended, whereas flounder has only three percent iron and three percent zinc of the recommended levels.

It cannot be disputed that beef is a healthy and nutritious food. It is an important part of an American diet that provides necessary vitamins and minerals. Beef is also an excellent source of high biological protein. It provides 45 percent of an adult male's RDA for protein, while roast chicken provides 44 percent and founder 31 percent (American Meat, 1985). When used in balance with other foods such as fruits, vegetables, and breads, and in recommended quantities, beef should not be a threat to the health of unsuspecting consumers. It is also recognized as a long time favorite of many Americans who would hate to lose it from their diets.

Contribution of Beef to the U.S. Diet

To the majority of Americans, beef has long been considered the "first choice" among meats. A preference for beef over most other

meats created an increasing demand for beef for several decades. A decline in consumption and demand had only been noted recently. There is disagreement as to the causes in this decline. Some analysts believe that consumers are losing their taste for beef (Taylor, 1984). Others feel that economics plays a part. Higher beef prices and reduced purchasing power have made some consumers cut back their beef purchases.

To trace consumption of beef in the U.S., carcass weight disappearance is reported (Williams, 1987). This method of record keeping has been used since the early 1900s and has been useful for evaluating trends for production and for beef availability. To evaluate availability, carcass weights for beef are divided by the total U.S. population to derive annual, per capita "consumption" (Williams, 1987).

Changes in diets have also affected beef consumption. A 1980 U.S.D.A. survey of 1,353 households disclosed that three out of every five households had made a diet change in the preceding three years "for health and nutrition reasons" (Lecos, 1985). It was reported that consumers were eating more fish and poultry and less beef.

In contrast, poultry consumption in 1984 was 67.5 pounds per person, an all time high. Fish also experienced a record rate of consumption. It was 15.5 pounds per person in 1984 (Lecos, 1985).

During the 1970s, beef consumption averaged 86 pounds per person with a high of 94.4 pounds in 1976 (Lecos, 1985). The U.S.D.A. report shows a decrease every year after that. During the 1980s, beef consumption has averaged 77.5 pounds a year (Lecos, 1985).

Blue-collar workers in average to high-income levels for their type of work and teenage boys have the highest consumption levels of beef.

The lowest consumers of beef are children under 12. Primary factors identified as having an effect on consumption patterns besides income level are region, family size, and age of household. Northeastern United States has the highest per capita beef consumption while the south has the lowest. As family size increases, beef expenditures decrease. Whites spend considerably more on beef than blacks. Households headed by a person 65 years or older consume less beef than younger counterparts. This probably reflects income level (Taylor, 1984).

Higher income families purchase more meals away from home and have a higher consumption of beef. Around one-third of total hamburger is consumed away from home, primarily in fast-food outlets. It has been found that the higher the disposable income, the greater the consumption of beef. This provides evidence that beef consumption is closely associated with standard of living. Future beef consumption patterns will be greatly influenced by the economic well-being of the country (Taylor, 1984).

<div align="center">Research Related to Beef</div>

Consumers and Beef

The demand, or lack of demand, for beef is controlled by the consumer. Their attitudes, opinions, and preferences shape the beef market. Since the early 1970s, many public opinion and economic factors have been working against beef consumption (Dikeman, 1984). The growing awareness of the diet-health implications of a diet high in fat has adversely affected the consumption of beef. The National Live Stock and Meat Board reported that three 1980 surveys showed a decrease in beef because of health and nutritional concerns (Breidenstein &

Carpenter, 1983). Those studies also reported that wholesomeness was a major concern of meat buying consumers. In 1982, U.S. News and World Report reported that beef sustained the highest decrease (-19.4%) in consumption of major foods (Breidenstein & Carpenter, 1983). Beef consumption, per capita, peaked in 1976 at 42.8 kg (retail weight), then declined to 34.7 kg in 1980 and has increased slightly since then (Dikeman, 1984).

The lower unit price of dairy, poultry and fish products is turning consumers to them as an alternative to beef. The relatively higher price of beef and the reduced purchasing power of the average consumer has forced them to more critically assess the cost of meat per serving (Taylor, 1984).

Consumer preferences shape the type of beef that is placed on supermarket shelves. Studies are done frequently to learn what consumers want to see at the grocery store. They prefer beef that is tender, flavorful, and juicy, with a high ratio of lean to fat, and a high ratio of lean to bone. Price is a major consideration, but unless severe economic pressures exist, the palatability of a cut is preferred over a cheaper cut. Fresh beef is preferred over frozen. The inability to judge the quality of frozen beef is a primary reason against its purchase (Taylor, 1984).

The color of beef is very important to most consumers. A bright, cherry red color in trast to a dark, less bright, red color ranks highest. Marbling is also used by consumers to select beef. While different amounts of marbling are preferred in certain areas, most consumers feel that marbling indicates increased tenderness and other palatability characteristics (Taylor, 1984).

The most important characteristic of beef rated by consumers is tenderness. Animal age and type of cut are primary factors necessary to tenderness. Cooking and serving methods have been found to significantly affect meat tenderness. The lean to fat ratio of beef is used as a selection criteria by consumers. They are avoiding excess fat because of health concerns, weight control and sensory characteristics (i.e. too greasy) (Taylor, 1984).

Consumer attitudes towards beef is greatly shaped by what they believe to be accurate information given to them in magazines, newspaper, and by word of mouth. Many of those sources are being disseminated by groups for economic gain or even by well-intentioned but misguided groups who are promoting a way of life (Francis, 1979). Some consumers really don't want to hear the truth or in some areas the technical issues are so complex that educational efforts have lagged behind (Francis, 1979). To totally exclude red meat from the diet is taking the health issue to the extreme, however, consumers have received such a flood of publicity on the adverse health effects of red meat, that the consumption has declined. The Food and Nutrition Board in a 1980 report stated that moderation should be the watchword and moderation does not imply avoidance of any particular food (Toward Healthful Diets, 1980).

Yankelovich, Skelly and White Research

The American Meat Institute (starting in 1981) and the National Live Stock and Beef Board (starting in 1983) commissioned a survey of the consumer market for meat and meat products. The most recent survey was conducted in 1985. There were three key purposes in mind.

1. To keep the industry abreast of changes in social values, demographics and economic factors that shape consumer

attitudes and that, over time, impact meat purchase
behavior.

2. To give the meat industry general guidance and guide-
   lines for marketing/communications, product development
   and merchandising strategy that would help moderate
   negative attitudes and increase demand for meat and
   meat products.

3. To provide the industry with an instrument for monitoring
   its performance (e.g., to assess the net effect of com-
   bined efforts in all areas of activity), --in the context
   of objectives and goals. (Yankelovich, Skelly & White,
   1985, p. 1).

The research was conducted by telephone interview. The interview length

was approximately 25-30 minutes. The sample (N=1211) consisted of the

primary shopper in the household (Yankelovich, Skelly & White, 1985).

There were 10 major findings of the 1985 research. These are

summarized as follows:

1. A significant shift in terms of increased support for diet
   and health factors.
   - Evidence of filtering down of concerns about diet and
     health
   - Today as many as two out of three consumers are health
     conscious
   - The two consumer segments whose meat usage is influenced
     by health factors grew in 1985
   * Active lifestyle 26% now vs. 16% in 1983
   * Health oriented 24% now vs. 17% in 1983
   - As many as nine out of ten report exercising care with
     respect to fat intake.

2. Convenience (simplification of the meal preparation pro-
   cess) is more of an issue in 1985 than in 1983.
   - The levels of identification with coping with time con-
     straints and with factoring in speed and ease of food
     preparation in meal planning are higher now
   - Consistent with high incidence (over 55%) of dual earner
     households among baby boomers (20-39 years of age),--The
     largest demographic group (45% of households) in the
     population.

3. Build up of negative publicity (plus strengthening of new
   values orientation towards food) puts meat in a less
   favorable position when evaluated against chicken on health
   and nutrition issues.
   - Benefits offered by chicken are more in line with con-
     sumer requirements--e.g., lighter in color and texture,
     leaner, etc.

4. Consequently, the commitment to meat has declined, as shown by the size of the consumer pro meat segments in 1985 versus 1983.
   - In 1983, 67% of households held pro meat attitudes
   - In 1985, 50% of households are similarly inclined.

5. While meat lags behind chicken on nearly all important dimensions, it holds a parity position on taste appeal.
   - However, chicken usage is fostering positive taste perceptions
   - Only a minority have strong preference for meat over chicken on taste.

6. A potential vulnerability of chicken is in the area of convenience,--e.g., ease of preparation.
   - Certain cuts of fresh meat and most processed meat have a competitive edge in this respect.

7. Price, in the two year period between measurements, has been a stable element in the mix of factors operating pro and con meat.

8. Relatively high level of consumer responsiveness to concept of leaner and calorie reduced meat products.
   - Suggests that a revival of meat usage is possible through (meaningful) product improvements.

9. At the same time, action needs to be taken quickly to check attitudes that signal the likelihood of future declines in meat usage. Specifically:
   - The pervasiveness of health concerns,--reflected in 1985, in the increase in size of both health conscious segments (health oriented and active lifestyle)
   - The pervasiveness of lifestyle factors governing usage, --which, in 1985, also contributed to the growth of the active lifestyle segment.

10. Upside in terms of the meat industry's performance is revealed in the retention of usage on the part of the new health oriented and active lifestyle segments.
    - In part, reflecting the efficacy of communication programs
    - In part, reflecting an underlying and enduring taste for meat. (Yankelovich, Skelly & White, 1985, pp. 7-9)

The implications and conclusions drawn by the research team are clear cut. In recent years, the meat industry's focus through communication and product development has been to counter attack the diet and health issues in an attempt to restore confidence in meat as a healthful food (Yankelovich, Skelly & White, 1985). The findings indicate that

the industry must be more aggressive in promotion and advertising to dispel the anti-meat sentiments stemming from both lifestyle induced needs and wants and diet-health issues that have resulted in lost volume to the industry.

An overall strategy was suggested by the study. It was suggested that the meat industry exploit the perceived benefits of meat via communications, and by addressing solutions to the problems that have discouraged meat usage through product design and merchandising tactics (Yankelovich, Skelly & White, 1985). A more marketing oriented approach should be taken. This approach needs to understand and respond to consumer needs and wants.

Diet-Health Considerations of Beef Consumption

The diet-health issue is very controversial. Complex detailed research studies have been conducted to determine if a relationship between diet and health does exist. Currently, only limited evidence has been gathered. Many more studies must be conducted to provide the conclusive data that is not currently available.

Television commercials use bits and pieces of said research data as evidence that the product being promoted has been proven to be beneficial. Margarine and vegetable oil manufacturers have often quoted research to support their claim that saturated fat and cholesterol are detrimental to good health. Also, politicians, governmental regulating agencies, and other organized groups have occasionally based judgments and decisions on emotion rather than the best accumulated facts that research provides (Taylor, 1984).

Heart disease and cancer are two of the most researched diseases
for a correlation between diet and health. What research has concluded
more than any other factor is that the causitive factors are many
and complex. The complexity of food consumption alone is enormous.
It is recognized by all researchers that diet is one factor in many
which might play a role in a disease state. Food ingestion involves a
long series of physiological and biochemical events from the point of
ingestion through metabolism to the point of excretion (Olson, 1981).
The variation between individuals, plus the nature and amount of total
diet that changes daily greatly complicate research. It is simplistic
to set a single set of dietary recommendations. Everyone is not alike,
hence individuals may not respond similarly to the same dietary
recommendations (Olson, 1981).

Coronary Heart Disease and
Animal Fat Consumption

Coronary heart disease is known to have four major risk factors.
These are high blood cholesterol levels, cigarette smoking, hyperten-
sion, and diabetes (Winston, 1981). Some research has shown that
saturated fat tends to elevate the level of cholesterol in the blood
(Winston, 1981). This data has been used to promote the assumption
that consumption of animal fat will cause an increase of cholesterol
in the blood. High blood serum levels of cholesterol have been
established as a major cause of death and disability in the United
States (Taylor, 1984).

Atherosclerosis is characterized by deposits of fatty substances
(primarily cholesterol and cholesterol esters) in the intima of the

medium and larger arteries (Winston, 1981). Fibrous tissue builds around the deposit forming a calcified plaque. This plaque becomes an obstruction and a progressive narrowing of artery occurs. If the narrowing is severe, the result is chest pain. Complete occlusion leads to and often sudden death. Occlusion of the arteries to other parts of the body can cause stroke, claudication and gangrene to the leg, hypertension, and poor renal function (Winston, 1981).

Cholesterol occurs naturally in the human body. Every cell manufactures cholesterol and the average replenishing rate is 2000 mg a day (Taylor, 1984). The American Heart Association is recommending that total dietary intake of cholesterol be limited to 300 mg a day and total calories from fat to under 30 percent (American Heart Association, 1982).

To be used by the body, cholesterol must be joined with a water soluble protein, creating complexes known as lipoproteins (Taylor, 1984). Two types of lipoproteins have been identified as playing a direct role in heart disease. These are high density lipoproteins (HDLs) and low density lipoproteins (LDLs). Both lipoproteins carry substantial amounts of cholesterol, but HDLs are the heaviest of the two and carry the largest amount of protein (Taylor, 1984). Some research has shown that having a high level of HDLs seems to be desirable. There is evidence that this lipoprotein carries cholesterol away from tissues including the arterial intima. LDLs are thought to be a major source of cholesterol and cholesterol esters in atherosclerotic plaques. Deposition of cholesterol in plaques is accelerated when LDL concentrations are elevated (Winston, 1981).

The complex etiology of coronary heart disease creates problems when forming an all-encompassing diet-heart recommendation. For example, while some studies show that serum cholesterol levels are positively correlated with the incidence of coronary heart disease, others show that this relationship is not linear and holds true only at serum levels above the 225-240 mg/dl range (Reiser, 1981). Also a number of other factors influence the serum cholesterol level, such as variable individual responses to dietary lipids and to cholesterol-lowering components in food such as pectins and plant sterols (Reiser, 1981). More research is needed (and is currently being conducted) before specific recommendations can be made. Researchers must be careful not to influence public opinion based on one single study. Data must be retested numerous times before they can be considered as facts.

Cancer and Animal Fat Consumption

The link between diet and cancer is under considerable research. Research has yet to establish an undeniable link between the consumption of animal fat and cancer. The National Research Council on Diet, Nutrition and Cancer has recommended the reduction of saturated fats, from 40 percent to 30 percent of total calories. This recommendation is based principally on human epidemiologic data, however the committee recognized that the data were not entirely consistent. For example, some studies on large-bowel cancer did not show an association with dietary fat (Pariza, 1984). There are also studies that have implicated diets high in polyunsaturated fats to cause cancer in humans and animals (Hegarty, 1979). At the American Cancer Society workshop conference in 1982 it was the conclusion of the committee that there is

no single dietary factor, including meat and fat, that can account for more than a small fraction of cancer in the United States (Pariza, 1984).

Toward Healthful Diets

In 1980, the Food and Nutrition Board of the National Research Council published Toward Healthful Diets in response to the call for specific recommendations on dietary intake by public groups, and governmental agencies. The reaction to this publication was skeptical. The National Research Council had not recommended any specific guidelines, rather, the board recommended balance in food selection tempered with moderation in consumption (Pariza, 1984).

Two years later the National Research Council issued another report entitled Diet, Nutrition, and Cancer. The report was prepared by a different group of scientists (with one exception). Diet, Nutrition, and Cancer made specific recommendations about dietary intake for the general public (Pariza, 1984). Recommendations 1 and 3 were at particular odds with Towards Healthful Diets. Neither committee recommended avoiding artificial additives, nor did they express concern about environmental contaminents. Also a recommendation regarding dietary fiber was not mentioned although much attention has been focused on it (Pariza, 1984).

The following are the recommendations of both committees.

1. Select a nutritionally adequate diet from the foods available, by consuming each day appropriate servings of dairy products, meats or legumes, vegetables and fruits, and cereal and breads.
2. Select as wide a variety of foods in each of the major food groups as is practical to ensure a high probability of consuming adequate quantities of all essential nutrients.

3. Adjust dietary energy intake and energy expenditure so as to maintain appropriate weight for height; if over-weight, achieve appropriate weight reduction by decreasing total food and fat intake and by increasing physical activity.
4. If the requirement for energy is low (e.g. reducing diet), reduce consumption of foods such as alcohol, sugars, fats, and oils, which provide calories but few other essential nutrients.
5. Use salt in moderation; adequate but safe intakes are considered to range between 3 and 8 grams of sodium chloride daily. (Toward Healthful Diets, 1980, pp. 19-20)

1. Reduce intake of both saturated and unsaturated fats, from 40% to 30% of total calories.
2. Include fruits, vegetables, and whole-grain cereal pro-ducts in daily diet, especially citrus and carotene-rich and cabbage family vegetables; avoid high-dose supplements of individual nutrients.
3. Minimize consumption of cured, pickled, and smoked foods.
4. Drink alcohol only in moderation. (Pariza, 1984, p. 1456)

Recommendations 1 and 3 for Diet, Nutrition, and Cancer are based on specific research studies. Recommendation one, the reduction of saturated fat intake to 30 percent, was based on human epidemiologic data. Data also exists that equally contrasts research that shows correlation to dietary fat and cancer. Recommendation number three from Diet, Nutrition, and Cancer is based on very limited evidence. The rationale for this recommendation is the fact that in some parts of the world the death rate for certain cancers is particularly high where the consumption of smoked, charred and/or salted foods as major dietary items is considerable (Pariza, 1984). There is no evidence whatsoever that the salted and/or smoked foods sold routinely in U. S. supermarkets are hazardous, especially when consumed moderately as part of a well-balanced diet (Pariza, 1984).

The differences between these two reports raised questions by consumer groups, the press, and governmental agencies. Many wondered why there was a need for two reports and why there were such differences.

