

ASSESSMENT OF FACTORS THAT INFLUENCE  
USE OF BEEF ON MENU IN HOSPITAL  
FOODSERVICE ENVIRONMENT

BY

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## CHAPTER I

### INTRODUCTION

Historically, the meat industry and health groups have held two quite different positions regarding the relationship between health and the consumption of red meat. The meat industry has maintained that meat consumption is safe and healthful, while health oriented groups have expressed a concern that meat consumption is a major contributor to fat in the diet and should be limited or even avoided (1). The opposing views have left the consumers frustrated and confused, therefore, have created a need for a consistent message about the role of lean meat in a healthful diet.

Beef, along with other red meats including pork, lamb, mutton, and veal has long been an important source of protein in the American diet (2). In 1987, Americans consumed 8.1 ounces of meats per capita a day, which included poultry and fish (3).

Because of its nutritious and lean-tissue composition, beef had maintained an increasing trend in national meat consumption from World War II to 1977. Table I (4) shows that the beef consumption per capita in the United States had a constant increase since 1950 and peaked in 1976.

TABLE I  
PER CAPITA CONSUMPTION OF BEEF  
RETAIL BASIS, 1950-1987 (pounds)

Year	Per Capita	Year	Per Capita
1950	63.4	1969	110.8
1951	56.1	1970	113.7
1952	62.2	1971	113.0
1953	77.6	1972	115.1
1954	80.1	1973	108.6
1955	82.0	1974	115.7
1956	85.4	1975	108.8
1957	84.6	1976	127.5
1958	80.6	1977	124.0
1959	81.4	1978	117.9
1960	85.1	1979	105.5
1961	87.8	1980	103.4
1962	88.9	1981	104.2
1963	94.5	1982	104.3
1964	99.9	1983	106.2
1965	99.5	1984	106.0
1966	104.2	1985	106.9
1967	106.5	1986	106.5
1968	109.7	1987	107.3

Source: United States Department of Agriculture, Economic Research Service, Agricultural Outlook, March, 1988.

From 1960 to 1987, the total meat consumption per capita in the United States increased by 9 percent, while the beef consumption per person level in 1987 was about 26.4 percent above the level in 1960 (5).

According to a survey conducted annually by the Annual Agricultural Outlook Conference, beef had been promising on the supply side due to lower production costs since

1980, while the demand side was not optimistic. Evidence showed that per capita beef consumption in the United States had maintained a 1.9 percent average decrease each year since then (6).

There are many influencing factors which are collectively responsible for the decrease in beef consumption. These factors included the economic situation, price, characteristics of individual consumers, purchasing specifications, convenience and availability of the products, supply of substitutes and nutrition and health awareness. Because of the perceived changes in the concept of diet and health, more customers have decided to controlled caloric intake and avoid cholesterol. They expected to exclude as much fat as possible, thus they purchased less meat or chose less red meat when they shopped for food (8).

The focus of this study is to identify the factors that influence the use of beef in the hospital foodservice environment. The research will obtain information concerning foodservice in hospitals, the criteria for inclusion of beef entrees on hospital foodservice menus and overall beef consumption.

#### Statement of the Problem

This study was designed to determine the factors that influence beef consumption in the hospital

foodservice institutions in selected Midwestern states including Kansas, Nebraska, Missouri, Oklahoma, and Texas.

### Objectives of the Study

The primary objective of this study was to determine the influencing factors on beef consumption in the hospital foodservice environment in the United States.

Specific objectives include:

1) obtain information on food service in hospital and other issues related to the consumption of beef in hospitals;

2) determine the factors that influence inclusion of beef entrees in cyclical menus, selective or other menu systems in hospital foodservice institutions;

3) determine the factors that influence beef purchasing specifications;

4) determine the factors influencing the overall beef consumption in the hospital foodservice environment.

### Hypotheses

The following hypotheses were formulated for this study:

H 1: There will be no significant association between beef purchasing specifications in hospital foodservice with selected personnel demographic variables including age, sex education level, and major of study of the respondents.

H 2: There will be no significant association between inclusion of beef items in the hospital foodservice menus and selected demographic variables as in H 1.

H 3: There will be no significant association between inclusion of beef items in hospital foodservice menus and selected hospital foodservice department variables including type of foodservice system, size (number of meals served per day), menu style, length of cyclical menu, menu planning and evaluation, and purchasing personnel.

H 4: There will be no significant association between beef purchasing specifications and selected foodservice department variables as in H 3.

H 5: There will be no significant association between overall beef consumption and selected hospital foodservice department variables including as in H 3.