The apparent explanation is the different experts, looking at much the same data may react differently (Pariza, 1984). Both committees had competent scientists who made conflicting recommendations. The interpretation of scientific data is a matter of individual judgment and is also dependent on the criteria selected for evaluation.

Interpretation of the evidence concerning diet and chronic diseases usually encompasses review of epidemiological studies, animal experiments, and in vitro tests and a determination of the quality, preponderance, concordance and the strength of the evidence (Palmer, 1983). When reviewing data from human studies it is important to have consistency among various population groups and among individuals within a population. The presence of a gradient in response and an association that is independent and temporal is also looked for (Palmer, 1983).

The use of appropriate models in animal research to simulate human disease must be stressed. Consistency of evidence from experiments in more than one laboratory, and evidence of a dose-response relationship add to the strength of the findings (Palmer, 1983). Plausible mechanisms must be sought to explain the findings.

No single system or criteria for determining the validity of scientific evidence for formulation of dietary policy is superior. A statement made by the Food and Nutrition Board of the National Academy of Science provides a guideline for researchers.

> The board believes that advice should be given to the public when the strength, extent, consistency, coherence, and plausibility of the evidence from lines of investigation ranging from epidemiology to molecular biology converge to indicate that certain dietary practices or other aspects of lifestyle promote health benefits without incurring undue risk. (Palmer, 1983, p. 2510S)

CHAPTER III

METHODOLOGY

This study was designed to assess the attitudes, characteristics and purchasing habits of Oklahoma homemakers towards beef. Recommendations will then be made to nutrition educators and dietitians on areas where homemakers need the most education on nutrition and how to best utilize the data collected to the benefit of homemakers. This chapter will include the research design, population, data collection, which includes instrumentation and procedure, and data analysis.

Research Design

A descriptive status survey or assessment was developed for this study. It was designed to measure the present attitudes of homemakers towards beef and their current selection criteria. These homemakers will have been exposed to previous media broadcasts and literature attention about diet-health issues concerning red meat consumption. The relationship between the variables will be the focus of this study (Best, 1981).

Population

A stratified random number (n=625) was taken from the membership list of Oklahoma Extension Homemakers Council (n=18,000). This list was obtained from the office of the Leadership Development Specialist,

The College of Home Economics at Oklahoma State University. The state
of Oklahoma was divided into four sections for sampling purposes:
Northwest, Southwest, Southeast, and Northeast. The sample was repre-
sentative of rural and urban homemakers who are members of the Extension
Homemakers Council throughout the state.

Data Collection

Instrumentation

A questionnaire was developed to gather information that fulfills
the objectives listed in Chapter I. The questions used were mostly
closed-form and included several Likert-type questions. Questions will
be adapted from a survey developed by Dr. Barbara Brown, R.D., L.D., a
Food Specialist for the Oklahoma Cooperative Extension Service, from
the Consumer Climate for Red Meat by Yankelovich, Skelly and White
(1985), and other studies from the review of literature.

Section one and two of the survey assesses the attitudes and
opinions of homemakers towards beef. Section three surveys their pur-
chasing habits. Questions regarding cooking habits are included in
part four. Section five contains the demographic questions.

To determine the reliability of the instrument, a pretest was con-
ducted. Content validity of the instrument was also determined by a
review of a panel of experts on beef consumption. This provided an
objective atmosphere for the review of the questions and their measure
of effectiveness. Some revisions were made, but final approval by the
researcher's graduate committee was given prior to the distribution of
the questionnaire.

A cover letter accompanied the questionnaire explaining the study. The letter and instrument were printed on green, lavender, blue, and pink colored paper. This was to designate different regions of the state. A copy of the letter and research instrument may be found in Appendix A.

Procedure

The instruments were mailed on November 18, 1986. Two weeks after the initial mailing of the questionnaire, a follow-up postcard was sent to the sample to encourage return. Return postage was included on the instrument to also encourage return. A total of 202 usable surveys (32%) were returned.

Data Analysis

Data were coded for analysis and processed through a computer using the Statistical System Package (SAS, 1979). Chi-squares and frequency tables were used during analysis. The level of significance was established at $p \leq 0.05$.

CHAPTER IV

RESULTS AND DISCUSSION

The purpose in this study was to measure the reflection of the
diet-health issues of beef consumption on the buying behavior of
Oklahoma Extension Homemakers. The questionnaire was mailed to 625
randomly selected members of the Extension Homemakers Councils of
Oklahoma. The response rate was 32 percent (n=202). The demographic
characteristics of the sample will be discussed in this chapter. The
association between demographic variables and their relationship with
attitudes and opinions, consumption, and buying behavior will also be
described.

Demographic Characteristics of Sample

Age and Age of Principal Shopper

Fifty-eight percent (n=188) of the respondents were 55 years of age
and older. The remaining respondents from the two other age groups com-
prised 42 percent of the response (Table I).

Education and Marital Status

The largest percentage, 34 percent (n=70), of the respondents were
high school graduates. Fifty percent were college graduate/post gradu-
ates and 28 percent (n=56) had attended college. The remaining
respondents (13%, n=26) had less than a high school education. Of the

TABLE I

CHARACTERISTICS OF RESPONDENTS

Demographics	Number	Percent*
Age (Years) N=202		
18-24 years	24	12
25-54 years	60	30
55 years and older	118	58
Education N=202		
Less than High School Graduate	26	13
High School Graduate	70	34
Attended College	56	28
College Graduate/Post Graduate	50	25
Race N=193		
Black	4	2
Mexican, Cuban, or Spanish American	3	1
Native American (American Indian)	8	4
White (Caucasian)	176	89
Oriental	2	1
Marital Status N=202		
Single/Never Married	3	1
Married	156	77
Widowed/Divorced/Separated	43	22
Number Living in Household N=202		
1 person	34	17
2 people	97	48
3-4 people	56	28
5 or more people	15	7
Children Living at Home N=201		
No	143	70
Yes	58	29
Employment N=200		
Employed Full-Time	26	13
Employed Part-Time	14	7
Unemployed	4	2
Retired	74	37
Full-Time Homemaker	82	41
Income N=179		
Less than $10,000	33	16
$10,000-$14,999	24	12
$15,000-$24,999	47	23
$25,000-$39,999	43	21
$40,000 or more	32	16
Age of Principal Shopper N=200		
18-24 years	24	12
25-54 years	60	30
55 years and older	116	57
Responsible for Food Purchase N=201		
Self	170	84
Spouse or Housemate	6	3
Parent	2	1
Child	2	1
Shared	21	10
Responsible for Cooking N=202		
Self	188	93
Spouse or Housemate	4	2
Parent	2	1
Child	3	1
Shared	5	3
Size of Community N=200		
Over 250,000 people	9	4
25,000 to 249,999 people	38	19
5,000 to 24,999 people	56	28
Under 5,000 people	97	48

*Percentages are based on 100 percent and rounded for convenience.

202 respondents, 156 (77%) were married. Forty-three (22%) indicated that they were either married, divorced or separated. Three respondents (1%) were single/never married (Table I).

Race

The predominant race of the 202 respondents was caucasian (89%, n=176). Four percent (n=8) of the respondents were native Americans. The remaining respondents were Black, Oriental, Mexican, Cuban or Spanish American, all under two percent. Nine respondents did not give their race (Table I).

Number Living in Household and
Children Living at Home

Over one third (48%, n=97) of the respondents lived in two member households. Twenty-eight percent (n=56) had three to four members in their household. Thirty-four (17%) of the respondents lived alone. In relation to number living in the household, two thirds of the respondents (70%, n=143) did not have any children living at home. Only 29 percent (n=58) of those replying had children living at home (Table I).

Employment and Income

The largest percentage reported under employment status was 41 percent (n=82) replying that they were full-time homemakers. Thirty-seven percent (n=74) were retired. The remainder of the respondents were split up between the remaining three categories. With respect to income, nearly 23 percent (n=47) of the sample earned between $15,000

to $24,999 annually, while 43 (21%) were in the income level of $25,000
to $39,999 (Table I).

Responsible for Food Purchase and

Responsible for Cooking

Those who were personally responsible for food purchasing comprised
the largest group (n=170, 84%). Ten percent (n=21) share the responsi-
bility of food purchasing with someone in the household. In comparison,
188 (93%) respondents have the primary responsibility for food prepara-
tion in their household (Table I).

Size of Community

Almost half of the respondents (n=97, 48%) lived in a community
of under 5,000 population. Twenty-eight percent (n=56) were from
communities of 5,000 to 24,999 people and 19 percent (n=38) lived in
communities of 25,000 to 249,999 people (Table I).

Attitudes and Opinions Towards Beef

Opinion Statements Regarding Beef

The first objective of this study was to describe the attitudes
and opinions of Oklahoma consumers about beef as a food item (Section 1
of research instrument). Respondents were asked to circle their
responses according to how strongly they agreed or disagreed with each
statement about beef. The responses available were: SA=Strongly Agree,
A=Agree, D=Disagree, and SD=Strongly Disagree. Later the data were
collapsed by the computer and assigned to two response categories:
A=Agree or D=Disagree.

Sixteen statements describing attitudes/opinions regarding beef were included in the survey, however, only nine were significantly associated with selected demographic variables (Tables II and III). The discussion will only include the results of the nine statements.

Almost three fourths of the respondents disagreed with the statement that "beef is not as nutritious as poultry" (Table II). There was a significant association between this opinion statement and race (p=0.035) (Table III). Caucasians and the primary food purchaser generally disagreed with the statement. The researcher did not expect that a majority of the consumers knew that beef was a comparable nutrition source as was poultry. Due to the prevalence of media advertisements touting the health benefits of poultry consumption, the researcher thought that there might have been a more significant impact upon the respondents' impression of beef as a nutritious food choice.

An overwhelming number of those surveyed agreed that "beef is a good protein source." This is perhaps due to the fact that the majority of the respondents were 55 years of age or older. They grew up during a time when beef was considered one of the most vital daily dietary requirements. There were significant associations between those responsible for food purchasing (p=0.041) and those responsible for food preparation (p=0.004) and this statement (Table III). Of those responsible for food purchasing, 151 (75%) felt that beef is a good protein source. Eighty-three percent (n=167) respondents who are responsible for food preparation also agreed.

When asked if "beef is more nutritious than fish," 104 respondents (51%) disagreed (Table II). Of that group, there was a significant association between age and the statement (p=0.052) (Table III).

TABLE II

ATTITUDES AND OPINIONS OF OKLAHOMA
HOMEMAKERS TOWARDS BEEF*

Opinions	Agreed		Disagreed	
	N	%	N	%
Beef is not as nutritious as poultry	40	21	151	77
Beef is a good protein source	176	93	13	7
It is more nutritious than fish	81	43	104	56
It is low in sodium	127	71	51	29
It is high in fat	127	64	58	31
Beef is a good nutrition choice	176	93	13	6
It is time consuming to prepare	46	24	148	76
Beef is a satisfying food	185	96	8	4
Beef is difficult to cook	14	7	179	93

*Not all respondents (n=202) replied to each question; the percentages
are based on the number of replies to each question.

TABLE III

CHI-SQUARE DETERMINATION INDICATING ASSOCIATION BETWEEN OPINIONS REGARDING BEEF AND DEMOGRAPHIC VARIABLES

Variable		Beef is not as nutritious as poultry	Beef is a good protein source	Beef is more nutritious than fish	Beef is low in sodium	Beef is high in fat	Beef is a good nutrition choice	Beef is time consuming to prepare	Beef is a satisfying food	Beef is difficult to cook
RACE	df=	4								
	Value=	9.221	NS	NS	NS	NS	NS	NS	NS	NS
	Prob=	0.056								
RESPONSIBLE FOOD PURCHASER	df=	4	4			4			4	
	Value=	10.315	9.944	NS	NS	9.389	NS	NS	10.991	NS
	Prob=	0.035	0.041			0.052			0.027	
RESPONSIBLE COOK	df=		4						4	
	Value=	NS	15.304	NS	NS	NS	NS	NS	15.564	NS
	Prob=		0.004						0.004	
AGE	df=			2						
	Value=	NS	NS	5.911	NS	NS	NS	NS	NS	NS
	Prob=			0.052						
AGE-PRINCIPAL SHOPPER	df=			2					2	
	Value=	NS	NS	6.932	NS	NS	NS	NS	6.432	NS
	Prob=			0.031					0.040	
EDUCATION	df=				3					
	Value=	NS	NS	NS	15.578	NS	NS	NS	NS	NS
	Prob=				0.001					
SIZE OF COMMUNITY	df=						3			
	Value=	NS	NS	NS	NS	NS	15.561	NS	NS	NS
	Prob						0.001			
NUMBER OF CHILDREN AT HOME	df=							1		1
	Value=	NS	NS	NS	NS	NS	NS	5.830	NS	6.485
	Prob=							0.016		0.011
MARITAL STATUS	df=								2	
	Value=	NS	NS	NS	NS	NS	NS	NS	10.922	NS
	Prob=								0.004	
INCOME	df=									4
	Value=	NS	NS	NS	NS	NS	NS	NS	NS	10.861
	Prob=									0.028

NS=Not significant

Fifty-one of the respondents (25%) 55 years of age or older disagreed, however, it should be noted that 53 (26%) agreed. The age of the principal shopper and the statement also showed a significant association (p=0.031) (Table III). Again 104 respondents from all age groups disagreed with the statement and 24 percent (n=49) of that group were 55 years or older (Table II). Twenty-six percent (n=53) of the subjects 55 years of age or older agreed. This split in opinion was unexpected. With the recent publications of the health benefits of omega-three fatty acids found in fish, the researcher felt that more respondents would feel that fish would be more nutritious than beef.

There was a significant association between education and the statement "beef is low in sodium" (p=0.001) (Table III). Seventy-one percent (n=127) responded that they agreed with the statement (Table II). Of that group, 45 (22%) were high school graduates and 73 (37%) had attended college or were college graduates. Several subjects answered that they felt beef was high in fat. Sixty-four percent (n=127) agreed while 31 percent (n=58) disagreed (Table II). Those responsible for food purchasing were significantly associated with this statement (p=0.052) (Table III). One hundred eleven respondents who were personally responsible for food purchasing agreed.

When asked if they felt that "beef is a good nutrition choice," 93 percent (n=176) agreed (Table II). The size of community was significantly associated with this statement (p=0.001) (Table III). Ninety-three respondents (n=176) from all sizes of communities agreed. The largest response (n=87) came from those who lived in communities of less than 5,000 people. These findings on the opinions consumers have about the health concerns related to beef are similar to those of

Yankelovich, Skelly and White (1985). Media advertisements may have
had an effect on whether residents feel beef is a good nutritional food
choice.

Almost 100 percent (96%, n=185) of the respondents replied that
they felt that "beef is a satisfying food" (Table II). Chi-square
determinations showed that this statement was significantly associated
with marital status (p=0.004), the age of the principal shopper (p=0.040),
those responsible for food purchasing (p=0.027), and those responsible
for food preparation (p=0.004) (Table III). Married respondents (n=146,
72%) indicated that beef was satisfying. Seventy-seven percent (n=156)
of those responsible for food purchasing and 86 percent (n=174) responsi-
ble for food preparation also agreed. Principal shoppers 55 years of
age and older (n=101, 50%) again agreed that beef is a satisfying food.

Respondents were asked questions regarding their opinions about
beef preparation. When asked whether they agreed or disagreed with the
statement that beef is time consuming to prepare, three fourths of the
respondents (n=148) disagreed with this statement (Table II). There
was a significant association between whether children were still
living at home and this statement. Nearly half of the respondents
(n=98) with no children at home replied that beef was not time consuming
to prepare. These respondents were predominantly from households with
no children, were 55 years of age or older, and were either semi-retired
or retired. It would seem that they would have more time to prepare the
food items which most likely affected their response. This finding con-
tradicts the findings of Yankelovich, Skelly and White (1985) who found
that their respondents felt that beef was time consuming to prepare.

Respondents were asked if they felt that beef was difficult to cook. Ninety-three percent (n=179) (Table II) answered that they disagreed with this statement. Significant associations occurred between this statement and income levels (p=0.028) and children living in the household (p=0.011) (Table III). Of those households with no children living there, 121 (60%) replied that they disagreed with this statement. One hundred sixty-one respondents (80%) from all income levels also disagreed. Eighty-five (42%) subjects earned between $15,000 to $39,999 annually. The reader is reminded that the respondents were older, more experienced cooks who had perhaps overcome their difficulties in cooking beef.

Opinion of the Price of Beef in
Relation to Other Meats

There were no significant associations between the demographic variables and the question on price of beef as it related to the prices of other meats. This section will therefore not be discussed.

Sources of Nutrition Information

In Section two, question two, respondents were asked to supply their sources of nutrition information. Several sources were listed and respondents were asked to check all sources that were used. Seven sources had significant associations among the demographic variables. The discussion will only include the results of the seven sources.

One hundred eleven (56%) responded that they used newspapers as a source of information (Table IV). Education was significantly associated with the use of newspapers (p=0.001) (Table V). Of those

TABLE IV

SOURCES OF NUTRITION INFORMATION*

Sources of Nutrition Information	Source Used		Source Not Used	
	N	%	N	%
Newspapers	111	56	86	44
Television	118	60	79	40
Radio	40	20	157	80
Family and women's magazines	124	63	73	37
Family	55	28	142	72
Friends	64	32	133	68
Labels on products	125	64	71	36

*Not all respondents (n=202) replied to each question; the percentages
  are based on the number of replies to each question.

TABLE V

CHI-SQUARE DETERMINATION INDICATING ASSOCIATIONS BETWEEN SOURCES OF
NUTRITION INFORMATION AND PERSONAL VARIABLES

Variable	Newspapers SNI 2	Television SNI 3	Radio SNI 4	Family and Women's Magazines SNI 5	Family SNI 6	Friends SNI 7	Labels on Products SNI 14
EDUCATION							
df=	3	3	3	3			3
Value=	16.908	8.112	8.837	10.966	NS	NS	9.246
Prob=	0.001	0.044	0.032	0.012			0.026
AGE							
df=		2	2		2	2	
Value=	NS	5.942	11.068	NS	13.240	15.332	NS
Prob=		0.051	0.004		0.001	0.000	

NS=Not significant

with high school education 40 (20%) used this source. Sixty-six (33%) respondents that used newspapers had attended college or were college graduate/post graduates. This source for information must be developed to its fullest potential. The American Dietetic Association Ambassadors have begun working with newspapers and they are available in major cities nationwide as resources for nutrition information, to confirm nutrition information used in articles, and for quotes on important political-nutrition related issues and/or any related nutritional topic.

Television was used as a source for information by 60 percent (n=118) of all subjects (Table IV). Age (p=0.051) and education (p=0.044) were significantly associated with the use of the television (Table V). Sixty-three (31%) of the 118 who relied on television as a source of nutrition information were 55 years of age or older and 34 percent (n=68) had attended some college or were college graduates. The cable news channel now available in nearly all parts of the country offers several educational programs directed at nutrition education. Dietitians and public health nutritionists need to recommend these programs to their patients and clients.

The use of the radio as a source of nutrition information was significantly associated with the age of the respondent (p=0.004) (Table V). Eighty percent (n=157) of all respondents reported that they did not use radio as a source for nutrition information (Table IV). Of that group, 98 (50%) were 55 years of age or older. This indicates that radio might be an under developed resource in the use of public nutrition education. Nutrition educators should look into the possibility of using radio more prominently in their programs for public nutrition

education. The public might not yet realize that they can use the radio
as a source for information. By using rhe radio more frequently the
public might come to depend on it as a useful, convenient information
source.

Family and womens magazines were used by 63 percent (n=124) of
the subjects as sources for nutrition information (Table IV). There
was a significant association between education and this source
(p=0.012) (Table V). Seventy-three people in this group had attended
college or were college graduates. Information in family and womens
magazines are not always scientifically based nor accurate. There is
a great need for nutrition educators and dietitians to write articles
for popular magazines, newspapers, radio or television use.

Family members were not a popular source for nutrition information
among the respondents. Seventy-two percent (n=142) stated that they
did not use family members as sources. Age was significantly
associated with the use of family members as sources (p=0.001) (Table V).
Eighty-seven subjects, 55 years of age or older replied that they did
not use family members for information. Respondents also stated
that friends were not a predominant source for information. Sixty-
eight percent (n=133) stated that they did not get information from
friends (Table IV). Age was again significantly associated with this
source for information (p=0.000) (Table V). Of those 55 years of age
or older, 87 replied that they did not rely on friends for information.
"Word of mouth" should not be underestimated as a prevalent source for
good and/or bad nutrition information. Nutrition educators should
strive to become trusted purveyors of public nutrition information.

Nutrition labels on products were used by 64 percent (n=125) of all subjects. There was a significant association between education and the use of labels (p=0.026) (Table V). Of the 125 respondents, 45 had graduated from high school and 70 had either attended college or were college graduates. This response indicated that a growing part of the population has come to rely on nutrition labeling information. Dietitians and nutrition educators must continue to lobby polititians for more stringent regulations requiring more specific nutrition information on all labels. This source must be utilized to its fullest potential. The higher percentage of homemakers indicating that they use nutrition labeling as a source of information could reflect the effectiveness of the home economics extension programs in the state.

Testing of Hypothesis One

The attitudes and opinions of Oklahoma homemakers toward beef as a food were not significantly ($p \leq 0.05$) associated with employment status, number living in the household, and race. Significant demand for beef was significantly affected, however, by age, education, marital status, children living at home, income, age of principal shopper, responsible for food purchase, responsible for cooking and size of community (Tables III and V). Based on the results of this study, the researcher rejected Hypothesis One.

Factors Impacting Beef Demand

Factors Affecting Beef Consumption

Objective two was to identify how 15 factors affected beef consumption among the respondents (Section 2 of questionnaire, question 1).

It did not establish whether or not these factors were valid concerns or beliefs; it merely asked how the 15 factors impacted on the amount of beef eaten as follows: No Impact, Some Impact, Large Impact. Data were then collapsed into two categories for statistical analysis: Impact or No Impact.

Fifteen statements describing factors that might have had an impact on the amount of beef purchased by the respondents were included in the survey, however, only 10 were significantly associated with selected demographic variables (Tables VI and VII). The discussion will only include the results of the 10 statements.

Concern over the health issues of beef consumption had an impact on the amount of beef eaten with 72 percent (n=144) (Table VI) of the respondents. There was a significant association between this factor and age (p=0.023), number of people in household (p=0.005) and the age of the principal shopper (p=0.028) (Table VII). Those respondents who were 55 years of age and older and who were principal shoppers stated that health issues did impact on their beef purchases. Households with two members also reported that their consumption was influenced by health issues. Forty percent (n=78) of the respondents were from two member households. Additional studies need to be conducted to identify the specific health issues that have an effect on the purchasing behavior of groups of consumers towards beef and other meats.

The fat content of beef had an impact on the amount of beef eaten in 70 percent (n=140) (Table VI) of the respondents. Significant associations were found between this factor and age (p=0.015), age of the principal shopper (p=0.020) and the size of the community where the respondents lived (p=0.037) (Table VII). Those who were 55 years of age

TABLE VI

FACTORS IMPACTING ON BEEF CONSUMPTION
OF OKLAHOMA HOMEMAKERS*

Factors Impacting Beef Demand	No Impact		Impact	
	N	%	N	%
Health concerns	56	28	144	72
Fat content of beef	61	30	140	70
Cholesterol content of beef	82	41	119	59
Sodium content of beef	131	66	69	34.
Ease of preparation	97	49	101	51
Lack preparation facilities or equipment	161	83	32	17
Cost of beef	77	39	123	61
Cost of poultry, fish or other meats	70	35	131	65
Preservatives added to beef	94	47	105	53
Availability of alternative protein foods	94	47	104	53

*Not all respondents (n=202) replied to each question; the percentages
   are based on the number of replies to each question.

TABLE VII

CHI-SQUARE DETERMINATION INDICATING ASSOCIATIONS BETWEEN FACTORS IMPACTING CONSUMER DEMAND AND SELECTED PERSONAL VARIABLES

Variable	Health Concerns	Fat Content of Beef	Cholesterol Content of Beef	Sodium Content of Beef	Ease of Preparation	Lack Preparation Facilities or Equipment	Cost of Beef	Cost of Poultry, Fish or Other Meats	Preservatives Added to Beef	Availability of Alternative Protein Foods
AGE										
df=	2	2		2	2			2	2	
Value=	7.504	8.400	NS	8.946	11.660	NS	NS	6.760	9.840	NS
Prob=	0.023	0.015		0.011	0.003			0.034	0.007	
NUMBER LIVING IN HOUSEHOLD										
df=	3			3	3				3	
Value=	12.993	NS	NS	14.897	14.690	NS	NS	NS	8.135	NS
Prob=	0.005			0.002	0.002				0.043	
AGE OF PRINCIPAL SHOPPER										
df=	2	2	2	2	2			2	2	
Value=	7.178	7.806	10.778	8.480	9.420	NS	NS	6.442	7.544	NS
Prob=	0.028	0.020	0.005	0.014	0.009			0.040	0.023	
SIZE OF COMMUNITY										
df=		3	3			3				3
Value=	NS	8.508	7.944	NS	NS	7.736	NS	NS	NS	10.904
Prob=		0.037	0.047			0.052				0.012
RESPONSIBLE COOK										
df=			4	4				4		
Value=	NS	NS	9.391	10.599	NS	NS	11.785	NS	NS	NS
Prob=			0.052	0.031			0.019			
NUMBER OF CHILDREN AT HOME										
df=				1	1			1	1	
Value=	NS	NS	NS	3.882	12.713	NS	NS	9.035	5.644	NS
Prob=				0.049	0.000			0.003	0.018	

TABLE VII (Continued)

Variable	Health Concerns	Fat Content of Beef	Cholesterol Content of Beef	Sodium Content of Beef	Ease of Preparation	Lack Preparation Facilities or Equipment	Cost of Beef	Cost of Poultry, Fish or Other Meats	Preservatives Added to Beef	Availability of Alternative Protein Foods
MARITAL STATUS										
df=					2					
Value=	NS	NS	NS	NS	6.560	NS	NS	NS	NS	NS
Prob=					0.038					
INCOME										
df=						4			4	
Value=	NS	NS	NS	NS	NS	11.262	NS	NS	11.760	NS
Prob=						0.024			0.019	
EMPLOYMENT										
df									4	
Value=	NS	NS	NS	NS	NS	NS	NS	NS	12.949	NS
Prob=									0.012	
EDUCATION										
df=										3
Value=	NS	NS	NS	NS	NS	NS	NS	NS	NS	7.727
Prob=										0.052

NS=Not significant

and older and who were the principle shoppers indicated that the fat content had impacted on the amount of beef eaten in their households. Respondents from communities with a population under 5,000 (n=60) also stated that concern over the fat content impacted on their consumption.

One hundred nineteen (59%) (Table VI) subjects reported that the cholesterol content of beef had impacted on their beef purchases. The variables principal shoppers who were 55 years of age and older (p=0.020), with the chief responsibility for food preparation (p=0.052), and who lived in communities of 5,000 or less (p=0.047) were significantly associated with the statement that cholesterol content of beef has an impact on beef consumption. These findings correspond with those of Yankelovich, Skelly and White (1985) who stated that the build up of negative publicity on health and nutrition issues has put red meat in a less favorable position when compared to other types of meat (poultry, fish).

Sixty-nine (34%) of the respondents were concerned over the sodium content of beef; in contrast, 131 (66%) replied that the sodium content of beef was not a factor in beef consumption. Respondents who were 55 years of age and older (p=0.011), who were the principal shoppers (p=0.014), and who were responsible for food preparation (p=0.031) did not indicate that the sodium content of beef impacted on their consumption (Table VII). The same is true for respondents from two member households (p=0.002) and with no children at home (p=0.049) (Table VII).

The findings of how the respondents replied to the concerns over health issues, fat content, cholesterol and sodium and how they impacted on their consumption illustrates the importance of proper public education on the benefits of red meat consumption versus its health concerns.

Health professionals need to discern how various media advertisements
could affect the buying behavior of the public.

There were other factors having an impact on the amount of beef
consumed other than health issues. The ease of preparation of beef
only impacted on roughly half of the subjects. Fifty-one percent
(n=101) (Table VI) of the respondents indicated that the ease of
preparation impacted on their beef consumption. There were five
variables that had a significant association with this factor. Ease of
preparation of beef impacted on those respondents who were married
(p=0.038), those who were from households of two people (p=0.002),
those who were 55 years of age and older (p=0.003), those who were the
principal shoppers (p=0.009), and those with no children at home
(p=0.000). These results showed that there are still a number of people
who need basic meal preparation techniques relative to beef cookery.
Results may also suggest that respondents over the age of 55 may have
physical difficulty (arthritic hands, etc.) in preparing certain cuts
of beef. Beef cuts that require a lot of preparation before cooking
might be difficult for members of this age group to prepare. Beef
purveyors might meet a consumer need by marketing cuts involving less
preparation accompanied by simpler cooking techniques or short cuts
in beef preparation. Demand for the simplification of the meat
preparation process was also an issue brought out in the findings of
Yankelovich, Skelly, and White (1985).

The lack of preparation facilities or equipment did not have an
impact on 83 percent (n=161) (Table VI) of the subjects. Income level
was, however, significantly associated with this factor (p=0.024) (Table
VII). The higher the income, the more likely that this factor would

have no impact on meal preparation. There was somewhat a significant association between respondents from communities under 5,000 people (p=0.052) and lack of preparation facilities and equipment (Table VII). Respondents living in the rural communities generally slaughter their own beef and have the preparation facilities and equipment for food preparation on hand.

Two thirds of the respondents. (n=123) (Table VI) reported that the cost of beef did have an impact on their consumption levels. Those responsible for food preparation did consider cost of beef in their food purchases (p=0.019) (Table VII). Respondents were also asked if the cost of poultry, fish, or other meats impacted their consumption. There were three significant associations with this factor. Those who are 55 years of age and older (p=0.034), principal shoppers (p=0.040), and those with no children at home (p=0.003) all reported that the cost of other meats had an impact on their consumption (Table VII). The reader is reminded that the respondents were predominantly 55 years of age or older, married with no children at home and were retired or full-time homemakers. Many of these people could be on fixed retirement incomes so the cost of beef and other meats would be very important in food purchasing and meal preparation.

The concern over the preservatives added to beef and beef products were addressed in this study. Half of the respondents (53%) (Table VI) indicated that their consumption was impacted by this factor. Six variables were significantly associated with this factor. They were age (p=0.007), age of the principal shopper (p=0.023), number in the household (p=0.043), number of children in the household (p=0.018), income level (p=0.019), and employment status (p=0.012) (Table VII).

Respondents who were 55 years of age or older and principal shoppers, those from two member households and with no children at home, and those retired with an income of $15,000 to $39,999 replied that preservatives had an impact on their consumption. These findings suggested that there are concerns over the use of preservatives among the retired community. Beef producers and companies manufacturing beef products need to be aware of these concerns among this age group and reflect those concerns in their practices for raising cattle and producing beef products.

Subjects were asked if the availability of alternative protein foods had an impact on their beef consumption. Half of the respondents (53%) (Table VI) stated that this factor had an impact on their consumption of beef. There was a significant association between the use of alternative protein foods and the variable size of community (p=0.012) and education of the respondent (p=0.052) (Table VII). Forty-five respondents from rural communities (5,000 or less) stated that other alternative protein foods did affect their consumption. Of those respondents with a high school education or more, 95 stated that the availability of other protein food also impacted on their consumption. Alternative protein foods were not clearly explained in the questionnaire, hence, only a few respondents completed this section.

Testing of Hypothesis Two

The demand for beef as a commodity item or the actual consumption of beef by Oklahoma consumers was not significantly (p≤0.05) associated with the respondents' education, employment status, marital status, or income level. Demand for beef was significantly associated however

with age, number in household, the age of the principal shopper, size of the community, responsibility for food preparation, and number of children in household (Table VII). Therefore, based on these results of this study the researcher rejected Hypothesis Two.

Oklahoma Consumers' Beef Buying Behavior

Beef Buying Behavior

Identifying Oklahoma consumers' beef buying behavior was the third objective of this study. In Section three of the questionnaire, 10 questions were listed for the respondents to describe their buying behavior. Only five of those questions had significant associations with the demographic variables used. Therefore, these will be the only questions discussed in this section. The questions covered will be over promotional techniques used to sell beef, factors influencing beef purchases, where beef is purchased, and the amounts of beef and non beef items consumed during a two week period.

Promotional Techniques

Respondents were given a list of promotional techniques that are commonly used by food purveyors to influence the purchases of consumers. They were asked to describe the level of influence that these techniques had over their purchases. The responses available were: a) never, b) sometimes, c) often, and d) always. Only one technique had a significant association with two variables (Tables VIII and IX). The appearance of the display was significantly associated with the age of the principal shopper ($p=0.010$) and with the employment status of the respondent ($p=0.001$) (Table IX). Of those principal shoppers, 55 years of age or

TABLE VIII

PROMOTIONAL TECHNIQUE WHICH INFLUENCED BUYER BEHAVIOR
OF OKLAHOMA HOMEMAKERS*

Promotional Technique	Never		Sometimes		Often		Always	
	N	%	N	%	N	%	N	%
Appearance of Display	38	20	59	31	42	22	50	27

*Not all respondents (n=202) replied to each question; the percentages
are based on the number of replies to each question.

TABLE IX

CHI-SQUARE DETERMINATION INDICATING
ASSOCIATIONS BETWEEN PROMOTIONAL
TECHNIQUES USED TO SELL BEEF
AND SELECTED VARIABLES

Variable	Appearance of Display Promo 3
EMPLOYMENT	
df=	12
Value=	32.162
Prob=	0.001
AGE OF PERSONAL SHOPPER	
df=	6
Value=	16.836
Prob=	0.010

older, 27 were sometimes influenced by the appearance of the display,
28 were often influenced and 27 were always influenced by the appearance.
Twenty-eight respondents who were full-time homemakers were always
influenced by appearance while 23 retired respondents were never in-
fluenced and 29 were sometimes influenced by the appearance of the
beef display.

Factors Influencing Beef Purchases

Question six in Section three of the questionnaire pertained to
the factors considered by consumers when purchasing beef items. Twelve
factors were listed and nine had significant associations with demo-
graphic variables. The responses available to the respondents were
always consider, sometimes consider, rarely consider, and never con-
sider. These responses were later collapsed to two answers: consider
and do not consider.

Over three fourths of the respondents reported that the color of
the meat was a consideration when purchasing meat. Almost all the
respondents (n=189, 99%) (Table X) indicated that the color of the
meat was an important quality to consider in purchasing beef. Signifi-
cant associations (p=0.001) were found between color of meat and the
personnel variable, responsible for food purchase (n=161, 85%). Those
responsible for food preparation (n=177, 94%) were also influenced by
color of beef (p=0.000).

The amount of fat around the cut of meat was considered by 99 per-
cent (n=187) (Table X) of the respondents when purchasing beef. The
responsibility for cooking was significantly associated with this
factor (p=0.000) (Table XI). Of the respondents who had the primary

TABLE X

FACTORS INFLUENCING THE PURCHASE OF BEEF*

Factors Influencing Purchase	Consider		Do Not Consider	
	N	%	N	%
Color of the meat	189	99	2	1
Amount of fat around the cut	187	99	2	1
Price per pound	185	98	4	2
Amount of marbling (fat in the cut)	182	97	6	3
Date packaged on label	174	95	10	5
Amount of time involved in preparation	131	72	52	28
Price per serving	145	78	40	22

*Not all respondents (n=202) replied to each question; the percentages are based on the number of replies to each question.