H 6: There will be no significant association between overall beef consumption and selected institutional characteristic variables including location, size (number of beds), annual admission, specialty, and type of institution.

H 7: There will be no significant association between purchasing specification and selected institutional characteristic variables as in H 6.

#### Limitations of the Study

The following delimitations and limitations are recognized for this study:

This study is limited to the foodservice institutions in the hospitals in selected Midwestern states which are listed in American Hospital Association (AHA) Guide to the Health Care Field 1986 Edition (9).

It is not the researcher's intent to identify the relationship between the foodservice facilities and the locations, sizes (in term of number of beds), and admissions of the hospitals.

The researcher does not intend to identify the nutrition knowledge level of the participating administrative dietitians.

Another limitation is the inability of the researcher to control the participants' responses to the questionnaire. The information is accurate only to the extent that respondents have knowledge about the subject. The questionnaires are sent to the administrative dietitians or any other preservice/dietary personnel who was responsible for menu planning.

#### Definitions of Terms

Administrative Dietitians - Dietetic professionals who translate nutrient description in diet therapy into menu items for the purpose of bring patients to a nutritional balance (10).

Consumption Patterns - The characteristics of using of goods in the satisfying of customers' needs (11).

Clinical Dietitians - Dietetic professionals



who assess patients' nutrition status, and treat them with diet therapy (10).

Competance - Knowledge, skills, attitude, understanding, and judgement that someone possesses when doing something (12).

Cyclical Menu - is one which repeats the sequence of food offerings on a regular basis (13).

Fabricated Cut - To make, shape or prepare according to standardized specifications so as to be interchangeable (13).

Microwave Prepared Cut - Specific meat cut prepared for microwave cooking.(13)

Popularity - The character or condition of a certain product being popular, especially of possessing the confidence or favor of the people (11).

## CHAPTER II

### REVIEW OF LITERATURE

#### Introduction

The objective of this study is to identify the factors that influence the use of beef in hospital foodservice environment. The research will obtain information concerning foodservice in hospital, the inclusion of beef entrees into hospital foodservice menus, and beef purchasing specification. This chapter dedicates to the review of literature.

The review of literature, deals with prominent perspectives that are closely related to this study. The first section covers the information on beef production and consumption in the United States. The succeeding section concentrates on food service management in hospital. The last section details the dietetic services in hospitals in which definition, background information, and the responsibilities of both clinical and administrative dietitian are discussed.

## Beef Production and Consumption

Literature available on beef consumption in hospital foodservice institutions was surprisingly some what limited. The researcher of this study conducted literature review on related factors that were of benefit in developing a workable format for this project.

### Beef Production

The production of beef and related industries had been the most important agricultural enterprises in the United States. One third of the agriculture populations were working in the areas related to beef production. Beef production had impact even upon American culture. Words such as cowboy, maverick, ranch, roping, broncobuster, and the like were used by those people who might never had seen a live beef cow (14). A man who raised cattle as a profession believed that he had earned the right to be known as a rancher or cattleman, and it would be ill-advised to call him a farmer.

According to the annual survey performed by United States Department of Agriculture, sales of cattle and calves in 1987 in the United States accounted for 55.2 percent of all farm cash market and totaled \$ 76.2 billions (5). Activities of marketing agencies, distributors, other processors, and retailers would

substantially improve the total income generated by the beef industry.

In the history of livestock production in the United States, beef production had varied cyclically around a long-run upward trend. To a great extent, this production provided the controlling force over the ability of marketing to effectively satisfy consumer desire (15).

In addition to the regular cyclical movements with natural causes, there also had been irregular fluctuations caused by factors like rising transportation costs, government policy changes, and alternatives in consumer preferences. Yankelovich, Skelly and White (16), indicated in their study that transportation cost for livestock production doubled in the past 10 years even the whole production cost decreased.

They found that the relationship between total domestic beef production, and net imports was one of the factors that could affect beef production. Though the import of beef consisted largely of low grades and was mainly used for processed meat industry, it did slightly affect the beef production and the balanced relationship between beef production and consumption in the United States (16).

A study conducted by the National Cattlemen Association (17) on modern beef production in the United States revealed another factor that once sharply influenced beef production in early 1970s. The beef production and

consumption in the United States dropped dramatically to the lowest level in recent 30 years. This alternative was because of the price control policy applied by the United States government in late 1972. Both beef production and consumption resumed in the next year after the elimination of the policy.