TABLE XI

CHI-SQUARE DETERMINATION INDICATING ASSOCIATIONS BETWEEN FACTORS INFLUENCING THE PURCHASE OF BEEF AND SELECTED VARIABLES

Variable	Color of the Meat	Amount of Fat Around the Cut	Price per Pound	Amount of Marbling	Date Packaged on Label	Amount of Time Involved in Preparation	Price per Serving
	PB 1	PB 2	PB 3	PB 4	PB 5	PB 9	PB 10
RESPONSIBLE FOOD PURCHASER							
df=	4						
Value=	19.034	NS	NS	NS	NS	NS	NS
Prob=	0.001						
RESPONSIBLE COOK							
df=	4	4	4				
Value=	94.489	22.402	45.288	NS	NS	NS	NS
Prob=	0.000	0.000	0.000				
RACE							
df=		4		4			
Value=	NS	30.371	NS	9.323	NS	NS	NS
Prob=		0.000		0.054			
NUMBER IN HOUSEHOLD							
df=						3	
Value=	NS	NS	NS	NS	NS	8.209	NS
Prob=						0.042	
AGE							
df=							2
Value=	NS	NS	NS	NS	NS	NS	8.691
Prob=							0.013
AGE OF PERSONAL SHOPPER							
df=							2
Value=	NS	NS	NS	NS	NS	NS	8.358
Prob=							0.015
SIZE OF COMMUNITY							
df=					3		
Value=	NS	NS	NS	NS	8.525	NS	NS
Prob=					0.036		

NS=Not significant

responsibility for food preparation, 174 (86%) replied that they con-
sidered the amount of fat on a beef cut. Race was also significantly
associated (p=0.000) with this beef characteristic (Table XI). One
hundred seventy-one caucasian respondents stated that they considered
the amount of fat in the beef purchased. These findings were similar
to the findings of Yankelovich, Skelly and White (1985) where there
was a high level of consumer responsiveness to the concept of leaner
and calorie reduced meat products. The price of beef per pound was
significantly associated with the variable respondents who were
responsible for food preparation (p=0.000) (Table XI). Ninety-eight
percent (n=185) of all respondents and 86 percent (n=173) of the
principal food preparers indicated that the cost of beef per pound
influenced their buying behavior (Table X).

The amount of marbling in a beef cut was considered by 182 (97%)
(Table X) of the respondents when purchasing beef. Marbling of beef
was significantly associated with the race of the respondent (p=0.054)
(Table XI). Caucasians (n=166) indicated that they considered marbling
as an indicator whether to buy or not buy beef. Data was not gathered,
however, as to whether the respondents considered not buying beef due
to the amount of marbling because of health concerns or buying a cut
with more marbling because of the added taste and tenderness.

Respondents also considered the date of packaging on the label. It
was significantly associated with the size of community the respondent
was from (p=0.036) (Table XI). Of the 184 respondents who answered
this question, 174 (95%) of them replied that they considered dates on
labels. Nearly half of them (n=84) were from communities with a popu-
lation of less than 5,000.

Another factor considered by 131 of the subjects (72%) in this study was the amount of time involved in the preparation of the beef cut purchased. There was a significant association between preparation time and the number of people in the household (p=0.042) (Table XI). Respondents from a two member household (n=86, 62%) considered the time involved in preparation. In the Yankelovich, Skelly, and White study (1985), chicken showed a potential vulnerability in popularity due to the ease (or lack) of preparation. So while the consumers in this study have expressed a concern over the amount of time involved in beef preparation, other studies have shown that beef still has an edge over chicken in this respect.

The last factor to show a significant association with personnel variables in this question was the consideration of the price per serving of beef. Three fourths of the subjects (n=145) (Table X) replied that they considered the price per serving in purchasing beef. Two significant associations were with age of the principal shopper (p=0.013) and with age of the respondent (p=0.013) (Table XI). Eighty-eight of 105 principal shoppers, who were 55 years of age or older stated the price per serving was a factor they considered when purchasing beef.

Where Beef is Purchased

In question eight of this section, respondents were asked to report where they purchased most of the beef they eat at home. Nine places where beef could be purchased were listed. Respondents were asked to check the following frequency description for each place listed; a) regularly, b) sometimes, c) rarely, and d) never. Of the nine places

listed, five had significant associations with the given variables. They were the meat market, the restaurant, direct from a rancher, slaughtering family owned animal and the wholesale warehouse.

Purchasing beef at the meat market was not a common practice among the respondents. Sixty-three percent (n=126) (Table XII) replied that they never purchased beef in a meat market. This was significantly associated with the size of community (p=0.011) (Table XIII). Of those from communities of 5,000 people or less, 59 respondents did not buy beef at a meat market.

Beef was also not regularly purchased at restaurants. Over half (n=121) (Table XII) did not purchase beef from a restaurant. Significant associations were found between purchasing from a restaurant and who were responsible for cooking (p=0.000), responsible for purchasing (p=0.005), marital status (p=0.017) (Table XIII). One hundred seventeen of those responsible for food preparation and 104 who were responsible for food purchasing replied that they did not go to a restaurant for beef. Almost half (n=91) of the respondents who were married did not purchase beef there. Sixty-four respondents from communities of 5,000 people or less also stated that they never bought beef at a restaurant (p=0.017).

Eighty-four percent (n=169) of the respondents stated that they never bought beef directly from a rancher (Table XII). The level of education was significantly associated with this beef source (p=0.014) (Table XIII). Of the group stating that they did not purchase from a rancher, 62 had high school education, 40 had attended college and 43 were college graduates.

TABLE XII

WHERE AND HOW OFTEN BEEF IS PURCHASED*

Where Beef is Purchased	Regularly		Sometimes		Rarely		Never	
	N	%	N	%	N	%	N	%
Meat Market	14	7	29	15	29	15	126	63
Restaurant	9	4	48	24	24	12	121	60
Direct from Rancher	14	7	7	3	11	6	169	84
Slaughtered Family Owned Animal	39	19	22	11	3	2	136	68
Wholesale Warehouses	3	2	12	6	15	8	168	84

*Not all respondents (n=202) replied to each question; the percentages are based on the number of replies to each question.

TABLE XIII

CHI-SQUARE DETERMINATION INDICATING ASSOCIATIONS BETWEEN WHERE BEEF IS PURCHASED AND SELECTED VARIABLES

Variable	Meat Market Where 2	Restaurant Where 4	Direct from Rancher Where 6	Slaughtered Family Owned Animal Where 7	Wholesale Warehouses Where 8
SIZE OF COMMUNITY					
df=	9	9			
Value=	21.414	20.208	NS	NS	NS
Prob=	0.011	0.017			
MARITAL STATUS					
df=		6			
Value=	NS	15.517	NS	NS	NS
Prob=		0.017			
RESPONSIBLE FOOD PURCHASER					
df=		12			
Value=	NS	28.355	NS	NS	NS
Prob=		0.005			
RESPONSIBLE COOK					
df=		12			
Value=	NS	42.457	NS	NS	NS
Prob=		0.000			
EDUCATION					
df=			12		
Value=	NS	NS	25.183	NS	NS
Prob=			0.014		
AGE					
df=				6	
Value=	NS	NS	NS	16.668	NS
Prob=				0.011	
AGE OF PERSONAL SHOPPER					
df=				6	
Value=	NS	NS	NS	16.230	NS
Prob=				0.013	
EMPLOYMENT					
df=					16
Value=	NS	NS	NS	NS	27.133
Prob=					0.040

NS=Not significant

Very few respondents stated that they slaughtered a family owned animal for beef. Only 39 (19%) (Table XII) replied that they used this method to purchase beef, while 136 (68%) (Table XII) stated that they did not. The age of the principal shopper (p=0.013) and the age of the respondents (p=0.011) (Table XIII) were significantly associated with this beef source. Eighty-three respondents, 55 years of age and over, and 82 principal shoppers over 55 stated that they did not slaughter their own animals.

Wholesale warehouse was also a very unlikely place for respondents to purchase beef. Eighty-four percent (n=168) (Table XII) of the respondents stated that they did not go to a wholesale warehouse. The employment status of the respondents was significantly associated (p=.04) with purchasing beef from wholesale warehouses. Sixty-six retired respondents and 64 full-time homemakers replied that they never bought beef at this location.

Results in this study clearly show that the majority of beef is still purchased from the grocery store. This is where a concentrated effort should be maintained to educate consumers about beef and beef products. There has definitely been a strong effort made by various agencies to promote beef consumption these past few years, however, these promotions should be on-going and adapted to meet current consumer demands for information.

Frequency of Beef Consumption

The frequency of beef consumption was the topic of questions 10 and 10a, Section 3 of the questionnaire. Thirteen beef items were listed in question 10. The respondents were asked to list the

frequency in which they consumed each beef item. The frequency selec-
tions available were 0, 1, 2, 3-5 and 6 or more. During the analysis
of the data, 3-5 and 6 or more were combined.

The frequency of consumption of ground beef was high. One half
of the respondents reported that they consumed ground beef three or
more times (n=103) (Table XIV) during a two week period. Thirty-one
percent of the remaining respondents stated that they ate ground beef
at least two times in the previous two weeks (n=60) (Table XIV). The
number of people in the household was significantly associated with
the consumption of ground beef (p=0.005) (Table XV). Of those people
consuming ground beef 3 or more times, 38 were from 2-member and 36
were from 3-member households.

Beef for stew was not consumed as frequently as ground beef. Over
three fourths of the respondents consumed it only one time or less
during the previous two weeks (82%) (Table XIV). Roast beef consumption
was significantly associated with the income of the respondent (p=0.044)
(Table XV). Forty-eight respondents who made $15,000 or more did not
eat stew meat at all, while 52 in the same group only consumed stew
meat once during the previous two weeks.

Many respondents did not eat beef fillet at all. Only 11 percent
(n=22) (Table XIV) had eaten fillet at least once, whereas 81 percent
(n=159) (Table XIV) had not eaten fillet at all. The education level
of the respondent was significantly associated with this beef item. Of
the group who had not consumed beef fillet, 56 were high school graduates,
37 had attended college and 44 were college graduates.

Steak was consumed by a little under half of the respondents. The
researcher had expected to find that more respondents had consumed

TABLE XIV

FREQUENCY OF BEEF CONSUMPTION*

| Beef Items | Frequency of Beef Consumption in Past Two Weeks | | | | | | | |
	0		1		2		3 or More	
	N	%	N	%	N	%	N	%
Ground beef	10	5	23	12	60	31	103	52
Beef for stew	72	41	72	41	25	15	5	3
Fillet	159	81	22	11	12	6	3	2
Steak	106	54	48	25	28	14	14	7
Roast	59	30	79	40	34	18	24	12
Top of bottom round	131	67	42	22	18	9	3	2
Ribs	171	87	19	10	4	2	1	1
Frozen beef entrees	167	85	17	9	9	4	3	2
Other beef item	178	93	7	4	1	1	3	2

*Not all respondents (n=202) replied to each question; the percentages
are based on the number of replies to each question.

TABLE XV

CHI-SQUARE DETERMINATION INDICATING ASSOCIATIONS BETWEEN FREQUENCY OF BEEF CONSUMPTION IN PAST TWO WEEKS AND SELECTED VARIABLES

Variable	Ground Beef CONB 1	Beef for Stew CONB 2	Fillet CONB 4	Steak CONB 5	Roast CONB 6	Top/Bottom Round CONB 7	Ribs CONB 8	Frozen Beef Entrees CONB 11	Other Beef Items CONB 13
NUMBER IN HOUSEHOLD df= Value= Prob	9 23.758 0.005	NS	NS	NS	9 21.348 0.011	NS	NS	NS	NS
INCOME df= Value= Prob=	NS	12 21.495 0.044	NS	NS	NS	NS	NS	NS	NS
EDUCATION df= Value= Prob=	NS	NS	9 17.952 0.036	NS	NS	NS	NS	NS	NS
RESPONSIBLE COOK df= Value=	NS	NS	NS	12 22.248 0.035	NS	NS	NS	NS	NS
CHILDREN LIVING AT HOME df= Value= Prob=	NS	NS	NS	NS	3 13.813 0.003	3 7.830 0.050	NS	3 9.497 0.023	3 12.447 0.006
AGE df= Value= Prob=	NS	NS	NS	NS	6 13.218 0.040	NS	NS	NS	NS
RESPONSIBLE FOOD PURCHASER df= Value= Prob=	NS	NS	NS	NS	NS	NS	12 27.068 0.008	NS	NS

NS=Not significant

steak due to the fact that Oklahoma produces a large amount of beef for market, however, only 106 (54%) (Table XIV) respondents stated that they had eaten steak in the past two weeks. The responsibility for cooking was found to be significantly associated (p=0.035) (Table XV) with steak consumption. One hundred two respondents who were responsible for food preparation had not consumed steak in a two week period.

Roast beef was a moderately favorite cut among the respondents. It was consumed by 70 percent (n=137) (Table XIV) at least once. Roast consumption was significantly associated with the number of children in the household (p=0.003), the number of members in the household (p=0.011), and with the age of the principal shopper (p=0.040) (Table XV). Of those with no children at home, 46 consumed no roast and 48 had roast only once in a two week period. Thirty-nine respondents from two member households had roast once and 22 did not have roast at all. The principal shoppers, 55 years of age and older had a similar response. Forty had not had any roast in the previous two weeks, while 37 had roast once.

The consumption of top or bottom round was not high among the respondents. Sixty-seven percent (n=131) (Table XIV) had not consumed this beef cut at all. This cut was significantly associated with the number of children in the household (p=0.050) (Table XV). Over half of the respondents (n=97) with no children at home did not consume top or bottom round.

Beef ribs were not consumed by 87 percent (n=171) (Table XIV) of the respondents. The survey was conducted in mid-November and ribs are more typically used as a summer food cooked on the barbeque grill. Rib consumption was significantly associated with the responsibility for

food purchasing (p=0.008) (Table XV). Of those responsible for food purchasing, 147 did not eat this cut at all.

The consumption of frozen beef entrees was low. Only 15 percent (n=29) (Table XIV) consumed frozen beef entrees one or more times during a two week period. Eighty-five (n=167) (Table XIV) did not eat frozen entrees at all. This beef item was significantly associated with the number of children in the household (p=0.023) (Table XV). One hundred eighteen respondents with no children living at home replied that they did not consume frozen beef entrees. The marketing of frozen beef entrees perhaps has not saturated this geographical area. Beef purveyors could enhance the consumption of these products by showing consumers how convenient these products can be. As mentioned later in this chapter, consumer use of the microwave is low. By targeting education on the use of microwave and frozen beef entrees, beef purveyors could widely increase the consumption of such items in the Oklahoma market.

Respondents were asked to list any other beef items that they consumed during the previous two weeks. Ninety-three percent (n=178) (Table XIV) did not list anything. This response was significantly associated with the number of children in the household (p=0.006) (Table XV). Of those with no children at home, 128 did not state that they consumed any other beef item.

Frequency of Consumption of

Non Beef Items

Question 10a surveyed the frequency of consumption of non beef items among the respondents. A list of 13 non beef items was provided

and the respondents reported how often they had consumed those items in
the previous two week period. The frequency selections available were
the same as listed for question 10. For data analysis, 3-5 and 6 or more
servings were combined. Only seven non beef items had significant
association with the variables available. They were chicken, turkey,
luncheon meats, frankfurters, and seafood (shrimp, scallops, etc.)

Chicken had the highest rate of consumption than any other non beef
item. Thirty-one percent (n=61) (Table XVI) had consumed chicken three
or more times in the past two weeks. The age of the principal shopper
was significantly associated with the consumption of chicken (p=0.022)
(Table XVII). Of those respondents who were 55 years of age or older
and who were principal shoppers in their household, 41 consumed chicken
three or more times and 38 had it twice.

Another poultry item listed was turkey. Only 25 respondents (13%)
(Table XVI) had turkey three or more times, while 108 (55%) (Table XVI)
did not consume it at all. There were two significant associations
with turkey. The respondents who were responsible for cooking (p=0.037)
(Table XVII) did not prepare turkey very often. One hundred two did
not prepare turkey at all and only 39 respondents had it once. Respond-
ents who were married (p=0.054) (Table XVII) also did not consume
turkey. Eighty-eight married respondents did not consume any, while 32
had it only once.

The use of luncheon meat was more evenly spread out among the
respondents. A little over one third of the population did not consume
luncheon meat at all. Whereas, 23 percent (n=45) (Table XVI) had it
once during the previous two weeks, 19 percent (n=38) (Table XVI) con-
sumed it three or more times. This is an item that is used often for

TABLE XVI

FREQUENCY OF CONSUMPTION OF NON BEEF ITEMS*

| Non Beef Items | Frequency of Non Beef Items Consumed in Past Two Weeks | | | | | | | |
	0		1		2		3 or More	
	N	%	N	%	N	%	N	%
Chicken	18	9	43	22	75	38	61	31
Turkey	108	55	43	22	19	10	25	13
Luncheon meats	74	38	45	23	38	19	39	20
Frankfurters	103	53	59	30	24	12	10	5
Seafood (shrimp, scallops, etc.)	152	77	29	15	11	6	5	2

*Not all respondents (n=202) replied to each question; the percentages are based on the number of replies to each question.

TABLE XVII

CHI-SQUARE DETERMINATION INDICATING ASSOCIATIONS BETWEEN FREQUENCY OF NON BEEF ITEMS CONSUMED IN PAST TWO WEEKS AND SELECTED VARIABLES

Variable	Chicken CONNB 5	Turkey CONNB 6	Luncheon Meats CONNB 7	Frankfurters CONNB 8	Seafood (shrimp, scallops, etc.) CONNB 11
AGE OF PERSONAL SHOPPER					
df=	6			6	
Value=	14.779	NS	NS	13.779	NS
Prob=	0.022			0.032	
RESPONSIBLE FOOD PURCHASER					
df=	12				
Value=	22.893	NS	NS	NS	NS
Prob=	0.029				
MARITAL STATUS					
df=		6			6
Value=	NS	12.389	NS	NS	13.468
Prob=		0.054			0.036
RESPONSIBLE COOK					
df=		12			
Value=	NS	22.061	NS	NS	NS
Prob=		0.037			
NUMBER LIVING IN HOUSEHOLD					
df=			9	9	9
Value=	NS	NS	33.986	22.964	17.562
Prob=			0.000	0.006	0.041
CHILDREN LIVING AT HOME					
df=			3	3	3
Value=	NS	NS	12.032	13.486	7.949
Prob=			0.007	0.004	0.047
AGE					
df=				6	6
Value=	NS	NS	NS	13.814	13.911
Prob=				0.032	0.031
INCOME					
df=					
Value=	NS	NS	NS	NS	NS
Prob=					

NS=Not significant

sack lunches. It might have helped the response if the term "cold cuts" was used instead of luncheon meats.

There were two significant associations with this particular food item. They were with the number of people in the household (p=0.000) and with the number of children living in the household (p=0.007) (Table XVII). Half of the respondents answering this question were from two member households. Of that group, 56 had luncheon meats one or more times during a two week period. Seventy-one percent of the respondents did not have any children at home. In the households without children, 69 ate luncheon meats one or more times.

The consumption of frankfurters, or lack of, drew two significant responses. They were the number of people in the household (p=0.006) (Table XVII) and the age of the respondent (p=0.032) (Table XVII). Over half of the respondents (n=103) (Table XVI) replied that they did not consume frankfurters during the previous two week period. Only 30 percent (n=59) (Table XVI) had frankfurters once. Of the significant associations, 91 respondents were from two member households and 54 of the people did not eat frankfurters at all. One hundred fifteen of the respondents were 55 years of age or over. Only 27 people out of that group ate frankfurters once, while 68 did not eat them at all. This data could point to the increasing numbers of consumers that are selecting meats that contain less fat and preservatives. The data discussed in the first part of this chapter noted that many respondents were concerned with the level of preservatives in their food. It is also possible that frankfurters are not a popular food choice of consumers 55 years of age or older. The largest number of people responding to this study were in this age category.

Many respondents replied that seafood (shrimp, scallops, etc.) was not a part of their diet during this survey period. Over two thirds (n=152, 77%) (Table XVI) of the respondents did not consume seafood at all. Only eight percent (n=16) (Table XVI) had it more than one time in two weeks. A significant association was found between this non beef item and the number of people in the household (p=0.041) (Table XVII). Of those people from two member households, 71 did not eat seafood at all, while only 11 ate seafood once.

Testing of Hypothesis Three

The Oklahoma consumers' beef buying behavior was not significantly ($p \leq 0.05$) associated with education, employment status, marital status, income level or size of community, therefore, the researcher failed to reject Hypothesis Three when only these variables were considered. Beef buying behavior of Oklahoma consumers, was however, significantly associated with age, number in the household, the age of the principal shopper, responsibility for food preparation, and number of children in household (Table XVII). Therefore, based on these results the researcher rejected Hypothesis Three.

Preparation Techniques Used by
Oklahoma Homemakers

The fourth objective identified in this study was to identify preparation techniques used by Oklahoma homemakers to prepare beef items. The first question in Section four was used to collect data on the methods used for cooking beef by respondents. A list of methods was provided and the respondents were asked to check all that applied.

Seven methods were significantly associated with various variables. They were roasting, broiling or grilling, pan frying, stir-frying, microwaving, crockpot cooking, and deep fat frying.

Roasting was used by 131 (66%) (Table XVIII) of the respondents. There was a significant association between this preparation method and the number of members in the household (p=0.003) (Table XIX). Sixty-nine respondents using roasting were from two member households while 40 had three to four members in their households.

A little over half of the respondents, (n=102, 52%) (Table XVIII) stated that they did not use broiling or grilling as a cooking method. Broiling was significantly associated with the education level of the respondents (p=0.004) (Table XIX). Of those who used broiling, only 16 (n=31) were high school graduates while 49 (25%) had attended college or were college graduates.

Pan frying was used by 141 (72%) (Table XVIII) of all respondents. This method was significantly associated with the number of household members (p=0.004) and with the number of children in the household (p=0.025) (Table XIX). Fifty-eight (30%) of those respondents were from two member households while 46 (26%) were from three to four member households. Of those respondents using pan frying as a method of preparation, 93 (47%) did not have any children in their household.

Stir-frying as a technique to prepare beef was not popular with Oklahoma consumers. Eighty percent (n=171) of the respondents did not use stir-frying at all (Table XVIII). Stir-frying was significantly associated with the age of the respondent (p=0.002) (Table XIX). Of those respondents, 55 years of age or older, 55 percent (n=109) did not

TABLE XVIII

COOKING METHODS TO PREPARE BEEF*

Cooking Methods	Used		Not Used	
	N	%	N	%
Roasting	131	66	66	34
Broiling or grilling	95	48	102	52
Pan frying	141	72	56	28
Stir frying	26	13	171	87
Microwaving	81	41	116	59
Crock pot	62	31	135	69
Deep fat frying	27	14	170	86

*Not all respondents (n=202) replied to each question; the percentages
are based on the number of replies to each question.

TABLE XIX

CHI-SQUARE DETERMINATION INDICATING ASSOCIATIONS BETWEEN COOKING METHODS USED TO PREPARE BEEF AND SELECTED VARIABLES

Variable	Roasting Cook 1	Broiling or Grilling Cook 3	Pan Frying Cook 4	Stir Frying Cook 5	Microwaving Cook 6	Crock Pot Cook 8	Deep Fat Frying Cook 9
NUMBER LIVING IN HOUSEHOLD							
df=	3		3	3	3		3
Value=	14.091	NS	13.111	10.868	9.584	NS	13.254
Prob=	0.003		0.004	0.012	0.022		0.004
EDUCATION							
df=		3			3		
Value=	NS	13.446	NS	NS	7.845	NS	NS
Prob=		0.004			0.049		
CHILDREN LIVING AT HOME							
df=		1					1
Value=	NS	5.054	NS	NS	NS	NS	13.391
Prob=		0.025					0.000
AGE							
df=				2			2
Value=	NS	NS	NS	12.842	NS	NS	11.996
Prob=				0.002			0.002
INCOME							
df=				4	4		
Value=	NS	NS	NS	12.013	12.999	NS	NS
Prob=				0.017	0.011		
EMPLOYMENT							
df=					4		
Value=	NS	NS	NS	NS	11.849	NS	NS
Prob					0.019		
RESPONSIBLE FOR COOKING							
df=						4	
Value=	NS	NS	NS	NS	NS	11.024	NS
Prob=						0.026	

NS=Not significant

use stir-frying as a cooking method for beef. Another significant association was with the number of people in the household (p=0.012) (Table XIX). Eighty-three respondents (42%) were from two member households. The last variable significantly associated with stir-frying was the income level of the respondents (p=0.017) (Table XIX). Subjects earning $15,000 to $24,999 (n=42) and 18 percent (n=31) of those earning $25,000 to $39,000 did not stir-fry beef items.

Microwaving as a method of preparation was also less frequently used by all respondents. One hundred sixteen (59%) (Table XVIII) reported that they did not use this method for beef preparation. Four significant associations were found with this cooking method. They were number in the household (p=0.022), income level (p=0.011), education level (p=0.049), and employment status (p=0.019) (Table XIX). These associations came from respondents from two member households (n=57) and those who earned between $15,000 and $24,999. Forty-five respondents who did not use microwaving, were high school graduates and 53 had attended or graduated from college. Also among the respondents who did not use microwaving, 48 were retired and 49 were full-time homemakers.

The use of the crockpot as a beef cooking method was not wide spread among Oklahoma homemakers. Sixty-nine percent (n=135) (Table XVIII) did not use the crockpot. One association was found between the individual responsible for food preparation and the use of the crockpot (n=0.026) (Table XIX). Of those responsible for food preparation, 129 did not use the crockpot while only 55 did.

Deep fat frying was also unpopular among the respondents. Eighty-six percent (n=170) (Table XVIII) did not use deep fat frying as a

cooking method for beef. Significant associations were observed between this method and with the number in the household (p=0.004), age of respondent (p=0.002) and the number of children in the household (p=0.000) (Table XIX). Respondents from two member households (n=85) indicated that they did not use deep fat frying. Over 50 percent (n=107) of the respondents stating that they did not use deep fat frying, were 55 years of age or older. Also respondents with no children in the household (n=128) did not use this method.

Broiling or grilling and pan frying were two of the most popular methods used by homemakers for beef preparation. While stir-frying, microwaving, use of the crockpot, and deep fat frying were the least popular among the respondents. It is possible that the respondents were not as familiar with the stated least popular cooking methods as with the other two methods. County extension agents, nutrition educators and dietitians need to try to encourage the use of stir-frying, microwaving, and crockpot use and offer assistance in developing the skills needed to incorporate these methods in the Oklahoma homemakers' cooking repertoire. New cooking methods could promote renewed interest in beef products. They should also provide guidelines for decreasing the use of fat in cooking since pan frying is the most popular way to prepare beef. As indicated earlier in this report, respondents were interested in cutting back the fat consumption in their diets and stir-frying, microwaving and use of a crockpot could be explored if guidelines and recipes could be provided.

Acceptance of Fat on a Beef Cut

The purpose of question two in Section four was to survey

respondents on the acceptance of fat on a beef cut. Three responses
were available. They were a) Do you trim the fat before eating?, b)
Do you trim or drain the fat after cooking?, and c) Do you eat the fat?
One hundred eighty-six (94%) (Table XX) replied that they did not
consume the fat on a beef cut. Of that group, 65 (33%) were high school
graduates, 54 (27%) attended some college and 47 (24%) were college
graduates. Only one significant association was found between the
education level of the respondents and eating the fat on a beef cut
(p=0.000) (Table XXI).

Testing of Hypothesis Four

The preparation techniques used by Oklahoma homemakers to prepare
beef was not significantly ($p \leq 0.05$) associated with marital status and
size of community. Choice of preparation techniques was significantly
associated, however, with the number in household, education level,
number of children in household, age, level of income, employment status
and responsibility for food preparation. Based on these results, the
researcher rejected Hypothesis Four.

TABLE XX

CONSUMPTION OF FAT FROM BEEF CUTS

Fat Consumption	Yes		No	
	N	%	N	%
Eat the fat	11	6	186	94

*Not all respondents (n=202) replied to each question; the percentages are based on the number of replies to each question.

TABLE XXI

CHI-SQUARE DETERMINATION INDICATING
ASSOCIATION BETWEEN FAT CONSUMED
FROM BEEF CUTS: PRACTICE USED
DURING PREPARATION AND
CONSUMPTION AND LEVEL
OF EDUCATION

	Eat The Fat
Variable	Cook BH_3
Education	
df=	3
Value=	18.672
Prob=	0.000

CHAPTER V

SUMMARY, RECOMMENDATIONS AND IMPLICATIONS

Summary

This study focused on identifying the attitudes and opinions of Oklahoma homemakers toward beef. The data collected were analyzed to see how those attitudes affected their purchasing habits as well as the demand for beef in Oklahoma. Specific objectives for this study were 1) to describe the attitudes and opinions of Oklahoma consumers about beef as a food item, 2) to ascertain the factors impacting on the demand for beef as a commodity item, and to discern the actual consumption of beef by Oklahoma consumers, 3) to identify the Oklahoma consumers' beef buying behavior, and 4) to identify the preparation techniques used by Oklahoma homemakers to prepare beef.

Almost three fourths of all respondents perceived beef as a nutritious food just like poultry and fish, and that beef was an excellent source of protein in the diet. Respondents who were the principal shoppers in their households indicated, however, that beef was high in fat content. Overall, the Oklahoma consumers in this study thought of beef as a good source of nutrients and provided satiety in the diet.

Respondents who were 55 years of age or older or those who did not have children in their households indicated that beef did not take much time and was actually easy to prepare as a food item. Consumers with

a college education used the newspaper and television as major sources of nutrition information. Those with less than college education relied upon the family and women's magazines as their source for nutrition information. Oklahoma homemakers tended not to use the radio as a source of information and college graduates found nutrition labeling helpful.

Concern over the health issues of beef consumption had impacted on those individuals who were 55 or older and who were principal food shoppers. This same group were affected by the fat and cholesterol content of beef. Also impacting beef consumption was the ease of preparation of beef. Those who were married and did the food purchasing for the household were affected by this.

The appearance of the display influenced the buying behavior of those 55 years or older. Individuals who were responsible for food purchasing were influenced by the color of the meat, the amount of fat and the amount of marbling in the cut.

Most beef was purchased in the grocery store. Those respondents from communities of 5000 or less rarely purchased beef from a meat market. Only 39 percent slaughtered a family owned animal for beef.

Ground beef was the most frequently consumed beef item by all individuals. Chicken was the most popular non-beef item consumed. Respondents 55 years or older consumed chicken up to three times a week.

Preparation techniques for beef varied. Roasting was used frequently by households with two members. Pan frying was used by 72 percent of all respondents. The microwave was not a popular technique used to prepare beef. Full-time homemakers were less likely to use the microwave.

When asked if they consumed the fat on a beef cut, 96 percent of the homemakers replied that they did not. The more educated respondents were the least likely to consume fat on a beef cut.

Recommendations

The research instrument could be streamlined to include less general topics and more focused questions regarding beef and diet-health issues affecting beef consumption. The sample needs to be expanded to include teens, young adults, middleage and older consumers, and, males. A random sample of all households in the U.S. needs to be surveyed to provide additional insights regarding a more accurate beef consumption pattern nationwide.

Implications

Dietitians, home economists, and nutrition educators on all levels need to determine specific educational approaches and materials that are most conducive to promoting the beneficial aspects of red meat consumption. A study to identify the specific lifestyle traits of Oklahomans that would impact their red meat consumption would provide a perspective on the directions to take. To be effective studies must be carefully reviewed, repeated and verified before the public is targeted for education on any change in dietary habits.

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APPENDIX A

QUESTIONNAIRE

O K L A H O M A   S T A T E   U N I V E R S I T Y

Department of Food, Nutrition and Institution Administration

College of Home Economics

November 17, 1986

Dear Homemaker,

There has been considerable interest in consumer attitudes, purchasing, and consumption patterns of beef from a diet-health issue perspective. The attached questionnaire focuses on your attitudes, buying patterns, and consumption of beef and beef products. We would appreciate it if you would take 15 minutes to answer all of the questions. All responses will be kept strictly confidential and not linked to any particular individual. Please return it, completed, by November 30, 1986.

Once the questionnaire is completed, fold it in thirds and staple it closed. The return address should be visible after stapling. Return postage is provided.

We would like to show our appreciation by sending a cook booklet to you after receiving your completed questionnaire. Thank you for your interest and participation. Your response will be extremely important to the outcome of the study.

Sincerely,

(Signed)

Lea L. Ebro, Ph.D., R.D.
Major Adviser

(Signed)

Joy E. Galloway
Graduate Student

SECTION 1

For this question, circle the number which tells how strongly you agree or dis-
agree with each statement. SA=strongly agree, A=agree, D=disagree, SD=strongly
disgree.

1.   How strongly do you agree with these statements about BEEF?

	SA	A	D	SD
a. It is high in cholesterol.	1	2	3	4
b. Beef is not as nutritious as poultry.	1	2	3	4
c. It is low in calories.	1	2	3	4
d. Beef is necessary for good health.	1	2	3	4
e. Beef is a good protein source.	1	2	3	4
f. It is low in iron.	1	2	3	4
g. It is more nutritious than fish.	1	2	3	4
h. It is low in sodium.	1	2	3	4
i. It is high in fat.	1	2	3	4
j. Beef is a good nutrition choice.	1	2	3	4
k. It is time consuming to prepare.	1	2	3	4
l. It is a good buy.	1	2	3	4
m. Beef is a satisfying food.	1	2	3	4
n. It confusing to buy because of the different names of cuts.	1	2	3	4
o. Beef is an expensive meat.	1	2	3	4
p. It is difficult to cook.	1	2	3	4

2.   What is your opinion of the price of BEEF in relation to prices of other meats
      (pork, veal, lamb, poultry)?

	Cheaper	Same	More Expensive	No Opinion
a. pork	____	____	____	____
b. veal	____	____	____	____
c. lamb	____	____	____	____
d. poultry	____	____	____	____

SECTION 2

1.   Which of the following factors have had an impact on the amount of BEEF you eat?

	No Impact	Some Impact	Large Impact
a. Health concerns	____	____	____
b. Fat content of beef	____	____	____
c. Cholesterol content of beef	____	____	____
d. Sodium content of beef	____	____	____
e. Iron content of beef	____	____	____
f. B-vitamin content of beef	____	____	____
g. Ease of preparation	____	____	____
h. Lack of preparation skills	____	____	____
i. Lack preparation facilities or equipment	____	____	____
j. Cost of beef	____	____	____
k. Cost of poultry, fish, or other meats	____	____	____
l. Caloric content	____	____	____
m. Growth promotants & antibiotics given before slaughter	____	____	____
n. Preservatives added to beef	____	____	____
o. Availability of alternative protein foods	____	____	____

2. Which of the following sources do you use for nutrition information? (✓)
   Check all that apply.

   a.___Health magazines   j.___Dentist
   b.___Newspapers   k.___School Teacher
   c.___Television   l.___Books on health, cooking, or diet
   d.___Radio   m.___Health club personnel
   e.___Family & Women's magazines   n.___Lables on products
   f.___Family   o.___Weight loss clinic
   g.___Friends   p.___Food store personnel
   h.___Dietitian   q.___Other_____
   i.___Physician

3. Put a check under the column which shows how much you spend at the grocery
   store for each of these meats in a week.

		$0-$4.99	$5-9.99	$10-$14.99	$15 or more
a.	Beef	___	___	___	___
b.	Chicken	___	___	___	___
c.	Pork	___	___	___	___
d.	Fish	___	___	___	___
e.	___Not Applicable because beef is slaughtered at home.				

SECTION 3

All meat sold in interstate and intrastate commerce must be inspected and graded
according to wholesomeness, tenderness and flavor. The grades are (in order of
highest quality to lowest quality) USDA Prime, USDA Choice, USDA Commercial, &
USDA Standard.

1. Does the grade of meat affect your purchase selection?
   a.___Never   c.___Often
   b.___Sometimes   d.___Always

2. At the time of purchase which color of beef do you prefer to buy?
   a.___Light Pink   c.___Light Red   e.___Dark Red
   b.___Pink   d.___Red

3. At the time of purchase, how much fat do you prefer around the sides of a cut
   of beef?
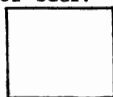
   ____3/4 inch   ____1/2 inch   ____1/4 inch   ____1/8 inch   ___none at all

4. Which of the following promotional techniques influences your food purchase?

		Never	Sometimes	Often	Always
a.	Weekly Specials	___	___	___	___
b.	Discounts	___	___	___	___
c.	Appearance of Display	___	___	___	___
d.	Daily Specials	___	___	___	___
e.	Service Personnel recommendations	___	___	___	___

5. If the price of BEEF dropped by 10%, 20%, or 30% and the prices of other
   meats remained the same, would you buy more BEEF, or the same amount?

		More	The Same Amount
a.	10%	___	___
b.	20%	___	___
c.	30%	___	___

6. Circle the number which tells how strongly you consider each of the following items when purchasing BEEF. (AC=always consider, SC=sometimes consider, RC= rarely consider, NC=never consider)

	AC	SC	RC	NC
a. Color of the meat	___	___	___	___
b. Amount of fat around the cut	___	___	___	___
c. Price per pound	___	___	___	___
d. Amount of marbeling (fat in the cut)	___	___	___	___
e. Date packaged on label	___	___	___	___
f. Nutrient value of beef	___	___	___	___
g. Cuts that are on sale	___	___	___	___
h. Ease of preparation	___	___	___	___
i. Amount of time involved in preparation	___	___	___	___
j. Price per serving	___	___	___	___
k. Number of servings available	___	___	___	___
l. Amount of waste in a cut (unedible portions bone, fat, etc.)	___	___	___	___

7. Last time you bought BEEF did you: (Check all that apply)
   a.____have it on your shopping list.
   b.____read weekly sales advertisement.
   c.____buy it on impulse.
   d.____plan to buy beef and bought more because it was on special.
   e.____read data on nutrifacts at display.
   f.____Not Applicable because beef is slaughtered at home.

8. Where is most of the BEEF you eat at home purchased?

	Regularly	Sometimes	Rarely	Never
a. Supermarket	___	___	___	___
b. Meat Market	___	___	___	___
c. Deli	___	___	___	___
d. Restaurant	___	___	___	___
e. Special distributor sales at motel, service stations, or department stores	___	___	___	___
f. Direct from rancher	___	___	___	___
g. Slaughtered family owned animal	___	___	___	___
h. Wholesale Warehouses				
i. Do not know	___	___	___	___

9. I would buy BEEF more often if: (Check all that apply)
   a.___lower calorie cuts were available.
   b.___brand named beef was available.
   c.___I had more storage facilities.
   d.___microwavable precooked beef was available.
   e.___I could find smaller packages.
   f.___better trimmed, leaner beef was available.
   g.___boneless beef was available.
   h.___irradiated beef was available.
   i.___better tasting frozen beef entrees were available.
   j.___Not Applicable because beef is slaughtered at home.
   k.___Other_____

93

10. In the last two weeks, how often did you eat each of the following BEEF items?

	0	1	2	3-5	6 or more
a. ground beef	___	___	___	___	___
b. beef for stew	___	___	___	___	___
c. cube steak	___	___	___	___	___
d. fillet	___	___	___	___	___
e. steak (t-bone, porterhouse sirloin, etc.)	___	___	___	___	___
f. roast (pot-roast, arm or shoulder, etc.)	___	___	___	___	___
g. top or bottom round	___	___	___	___	___
h. ribs	___	___	___	___	___
i. beef organs (liver, heart, etc.)	___	___	___	___	___
j. canned beef	___	___	___	___	___
k. frozen beef entrees	___	___	___	___	___
l. processed beef (jerky, sausage, etc.)	___	___	___	___	___
m. OTHER, please specify below	___	___	___	___	___

_____

10a. In the last two weeks how often did you eat each of the following NON-BEEF items?

	0	1	2	3-5	6 or more
a. pork chops	___	___	___	___	___
b. ham (cured or fresh)	___	___	___	___	___
c. pork roast	___	___	___	___	___
d. processed pork (bacon, sausage, etc.)	___	___	___	___	___
e. chicken	___	___	___	___	___
f. turkey	___	___	___	___	___
g. luncheon meats	___	___	___	___	___
h. frankfurters	___	___	___	___	___
i. wild game	___	___	___	___	___
j. fish	___	___	___	___	___
k. seafood (shrimp, scallops, etc.)	___	___	___	___	___

SECTION 4

1. Place a check mark beside the cooking methods that you or the person who cooks for you has used in the last two weeks.

a.___roasting   g.___pressure cooking
b.___stewing or braising   h.___crock pot
c.___broiling or grilling   i.___deep fat frying
d.___pan frying   j.___baking
e.___stirfrying   k.___OTHER_____
f.___microwaving

2. When preparaing and eating beef do you or the person who usually cooks for you:
a.___trim fat before eating
b.___trim or drain fat after cooking
c.___eat the fat

SECTION 5

Please place a check mark beside the response that is most correct for you.

1. What is your present age?
    ___ Less than 18 years of age   ___ 45-54
    ___ 18-24   ___ 55-64
    ___ 25-34   ___ 65 and over
    ___ 35-44

2. What is the highest level of education that you achieved?
    ___ Less than high school graduate   ___ Attended college
    ___ High school graduate   ___ College graduate/post graduate

3. Which of the following best describes your racial or ethnic identification?
    ___ Black   ___ White (Caucasian)
    ___ Mexican, Cuban, or Spanish   ___ Oriental
    ___ American   ___ Other (Please specify)_____
    ___ Native American (American Indian)

4. What is your present marital status?
    ___ Single/Never Married
    ___ Married
    ___ Widowed/Divorced/Separated

5. How many people are currently living in your household? Please specify
    number._____

6. Do you have children under 18 living in your household? ___ Yes ___ No

6a. If Yes, what are their ages and sexes?_____

7. Are you presently: ___ Employed full-time   ___ Unemployed   ___ Full-time homemaker
                       ___ Employed part-time   ___ Retired

8. What was your net family income from all sources, before taxes in 1985?
    ___ Less than $10,000   ___ $15,000-$24,999   ___ $40,000 or more
    ___ $10,000-$14,999   ___ $25,000-$39,999

9. What is the approximate age of the principal shopper?
    ___ Less than 18 years of age   ___ 25-34   ___ 45-54   ___ 65 and above
    ___ 18-24   ___ 35-44   ___ 55-64

10. In general, who has the primary responsibility for food purchasing in your
    home?   ___ Self   ___ Parent   ___ Shared
               ___ Spouse or Housemate ___ Child

11. In general, who has the primary responsibility for cooking in your home?
    ___ Self   ___ Parent   ___ Shared
    ___ Spouse or Housemate ___ Child

12. In which size of community do you live?
    ___ Over 250,000 people   ___ 5,000 to 24,999 people
    ___ 25,000 to 249,999 people   ___ Under 5000 people

Please make sure that you have completed the front and back portions of each page.
Thank you for your participation. Please fold the questionnaire in thirds and
staple it closed. The return address should be visible after stapling. Return
postage is provided. Thank you very much.

APPENDIX B

CHI-SQUARE TABLES

TABLE OF RACE BY OPIN2

RACE	OPIN2		
FREQUENCY	2	3	TOTAL
1	2	1	3
2	1	2	3
3	4	4	8
4	33	143	176
5	0	2	2
TOTAL	40	152	192

FREQUENCY MISSING = 10

STATISTICS FOR TABLE OF RACE BY OPIN2

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	9.221	0.056

TABLE OF RCOOK BY OPIN5

RCOOK	OPIN5		
FREQUENCY	2	3	TOTAL
1	167	10	177
2	3	0	3
3	1	1	2
4	3	0	3
5	3	2	5
TOTAL	177	13	190

FREQUENCY MISSING = 12

STATISTICS FOR TABLE OF RCOOK BY OPIN5

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	15.304	0.004

TABLE OF RFOODPUR BY OPIN2

RFOODPUR	OPIN2		
FREQUENCY	2	3	TOTAL
1	35	125	160
2	0	6	6
3	2	0	2
4	0	2	2
5	3	18	21
TOTAL	40	151	191

FREQUENCY MISSING = 11

STATISTICS FOR TABLE OF RFOODPUR BY OPIN2

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	10.315	0.035

TABLE OF AGE BY OPIN7

AGE	OPIN7		
FREQUENCY	2	3	TOTAL
1	6	17	23
4	22	36	58
6	53	51	104
TOTAL	81	104	185

FREQUENCY MISSING = 17

STATISTICS FOR TABLE OF AGE BY OPIN7

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	2	5.911	0.052

TABLE OF RFOODPUR BY OPIN5

RFOODPUR	OPIN5		
FREQUENCY	2	3	TOTAL
1	151	8	159
2	4	1	5
3	1	1	2
4	2	0	2
5	18	3	21
TOTAL	176	13	189

FREQUENCY MISSING = 13

STATISTICS FOR TABLE OF RFOODPUR BY OPIN5

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	9.944	0.041

TABLE OF AGE_PS BY OPIN7

AGE_PS	OPIN7		
FREQUENCY	2	3	TOTAL
1	6	17	23
4	22	38	60
6	53	49	102
TOTAL	81	104	185

FREQUENCY MISSING = 17

STATISTICS FOR TABLE OF AGE_PS BY OPIN7

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	2	6.932	0.031

TABLE OF EDUC BY OPIN8

EDUC   OPIN8

FREQUENCY	2	3	TOTAL
1	7	13	20
2	45	15	60
3	42	10	52
4	33	13	46
TOTAL	127	51	178

FREQUENCY MISSING = 24

STATISTICS FOR TABLE OF EDUC BY OPIN8

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	15.578	0.001

TABLE OF RFOODPUR BY OPIN9

RFOODPUR   OPIN9

FREQUENCY	2	3	TOTAL
1	111	44	155
2	1	5	6
3	1	1	2
4	1	0	1
5	13	8	21
TOTAL	127	58	185

FREQUENCY MISSING = 17

STATISTICS FOR TABLE OF RFOODPUR BY OPIN9

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	9.389	0.052

TABLE OF SIZECOMM BY OPIN10

SIZECOMM   OPIN10

FREQUENCY	2	3	TOTAL
1	9	0	9
2	35	1	36
3	45	10	55
4	87	2	89
TOTAL	176	13	189

FREQUENCY MISSING = 13

STATISTICS FOR TABLE OF SIZECOMM BY OPIN10

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	15.561	0.001

TABLE OF NOKIDS BY OPIN11

NOKIDS   OPIN11

FREQUENCY	2	3	TOTAL
0	39	98	137
1	7	50	57
TOTAL	46	148	194

FREQUENCY MISSING = 8

STATISTICS FOR TABLE OF NOKIDS BY OPIN11

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	5.830	0.016

TABLE OF AGE_PS BY OPIN13

AGE_PS   OPIN13

FREQUENCY	2	3	TOTAL
1	23	0	23
4	61	0	61
6	101	8	109
TOTAL	185	8	193

FREQUENCY MISSING = 9

STATISTICS FOR TABLE OF AGE_PS BY OPIN13

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	2	6.432	0.040

TABLE OF MS BY OPIN13

MS   OPIN13

FREQUENCY	2	3	TOTAL
1	1	1	2
2	146	5	151
3	38	2	40
TOTAL	185	8	193

FREQUENCY MISSING = 9

STATISTICS FOR TABLE OF MS BY OPIN13

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	2	10.922	0.004

TABLE OF RFOODPUR BY OPIN13

RFOODPUR	OPIN13		
FREQUENCY	2	3	TOTAL
1	156	6	162
2	6	0	6
3	1	1	2
4	2	0	2
5	19	1	20
TOTAL	184	8	192

FREQUENCY MISSING = 10

STATISTICS FOR TABLE OF RFOODPUR BY OPIN13

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	10.991	0.027

TABLE OF INCOME BY OPIN16

INCOME	OPIN16		
FREQUENCY	2	3	TOTAL
1	3	27	30
2	5	18	23
3	1	44	45
4	2	41	43
5	1	31	32
TOTAL	12	161	173

FREQUENCY MISSING = 29

STATISTICS FOR TABLE OF INCOME BY OPIN16

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	10.861	0.028

TABLE OF RCOOK BY OPIN13

RCOOK	OPIN13		
FREQUENCY	2	3	TOTAL
1	174	6	180
2	3	1	4
3	1	1	2
4	3	0	3
5	4	0	4
TOTAL	185	8	193

FREQUENCY MISSING = 9

STATISTICS FOR TABLE OF RCOOK BY OPIN13

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	15.564	0.004

TABLE OF NOKIDS BY OPIN16

NOKIDS	OPIN16		
FREQUENCY	2	3	TOTAL
0	14	121	135
1	0	58	58
TOTAL	14	179	193

FREQUENCY MISSING = 9

STATISTICS FOR TABLE OF NOKIDS BY OPIN16

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	6.485	0.011

TABLE OF EDUC BY SNI2

EDUC   SNI2

FREQUENCY	O	1	TOTAL
1	21	5	26
2	26	40	66
3	21	34	55
4	18	32	5C
TOTAL	86	111	137

FREQUENCY MISSING = 5

STATISTICS FOR TABLE OF EDUC BY SNI2

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	16.908	0.001

TABLE OF AGE BY SNI4

AGE   SNI4

FREQUENCY	O	1	TOTAL
1	13	11	24
4	46	10	56
6	98	19	117
TOTAL	157	40	197

FREQUENCY MISSING = 5

STATISTICS FOR TABLE OF AGE BY SNI4

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	2	11.068	0.004

TABLE OF AGE BY SNI3

AGE   SNI3

FREQUENCY	O	1	TOTAL
1	5	19	24
4	20	36	56
6	54	63	117
TOTAL	79	118	197

FREQUENCY MISSING = 5

STATISTICS FOR TABLE OF AGE BY SNI3

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	2	5.942	0.051

TABLE OF EDUC BY SNI4

EDUC   SNI4

FREQUENCY	O	1	TOTAL
1	25	1	26
2	50	16	66
3	39	16	55
4	43	7	50
TOTAL	157	40	197

FREQUENCY MISSING = 5

STATISTICS FOR TABLE OF EDUC BY SNI4

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	8.837	0.032

TABLE OF EDUC BY SNI3

EDUC   SNI3

FREQUENCY	O	1	TOTAL
1	17	9	26
2	25	41	66
3	19	36	55
4	18	32	50
TOTAL	79	118	197

FREQUENCY MISSING = 5

STATISTICS FOR TABLE OF EDUC BY SNI3

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	8.112	0.044

TABLE OF EDUC BY SNI5

EDUC   SNI5

FREQUENCY	O	1	TOTAL
1	16	10	26
2	25	41	66
3	13	42	55
4	19	31	50
TOTAL	73	124	197

FREQUENCY MISSING = 5

STATISTICS FOR TABLE OF EDUC BY SNI5

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	10.966	0.012

```
            TABLE OF AGE BY SNI6

AGE        SNI6

FREQUENCY|      O|      1|  TOTAL
---------+--------+--------+
       1 |    10 |    14 |    24
---------+--------+--------+
       4 |    45 |    11 |    56
---------+--------+--------+
       6 |    87 |    30 |   117
---------+--------+--------+
TOTAL         142     55      197
FREQUENCY MISSING = 5
```

STATISTICS FOR TABLE OF AGE BY SNI6

```
STATISTIC                    DF    VALUE    PROB
-----------------------------------------------
CHI-SQUARE                    2   13.240    0.001
```

```
            TABLE OF AGE BY SNI7

AGE        SNI7

FREQUENCY|      O|      1|  TOTAL
---------+--------+--------+
       1 |     8 |    16 |    24
---------+--------+--------+
       4 |    43 |    13 |    56
---------+--------+--------+
       6 |    82 |    35 |   117
---------+--------+--------+
TOTAL         133     64      197
FREQUENCY MISSING = 5
```

STATISTICS FOR TABLE OF AGE BY SNI7

```
STATISTIC                    DF    VALUE    PROB
-----------------------------------------------
CHI-SQUARE                    2   15.332    0.000
```

```
            TABLE OF EDUC BY SNI14

EDUC       SNI14

FREQUENCY|      O|      1|  TOTAL
---------+--------+--------+
       1 |    16 |    10 |    26
---------+--------+--------+
       2 |    21 |    45 |    66
---------+--------+--------+
       3 |    20 |    34 |    54
---------+--------+--------+
       4 |    14 |    36 |    50
---------+--------+--------+
TOTAL          71    125      196
FREQUENCY MISSING = 6
```

STATISTICS FOR TABLE OF EDUC BY SNI14

```
STATISTIC                    DF    VALUE    PROB
-----------------------------------------------
CHI-SQUARE                    3    9.246    0.026
```

TABLE OF NOHH BY IMPACT1

NOHH	IMPACT1		
FREQUENCY	1	2	TOTAL
1	12	21	33
2	18	78	96
3	17	39	56
5	9	6	15
TOTAL	56	144	200

FREQUENCY MISSING = 2

STATISTICS FOR TABLE OF NOHH BY IMPACT1

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	12.993	0.005

TABLE OF AGE BY IMPACT2

AGE	IMPACT2		
FREQUENCY	1	2	TOTAL
1	12	12	24
4	11	48	59
6	38	80	118
TOTAL	61	140	201

FREQUENCY MISSING = 1

STATISTICS FOR TABLE OF AGE BY IMPACT2

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	2	8.400	0.015

TABLE OF AGE BY IMPACT1

AGE	IMPACT1		
FREQUENCY	1	2	TOTAL
1	12	12	24
4	12	47	59
6	32	85	117
TOTAL	56	144	200

FREQUENCY MISSING = 2

STATISTICS FOR TABLE OF AGE BY IMPACT1

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	2	7.504	0.023

TABLE OF SIZECOMM BY IMPACT2

SIZECOMM	IMPACT2		
FREQUENCY	1	2	TOTAL
1	4	5	9
2	5	33	38
3	16	40	56
4	36	60	96
TOTAL	61	138	199

FREQUENCY MISSING = 3

STATISTICS FOR TABLE OF SIZECOMM BY IMPACT2

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	8.508	0.037

TABLE OF AGE_PS BY IMPACT1

AGE_PS	IMPACT1		
FREQUENCY	1	2	TOTAL
1	12	12	24
4	13	48	61
6	31	84	115
TOTAL	56	144	200

FREQUENCY MISSING = 2

STATISTICS FOR TABLE OF AGE_PS BY IMPACT1

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	2	7.178	0.028

TABLE OF AGE_PS BY IMPACT2

AGE_PS	IMPACT2		
FREQUENCY	1	2	TOTAL
1	12	12	24
4	12	49	61
6	37	79	116
TOTAL	61	140	201

FREQUENCY MISSING = 1

STATISTICS FOR TABLE OF AGE_PS BY IMPACT2

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	2	7.806	0.020

TABLE OF RCOOK BY IMPACT3

RCOOK   IMPACT3

FREQUENCY	1	2	TOTAL
1	76	111	187
2	4	0	4
3	1	1	2
4	1	2	3
5	0	5	5
TOTAL	82	119	201

FREQUENCY MISSING = 1

STATISTICS FOR TABLE OF RCOOK BY IMPACT3

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	9.391	0.052

TABLE OF AGE BY IMPACT4

AGE   IMPACT4

FREQUENCY	1	2	TOTAL
1	22	2	24
4	39	20	59
6	70	47	117
TOTAL	131	69	200

FREQUENCY MISSING = 2

STATISTICS FOR TABLE OF AGE BY IMPACT4

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	2	8.946	0.011

TABLE OF AGE_PS BY IMPACT3

AGE_PS   IMPACT3

FREQUENCY	1	2	TOTAL
1	17	7	24
4	20	41	61
6	45	71	116
TOTAL	82	119	201

FREQUENCY MISSING = 1

STATISTICS FOR TABLE OF AGE_PS BY IMPACT3

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	2	10.778	0.005

TABLE OF NOKIDS BY IMPACT4

NOKIDS   IMPACT4

FREQUENCY	1	2	TOTAL
0	87	55	142
1	44	14	58
TOTAL	131	69	200

FREQUENCY MISSING = 2

STATISTICS FOR TABLE OF NOKIDS BY IMPACT4

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	3.882	0.049

TABLE OF SIZECOMM BY IMPACT3

SIZECOMM   IMPACT3

FREQUENCY	1	2	TOTAL
1	6	3	9
2	9	29	38
3	26	30	56
4	41	55	96
TOTAL	82	117	199

FREQUENCY MISSING = 3

STATISTICS FOR TABLE OF SIZECOMM BY IMPACT3

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	7.944	0.047

TABLE OF NOHH BY IMPACT4

NOHH   IMPACT4

FREQUENCY	1	2	TOTAL
1	15	18	33
2	59	38	97
3	44	11	55
5	13	2	15
TOTAL	131	69	200

FREQUENCY MISSING = 2

STATISTICS FOR TABLE OF NOHH BY IMPACT4

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	14.897	0.002

TABLE OF RCOOK BY IMPACT4

RCOOK FREQUENCY	IMPACT4 1	2	TOTAL
1	124	62	186
2	4	0	4
3	0	2	2
4	2	1	3
5	1	4	5
TOTAL	131	69	200

FREQUENCY MISSING = 2

STATISTICS FOR TABLE OF RCOOK BY IMPACT4

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	10.599	0.031

TABLE OF AGE_PS BY IMPACT4

AGE_PS FREQUENCY	IMPACT4 1	2	TOTAL
1	21	3	24
4	43	18	61
6	67	48	115
TOTAL	131	69	200

FREQUENCY MISSING = 2

STATISTICS FOR TABLE OF AGE_PS BY IMPACT4

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	2	8.480	0.014

TABLE OF AGE BY IMPACT7

AGE FREQUENCY	IMPACT7 1	2	TOTAL
1	4	20	24
4	30	29	59
6	63	52	115
TOTAL	97	101	198

FREQUENCY MISSING = 4

STATISTICS FOR TABLE OF AGE BY IMPACT7

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	2	11.660	0.003

TABLE OF MS BY IMPACT7

MS FREQUENCY	IMPACT7 1	2	TOTAL
1	3	0	3
2	69	85	154
3	25	16	41
TOTAL	97	101	198

FREQUENCY MISSING = 4

STATISTICS FOR TABLE OF MS BY IMPACT7

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	2	6.560	0.038

TABLE OF NOKIDS BY IMPACT7

NOKIDS FREQUENCY	IMPACT7 1	2	TOTAL
0	80	60	140
1	17	41	58
TOTAL	97	101	198

FREQUENCY MISSING = 4

STATISTICS FOR TABLE OF NOKIDS BY IMPACT7

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	12.713	0.000

TABLE OF MS BY IMPACT7

MS FREQUENCY	IMPACT7 1	2	TOTAL
1	3	0	3
2	69	85	154
3	25	16	41
TOTAL	97	101	198

FREQUENCY MISSING = 4

STATISTICS FOR TABLE OF MS BY IMPACT7

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	2	6.560	0.038

TABLE OF NOKIDS BY IMPACT11

NOKIDS	IMPACT11		
FREQUENCY	1	2	TOTAL
0	59	84	143
1	11	47	58
TOTAL	70	131	201

FREQUENCY MISSING = 1

STATISTICS FOR TABLE OF NOKIDS BY IMPACT11

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	9.035	0.003

TABLE OF AGE_PS BY IMPACT14

AGE_PS	IMPACT14		
FREQUENCY	1	2	TOTAL
1	16	8	24
4	33	28	61
6	45	69	114
TOTAL	94	105	199

FREQUENCY MISSING = 3

STATISTICS FOR TABLE OF AGE_PS BY IMPACT14

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	2	7.544	0.023

TABLE OF AGE BY IMPACT14

AGE	IMPACT14		
FREQUENCY	1	2	TOTAL
1	17	7	24
4	32	27	59
6	45	71	116
TOTAL	94	105	199

FREQUENCY MISSING = 3

STATISTICS FOR TABLE OF AGE BY IMPACT14

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	2	9.840	0.007

TABLE OF NOKIDS BY IMPACT14

NOKIDS	IMPACT14		
FREQUENCY	1	2	TOTAL
0	59	82	141
1	35	23	58
TOTAL	94	105	199

FREQUENCY MISSING = 3

STATISTICS FOR TABLE OF NOKIDS BY IMPACT14

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	5.644	0.018

TABLE OF NOHH BY IMPACT14

NOHH	IMPACT14		
FREQUENCY	1	2	TOTAL
1	15	17	32
2	37	60	97
3	32	23	55
5	10	5	15
TOTAL	94	105	199

FREQUENCY MISSING = 3

STATISTICS FOR TABLE OF NOHH BY IMPACT14

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	8.135	0.043

TABLE OF EMPLOY BY IMPACT14

EMPLOY	IMPACT14		
FREQUENCY	1	2	TOTAL
1	15	10	25
2	9	5	14
3	2	2	4
4	23	51	74
5	45	37	82
TOTAL	94	105	199

FREQUENCY MISSING = 3

STATISTICS FOR TABLE OF EMPLOY BY IMPACT14

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	12.949	0.012

```
        TABLE OF AGE_PS BY IMPACT7                    TABLE OF AGE_PS BY IMPACT11

    AGE_PS     IMPACT7                            AGE_PS     IMPACT11

    FREQUENCY|      1|      2|  TOTAL             FREQUENCY|      1|      2|  TOTAL
    ---------+-------+-------+                    ---------+-------+-------+
           1 |    5  |   19  |    24                     1 |    4  |   20  |    24
    ---------+-------+-------+                    ---------+-------+-------+
           4 |   29  |   31  |    60                     4 |   18  |   43  |    61
    ---------+-------+-------+                    ---------+-------+-------+
           6 |   63  |   51  |   114                     6 |   48  |   68  |   116
    ---------+-------+-------+                    ---------+-------+-------+
    TOTAL        97     101      198             TOTAL        70     131      201
    FREQUENCY MISSING = 4                        FREQUENCY MISSING = 1
```

```
      STATISTICS FOR TABLE OF AGE_PS BY IMPACT7      STATISTICS FOR TABLE OF AGE_PS BY IMPACT11


STATISTIC                DF    VALUE   PROB  STATISTIC                 DF    VALUE   PROB
-----------------------------------------   ---------------------------------------------
CHI-SQUARE                2    9.420   0.009 CHI-SQUARE                 2    6.442   0.040
```

```
        TABLE OF INCOME BY IMPACT9                    TABLE OF RCOOK BY IMPACT10

    INCOME     IMPACT9                           RCOOK      IMPACT10

    FREQUENCY|      1|      2|  TOTAL             FREQUENCY|      1|      2|  TOTAL
    ---------+-------+-------+                    ---------+-------+-------+
           1 |   24  |    7  |    31                     1 |   71  |  115  |   186
    ---------+-------+-------+                    ---------+-------+-------+
           2 |   15  |    8  |    23                     2 |    4  |    0  |     4
    ---------+-------+-------+                    ---------+-------+-------+
           3 |   41  |    6  |    47                     3 |    0  |    2  |     2
    ---------+-------+-------+                    ---------+-------+-------+
           4 |   38  |    4  |    42                     4 |    2  |    1  |     3
    ---------+-------+-------+                    ---------+-------+-------+
           5 |   30  |    2  |    32                     5 |    0  |    5  |     5
    ---------+-------+-------+                    ---------+-------+-------+
    TOTAL       148      27      175             TOTAL        77     123      200
    FREQUENCY MISSING = 27                       FREQUENCY MISSING = 2
```

```
      STATISTICS FOR TABLE OF INCOME BY IMPACT9      STATISTICS FOR TABLE OF RCOOK BY IMPACT10


STATISTIC                DF    VALUE   PROB  STATISTIC                 DF    VALUE   PROB
-----------------------------------------   ---------------------------------------------
CHI-SQUARE                4   11.262   0.024 CHI-SQUARE                 4   11.785   0.019
```

```
       TABLE OF SIZECOMM BY IMPACT9                    TABLE OF AGE BY IMPACT11

    SIZECOMM     IMPACT9                          AGE        IMPACT11

    FREQUENCY|      1|      2|  TOTAL             FREQUENCY|      1|      2|  TOTAL
    ---------+-------+-------+                    ---------+-------+-------+
           1 |    7  |    2  |     9                     1 |    4  |   20  |    24
    ---------+-------+-------+                    ---------+-------+-------+
           2 |   29  |    6  |    35                     4 |   17  |   42  |    59
    ---------+-------+-------+                    ---------+-------+-------+
           3 |   53  |    3  |    56                     6 |   49  |   69  |   118
    ---------+-------+-------+                    ---------+-------+-------+
           4 |   72  |   21  |    93             TOTAL        70     131      201
    ---------+-------+-------+                    FREQUENCY MISSING = 1
    TOTAL       161      32      193
    FREQUENCY MISSING = 9
```

```
     STATISTICS FOR TABLE OF SIZECOMM BY IMPACT9     STATISTICS FOR TABLE OF AGE BY IMPACT11


STATISTIC                DF    VALUE   PROB  STATISTIC                 DF    VALUE   PROB
-----------------------------------------   ---------------------------------------------
CHI-SQUARE                3    7.736   0.052 CHI-SQUARE                 2    6.760   0.034
```

TABLE OF INCOME BY IMPACT14

INCOME   IMPACT14

FREQUENCY	1	2	TOTAL
1	19	14	33
2	4	19	23
3	26	21	47
4	23	20	43
5	18	14	32
TOTAL	90	88	178

FREQUENCY MISSING = 24

STATISTICS FOR TABLE OF INCOME BY IMPACT14

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	11.760	0.019

TABLE OF EDUC BY IMPACT15

EDUC   IMPACT15

FREQUENCY	1	2	TOTAL
1	16	9	25
2	38	31	69
3	21	34	55
4	19	30	49
TOTAL	94	104	198

FREQUENCY MISSING = 4

STATISTICS FOR TABLE OF EDUC BY IMPACT15

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	7.727	0.052

TABLE OF SIZECOMM BY IMPACT15

SIZECOMM   IMPACT15

FREQUENCY	1	2	TOTAL
1	6	3	9
2	9	28	37
3	30	26	56
4	49	45	94
TOTAL	94	102	196

FREQUENCY MISSING = 6

STATISTICS FOR TABLE OF SIZECOMM BY IMPACT15

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	10.904	0.012

TABLE OF AGE_PS BY PROMO3

AGE_PS   PROMO3

FREQUENCY	1	2	3	4	TOTAL
1	7	10	2	5	24
4	16	22	12	8	58
6	15	27	28	37	107
TOTAL	38	59	42	50	189

FREQUENCY MISSING = 13

STATISTICS FOR TABLE OF AGE_PS BY PROMO3

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	6	16.836	0.010

TABLE OF EMPLOY BY PROMO3

EMPLOY   PROMO3

FREQUENCY	1	2	3	4	TOTAl
1	5	12	4	5	26
2	2	5	5	2	14
3	0	1	0	3	4
4	8	12	19	28	67
5	23	29	14	12	78
TOTAL	38	59	42	50	189

FREQUENCY MISSING = 13

STATISTICS FOR TABLE OF EMPLOY BY PROMO3

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	12	32.162	0.001

TABLE OF RFOODPUR BY PB1

RFOODPUR   PB1

FREQUENCY	2	3	TOTAL
1	161	0	161
2	5	1	6
3	2	0	2
4	2	0	2
5	18	1	19
TOTAL	188	2	190

FREQUENCY MISSING = 12

STATISTICS FOR TABLE OF RFOODPUR BY PB1

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	19.034	0.001

TABLE OF RACE BY PB2

RACE   PB2

FREQUENCY	2	3	TOTAL
1	4	0	4
2	2	1	3
3	8	0	8
4	171	1	172
5	2	0	2
TOTAL	187	2	189

FREQUENCY MISSING = 13

STATISTICS FOR TABLE OF RACE BY PB2

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	30.371	0.000

TABLE OF RCOOK BY PB1

RCOOK   PB1

FREQUENCY	2	3	TOTAL
1	177	0	177
2	2	2	4
3	2	0	2
4	3	0	3
5	5	0	5
TOTAL	189	2	191

FREQUENCY MISSING = 11

STATISTICS FOR TABLE OF RCOOK BY PB1

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	94.489	0.000

TABLE OF RCOOK BY PB3

RCOOK   PB3

FREQUENCY	2	3	TOTAL
1	173	2	175
2	2	2	4
3	2	0	2
4	3	0	3
5	5	0	5
TOTAL	185	4	189

FREQUENCY MISSING = 13

STATISTICS FOR TABLE OF RCOOK BY PB3

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	45.288	0.000

TABLE OF RCOOK BY PB2

RCOOK   PB2

FREQUENCY	2	3	TOTAL
1	174	1	175
2	3	1	4
3	2	0	2
4	3	0	3
5	5	0	5
TOTAL	187	2	189

FREQUENCY MISSING = 13

STATISTICS FOR TABLE OF RCOOK BY PB2

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	22.402	0.000

TABLE OF RACE BY PB4

RACE   PB4

FREQUENCY	2	3	TOTAL
1	4	0	4
2	2	1	3
3	8	0	8
4	166	5	171
5	2	0	2
TOTAL	182	6	188

FREQUENCY MISSING = 14

STATISTICS FOR TABLE OF RACE BY PB4

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	9.323	0.054

TABLE OF AGE BY PB10

AGE   PB10

FREQUENCY	2	3	TOTAL
1	13	10	23
4	42	13	55
6	90	17	107
TOTAL	145	40	185

FREQUENCY MISSING = 17

STATISTICS FOR TABLE OF AGE BY PB10

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	2	8.691	0.013

TABLE OF NOHH BY PB9

NOHH   PB9

FREQUENCY	2	3	TOTAL
1	21	8	29
2	62	24	86
3	43	12	55
5	5	8	13
TOTAL	131	52	183

FREQUENCY MISSING = 19

STATISTICS FOR TABLE OF NOHH BY PB9

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	8.209	0.042

TABLE OF SIZECOMM BY PB5

SIZECOMM   PB5

FREQUENCY	2	3	TOTAL
1	6	2	8
2	34	2	36
3	45	4	49
4	89	2	91
TOTAL	174	10	184

FREQUENCY MISSING = 18

STATISTICS FOR TABLE OF SIZECOMM BY PB5

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	8.525	0.036

TABLE OF AGE_PS BY PB10

AGE_PS   PB10

FREQUENCY	2	3	TOTAL
1	13	10	23
4	44	13	57
6	88	17	105
TOTAL	145	40	185

FREQUENCY MISSING = 17

STATISTICS FOR TABLE OF AGE_PS BY PB10

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	2	8.358	0.015

TABLE OF SIZECOMM BY WHERE2

SIZECOMM   WHERE2

FREQUENCY	1	2	3	4	TOTAL
1	0	0	3	6	9
2	5	1	11	21	38
3	2	9	5	40	56
4	7	19	10	59	95
TOTAL	14	29	29	126	198

FREQUENCY MISSING = 4

STATISTICS FOR TABLE OF SIZECOMM BY WHERE2

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	9	21.414	0.011

TABLE OF RCOOK BY WHERE4

RCOOK   WHERE4

FREQUENCY	1	2	3	4	TOTAL
1	8	43	20	117	188
2	0	0	0	4	4
3	0	2	0	0	2
4	1	2	0	0	3
5	0	1	4	0	5
TOTAL	9	48	24	121	202

STATISTICS FOR TABLE OF RCOOK BY WHERE4

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	12	42.457	0.000

TABLE OF RFOODPUR BY WHERE4

RFOODPUR   WHERE4

FREQUENCY	1	2	3	4	TOTAL
1	8	40	18	104	170
2	0	0	0	6	6
3	0	2	0	0	2
4	1	1	0	0	2
5	0	5	6	10	21
TOTAL	9	48	24	120	201

FREQUENCY MISSING = 1

STATISTICS FOR TABLE OF RFOODPUR BY WHERE4

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	12	28.355	0.005

TABLE OF EDUC BY WHERE6

EDUC   WHERE6

FREQUENCY	0	1	2	3	4	TOTAL
1	1	1	0	1	23	26
2	0	1	1	6	62	70
3	0	8	5	3	40	56
4	0	4	1	1	43	49
TOTAL	1	14	7	11	168	201

FREQUENCY MISSING = 1

STATISTICS FOR TABLE OF EDUC BY WHERE6

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	12	25.183	0.014

TABLE OF MS BY WHERE4

MS   WHERE4

FREQUENCY	1	2	3	4	TOTAL
1	0	1	0	2	3
2	3	42	20	91	156
3	6	5	4	28	43
TOTAL	9	48	24	121	202

STATISTICS FOR TABLE OF MS BY WHERE4

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	6	15.517	0.017

TABLE OF SIZECOMM BY WHERE4

SIZECOMM   WHERE4

FREQUENCY	1	2	3	4	TOTAL
1	1	1	0	7	9
2	4	15	2	17	38
3	0	12	11	33	56
4	4	18	11	64	97
TOTAL	9	46	24	121	200

FREQUENCY MISSING = 2

STATISTICS FOR TABLE OF SIZECOMM BY WHERE4

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	9	20.208	0.017

TABLE OF EMPLOY BY WHERE8

EMPLOY   WHERE8

FREQUENCY	0	1	2	3	4	TOTAL
1	0	2	0	3	21	26
2	0	0	0	0	14	14
3	0	0	0	1	3	4
4	1	0	1	6	66	74
5	0	1	11	5	64	81
TOTAL	1	3	12	15	168	199

FREQUENCY MISSING = 3

STATISTICS FOR TABLE OF EMPLOY BY WHERE8

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	16	27.133	0.040

TABLE OF AGE_PS BY WHERE7

AGE_PS   WHERE7

FREQUENCY	1	2	3	4	TOTAL
1	4	8	0	12	24
4	11	6	2	42	61
6	24	8	1	82	115
TOTAL	39	22	3	136	200

FREQUENCY MISSING = 2

STATISTICS FOR TABLE OF AGE_PS BY WHERE7

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	6	16.230	0.013

TABLE OF AGE BY WHERE7

AGE   WHERE7

FREQUENCY	1	2	3	4	TOTAL
1	4	8	0	12	24
4	10	6	2	41	59
6	25	8	1	83	117
TOTAL	39	22	3	136	200

FREQUENCY MISSING = 2

STATISTICS FOR TABLE OF AGE BY WHERE7

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	6	16.668	0.011

TABLE OF NOHH BY CONB1

NOHH   CONB1

FREQUENCY	1	2	3	4	TOTAL
1	5	3	10	16	34
2	4	15	35	38	92
3	1	4	14	36	55
5	0	1	1	13	15
TOTAL	10	23	60	103	196

FREQUENCY MISSING = 6

STATISTICS FOR TABLE OF NOHH BY CONB1

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	9	23.758	0.005

TABLE OF RCOOK BY CONB5

RCOOK   CONB5

FREQUENCY	1	2	3	4	TOTAL
1	102	42	25	14	183
2	1	3	0	0	4
3	1	1	0	0	2
4	0	2	0	0	2
5	2	0	3	0	5
TOTAL	106	48	28	14	196

FREQUENCY MISSING = 6

STATISTICS FOR TABLE OF RCOOK BY CONB5

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	12	22.248	0.035

TABLE OF INCOME BY CONB2

INCOME   CONB2

FREQUENCY	1	2	3	4	TOTAL
1	12	11	8	0	31
2	12	9	2	0	23
3	18	16	8	4	46
4	15	26	2	0	43
5	15	10	5	1	31
TOTAL	72	72	25	5	174

FREQUENCY MISSING = 28

STATISTICS FOR TABLE OF INCOME BY CONB2

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	12	21.495	0.044

TABLE OF NOKIDS BY CONB6

NOKIDS   CONB6

FREQUENCY	1	2	3	4	TOTAL
0	46	48	21	23	138
1	13	31	13	1	58
TOTAL	59	79	34	24	196

FREQUENCY MISSING = 6

STATISTICS FOR TABLE OF NOKIDS BY CONB6

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	13.813	0.003

TABLE OF NOHH BY CONB6

NOHH   CONB6

FREQUENCY	1	2	3	4	TOTAL
1	20	8	3	3	34
2	22	39	16	15	92
3	12	24	13	6	55
5	5	8	2	0	15
TOTAL	59	79	34	24	196

FREQUENCY MISSING = 6

STATISTICS FOR TABLE OF NOHH BY CONB6

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	9	21.348	0.011

TABLE OF EDUC BY CONB4

EDUC   CONB4

FREQUENCY	1	2	3	4	TOTAL
1	22	0	4	0	26
2	56	8	2	1	67
3	37	10	6	1	54
4	44	4	0	1	49
TOTAL	159	22	12	3	196

FREQUENCY MISSING = 6

STATISTICS FOR TABLE OF EDUC BY CONB4

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	9	17.952	0.036

TABLE OF AGE_PS BY CONB6

AGE_PS   CONB6

FREQUENCY	1	2	3	4	TOTAL
1	8	10	5	1	24
4	11	32	11	4	58
6	40	37	18	19	114
TOTAL	59	79	34	24	196

FREQUENCY MISSING = 6

STATISTICS FOR TABLE OF AGE_PS BY CONB6

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	6	13.218	0.040

TABLE OF NOKIDS BY CONB7

NOKIDS   CONB7

FREQUENCY	1	2	3	4	TOTAL
0	97	24	15	1	137
1	34	18	3	2	57
TOTAL	131	42	18	3	194

FREQUENCY MISSING = 8

STATISTICS FOR TABLE OF NOKIDS BY CONB7

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	7.830	0.050

TABLE OF NOKIDS BY CONB11

NOKIDS   CONB11

FREQUENCY	1	2	3	4	TOTAL
0	118	8	9	3	138
1	49	9	0	0	58
TOTAL	167	17	9	3	196

FREQUENCY MISSING = 6

STATISTICS FOR TABLE OF NOKIDS BY CONB11

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	9.497	0.023

TABLE OF NOKIDS BY CONB13

NOKIDS   CONB13

FREQUENCY	1	2	3	4	TOTAL
0	128	1	1	3	133
1	50	6	0	0	56
TOTAL	178	7	1	3	189

FREQUENCY MISSING = 13

STATISTICS FOR TABLE OF NOKIDS BY CONB13

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	12.447	0.006

TABLE OF RFOODPUR BY CONB8

RFOODPUR   CONB8

FREQUENCY	1	2	3	4	TOTAL
1	147	17	1	0	165
2	5	1	0	0	6
3	2	0	0	0	2
4	1	0	0	0	1
5	16	1	3	1	21
TOTAL	171	19	4	1	195

FREQUENCY MISSING = 7

STATISTICS FOR TABLE OF RFOODPUR BY CONB8

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	12	27.068	0.008

TABLE OF AGE_PS BY CONNB5

AGE_PS	CONNB5				
FREQUENCY	1	2	3	4	TOTAL
1	2	10	11	1	24
4	3	11	26	19	59
6	13	22	38	41	114
TOTAL	18	43	75	61	197

FREQUENCY MISSING = 5

STATISTICS FOR TABLE OF AGE_PS BY CONNB5

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	6	14.779	0.022

TABLE OF MS BY CONNB6

MS	CONNB6				
FREQUENCY	1	2	3	4	TOTAL
1	0	1	0	2	3
2	88	32	16	15	151
3	20	10	3	8	41
TOTAL	108	43	19	25	195

FREQUENCY MISSING = 7

STATISTICS FOR TABLE OF MS BY CONNB6

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	6	12.389	0.054

TABLE OF AGE_PS BY CONNB5

AGE_PS	CONNB5				
FREQUENCY	1	2	3	4	TOTAL
1	2	10	11	1	24
4	3	11	26	19	59
6	13	22	38	41	114
TOTAL	18	43	75	61	197

FREQUENCY MISSING = 5

STATISTICS FOR TABLE OF AGE_PS BY CONNB5

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	6	14.779	0.022

TABLE OF NOKIDS BY CONNB7

NOKIDS	CONNB7				
FREQUENCY	1	2	3	4	TOTAL
0	59	29	30	20	138
1	15	16	8	19	58
TOTAL	74	45	38	39	196

FREQUENCY MISSING = 6

STATISTICS FOR TABLE OF NOKIDS BY CONNB7

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	12.032	0.007

TABLE OF RCOOK BY CONNB6

RCOOK	CONNB6				
FREQUENCY	1	2	3	4	TOTAL
1	102	39	18	23	182
2	3	0	1	0	4
3	0	0	0	2	2
4	1	1	0	0	2
5	2	3	0	0	5
TOTAL	108	43	19	25	195

FREQUENCY MISSING = 7

STATISTICS FOR TABLE OF RCOOK BY CONNB6

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	12	22.061	0.037

TABLE OF NOHH BY CONNB7

NOHH	CONNB7				
FREQUENCY	1	2	3	4	TOTAL
1	20	3	9	2	34
2	35	21	21	14	91
3	18	17	7	14	56
5	1	4	1	9	15
TOTAL	74	45	38	39	196

FREQUENCY MISSING = 6

STATISTICS FOR TABLE OF NOHH BY CONNB7

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	9	33.986	0.000

TABLE OF NOHH BY CONNB8

NOHH   CONNB8

FREQUENCY	1	2	3	4	TOTAL
1	24	5	3	2	34
2	54	25	9	3	91
3	22	23	9	2	56
5	3	6	3	3	15
TOTAL	103	59	24	10	196

FREQUENCY MISSING = 6

STATISTICS FOR TABLE OF NOHH BY CONNB8

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	9	22.964	0.006

TABLE OF NOHH BY CONNB11

NOHH   CONNB11

FREQUENCY	1	2	3	4	TOTAL
1	31	1	0	2	34
2	71	11	8	2	92
3	37	15	3	1	56
5	13	2	0	0	15
TOTAL	152	29	11	5	197

FREQUENCY MISSING = 5

STATISTICS FOR TABLE OF NOHH BY CONNB11

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	9	17.562	0.041

TABLE OF AGE BY CONNB8

AGE   CONNB8

FREQUENCY	1	2	3	4	TOTAL
1	7	9	6	2	24
4	28	23	3	3	57
6	68	27	15	5	115
TOTAL	103	59	24	10	196

FREQUENCY MISSING = 6

STATISTICS FOR TABLE OF AGE BY CONNB8

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	6	13.814	0.032

TABLE OF NOHH BY CONNB8

NOHH   CONNB8

FREQUENCY	1	2	3	4	TOTAL
1	24	5	3	2	34
2	54	25	9	3	91
3	22	23	9	2	56
5	3	6	3	3	15
TOTAL	103	59	24	10	196

FREQUENCY MISSING = 6

STATISTICS FOR TABLE OF NOHH BY CONNB8

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	9	22.964	0.006

TABLE OF NOHH BY COOK1

NOHH   COOK1

FREQUENCY	0	1	TOTAL
1	18	16	34
2	23	69	92
3	16	40	56
5	9	6	15
TOTAL	66	131	197

FREQUENCY MISSING = 5

STATISTICS FOR TABLE OF NOHH BY COOK1

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	14.091	0.003

TABLE OF EDUC BY COOK3

EDUC   COOK3

FREQUENCY	0	1	TOTAL
1	22	4	26
2	31	37	68
3	24	30	54
4	25	24	49
TOTAL	102	95	197

FREQUENCY MISSING = 5

STATISTICS FOR TABLE OF EDUC BY COOK3

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	13.446	0.004

TABLE OF NOHH BY COOK4

NOHH   COOK4

FREQUENCY	0	1	TOTAL
1	12	22	34
2	34	58	92
3	10	46	56
5	0	15	15
TOTAL	56	141	197

FREQUENCY MISSING = 5

STATISTICS FOR TABLE OF NOHH BY COOK4

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	13.111	0.004

TABLE OF NOKIDS BY COOK4

NOKIDS   COOK4

FREQUENCY	0	1	TOTAL
0	46	93	139
1	10	48	58
TOTAL	56	141	197

FREQUENCY MISSING = 5

STATISTICS FOR TABLE OF NOKIDS BY COOK4

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	5.054	0.025

TABLE OF AGE BY COOK5

AGE   COOK5

FREQUENCY	0	1	TOTAL
1	19	5	24
4	43	14	57
6	109	7	116
TOTAL	171	26	197

FREQUENCY MISSING = 5

STATISTICS FOR TABLE OF AGE BY COOK5

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	2	12.842	0.002

TABLE OF NOHH BY COOK5

NOHH   COOK5

FREQUENCY	0	1	TOTAL
1	33	1	34
2	83	9	92
3	42	14	56
5	13	2	15
TOTAL	171	26	197

FREQUENCY MISSING = 5

STATISTICS FOR TABLE OF NOHH BY COOK5

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	10.868	0.012

TABLE OF INCOME BY COOK5

INCOME   COOK5

FREQUENCY	0	1	TOTAL
1	30	1	31
2	21	3	24
3	42	4	46
4	31	12	43
5	28	3	31
TOTAL	152	23	175

FREQUENCY MISSING = 27

STATISTICS FOR TABLE OF INCOME BY COOK5

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	12.013	0.017

TABLE OF EDUC BY COOK6

EDUC   COOK6

FREQUENCY	0	1	TOTAL
1	18	8	26
2	45	23	68
3	32	22	54
4	21	28	49
TOTAL	116	81	197

FREQUENCY MISSING = 5

STATISTICS FOR TABLE OF EDUC BY COOK6

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	7.845	0.049

TABLE OF NOHH BY COOK6

NOHH   COOK6

FREQUENCY	0	1	TOTAL
1	26	8	34
2	57	35	92
3	25	31	56
5	8	7	15
TOTAL	116	81	197

FREQUENCY MISSING = 5

STATISTICS FOR TABLE OF NOHH BY COOK6

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	9.584	0.022

TABLE OF EMPLOY BY COOK6

EMPLOY   COOK6

FREQUENCY	0	1	TOTAL
1	15	10	25
2	3	11	14
3	1	3	4
4	48	24	72
5	49	33	82
TOTAL	116	81	197

FREQUENCY MISSING = 5

STATISTICS FOR TABLE OF EMPLOY BY COOK6

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	11.849	0.019

TABLE OF INCOME BY COOK6

INCOME   COOK6

FREQUENCY	0	1	TOTAL
1	25	6	31
2	15	9	24
3	29	17	46
4	18	25	43
5	15	16	31
TOTAL	102	73	175

FREQUENCY MISSING = 27

STATISTICS FOR TABLE OF INCOME BY COOK6

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	12.999	0.011

TABLE OF RCOOK BY COOK8

RCOOK   COOK8

FREQUENCY	0	1	TOTAL
1	129	55	184
2	1	3	4
3	2	0	2
4	2	0	2
5	1	4	5
TOTAL	135	62	197

FREQUENCY MISSING = 5

STATISTICS FOR TABLE OF RCOOK BY COOK8

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	4	11.024	0.026

```
            TABLE OF NOHH BY COOK9

NOHH      COOK9

FREQUENCY|      O|       1|  TOTAL
---------+--------+--------+
        1 |    32 |    2 |     34
---------+--------+--------+
        2 |    85 |    7 |     92
---------+--------+--------+
        3 |    41 |   15 |     56
---------+--------+--------+
        5 |    12 |    3 |     15
---------+--------+--------+
TOTAL        170      27      197
FREQUENCY MISSING = 5
```

STATISTICS FOR TABLE OF NOHH BY COOK9

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	13.254	0.004

```
            TABLE OF EDUC BY COOKBH3

EDUC      COOKBH3

FREQUENCY|      O|       1|  TOTAL
---------+--------+--------+
        1 |    20 |    6 |     26
---------+--------+--------+
        2 |    65 |    3 |     68
---------+--------+--------+
        3 |    54 |    O |     54
---------+--------+--------+
        4 |    47 |    2 |     49
---------+--------+--------+
TOTAL        186      11      197
FREQUENCY MISSING = 5
```

STATISTICS FOR TABLE OF EDUC BY COOKBH3

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	3	18.672	0.000

```
            TABLE OF AGE BY COOK9

AGE       COOK9

FREQUENCY|      O|       1|  TOTAL
---------+--------+--------+
        1 |    16 |    8 |     24
---------+--------+--------+
        4 |    47 |   10 |     57
---------+--------+--------+
        6 |   107 |    9 |    116
---------+--------+--------+
TOTAL        170      27      197
FREQUENCY MISSING = 5
```

STATISTICS FOR TABLE OF AGE BY COOK9

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	2	11.996	0.002

```
            TABLE OF NOKIDS BY COOK9

NOKIDS    COOK9

FREQUENCY|      O|       1|  TOTAL
---------+--------+--------+
        O |   128 |   11 |    139
---------+--------+--------+
        1 |    42 |   16 |     58
---------+--------+--------+
TOTAL        170      27      197
FREQUENCY MISSING = 5
```

STATISTICS FOR TABLE OF NOKIDS BY COOK9

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	13.391	0.000

VITA

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Master of Science

Thesis: THE DIET-HEALTH ISSUES OF BEEF CONSUMPTION AND THEIR REFLECTION
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