A latest survey conducted by the USDA (18), indicated that beef production had been declining since 1977 and this trend could remain until 1991. The survey pointed out that comparing to the same period in 1988, from January to April of 1989, all cattle and cow supply dropped 4 to 5 percent. According to the survey, relatively low price, large supply of other kinds of meat, especially poultry, and the changes in consumers' eating trend were among the primary reasons that caused the decline.

#### Beef Consumption and Its Affecting Factors

The population of the United States had generally been considered to be among the best fed in the world, a characteristic attributed to the high consumption of animal products. Even after saturated fats were concluded to be the cause of a greatly increased incidence of coronary heart disease, and other health related concerns, the total animal product consumption in the United States was still increasing in the recent 10 years (19).

It had become increasingly evident that in recent years (1975-1987), meat especially beef consumption patterns were changing rapidly. For years, Americans had enjoyed the flavor and nutrition of beef without often questioning its value as a dietary staple. Because it was a part of the meat group, dietitians, nutritionists, and other health care professionals had long recommended eating two three-ounce servings of beef or other foods from the meat group daily (14). Meat consumers, however, today began to worry about the fat and cholesterol increase that beef could bring to them. Many people began to decrease their beef consumption. A USDA survey conducted recently showed that beef consumption had declined in the United States since 1977. In 1987, Americans consumed the least amount of beef (69.2 pounds per capita) in the past 20 years (6).

Numerous factors had combined and contributed to these changing beef consumption patterns. Important ones among them were income, customers' taste and preferences, and supply of substitutions.

#### Income

Economic factors were strongly emphasized as influencing elements to food consumption patterns in Clark's study (20). He pointed out that income of consumers and the price of the food together would determine the amount and quality of the food consumed.

Duesenberry (21) indicated in his book that consumer income reflected major changes in the level of economic activity over time. It could also be used as a measure of the rate of economic growth, and a factor which had significant bearing on the level of food demand shifter and an important demand analysis.

As income increased, there was evidence that consumers tended to substitute higher quality foods for lower quality foods. A USDA (22) survey conducted to show the influence of income elasticity on demand for food based on the data from the Food and Agriculture Organization proved Duesenberry's statement. The survey found that an increase of one percent in real income was seen to result in an increase of 0.9 percent in consumption of animal protein and a decrease of 0.2 percent in cereal products.

Pearson (23), however, indicated that income elasticity existed in consumers' food consumption pattern. The low income consumers' consumption of high quality food was much more sensitive to income changes than high-income consumers. An example was that a \$25-a-week raise might not change the beef consumption patterns of a person earning \$1,000 a week, but it could greatly increase the beef consumption of someone earning \$100 a week.

### Taste and preference

The fate of any product depends on its acceptance by the consuming public. Amerine, Pangborn, and Roessler (24), defined the customer acceptance as "an expression or feature of experience characterized by a positive attitude". Peter and Olson (25) referred to acceptance as "person's affective reaction to or overall evaluation of an object or concept."

Consumer tastes and preference are difficult to predict and prove. With their food dollars, consumers evaluate and vote for food products which will be successful and thrive in the marketplace. According to Redman (26), when consumers evaluate a product, they could have attitudes toward various aspects of the products such as brands, models, quality, packaging, marketing strategy, and environment of the product like store, people, location and so on. When they purchased the products, they used their knowledge about the products and its environment to assist their decision making process. Many factors from biochemical, physiological, psychological, social and economic, aspects could have effects on customers' knowledge about the products and their decision making process.

Biochemical and physiological factors identified by Eppright and Kramer included: difference between appetite and hunger; metabolic needs in nutrient selection; taste



sensation, and fatigability. Eppright (27) stated that it is very important for food manufacturers and service personnel to follow the changes in consumers' taste buds which determine their attitude and purchasing habit toward a certain kind of food.

Psychologically, memories and emotion were found to be the most affecting factors in customer preference in Kramer's study. Tasting experience and influence from other people might lead to rejection of food, while excessive eating was frequently associated with disturbed mental states like sorrow, nervousness, anxiety, excitement frustration, and lack of emotional satisfaction (28).

According to a report given by the USDA (29), when being asked about their reasons for cutting beef consumption, beef consumers were concerned about their weight and about the effects of cholesterol on their health. Such concern might shift expenditures to other food products. Even though it was difficult to measure consumers' taste and preference accurately, the USDA reporter assumed that these changes in tastes and preferences would have accounted for a decline in beef consumption of more than 30 percent between 1977 and 1985.

### Substitutions:

Pearson (23), indicated that beef production and consumption were being heavily affected by relatively low price and large supplies of poultry and, other meats. The red meat, poultry and fish consumption from 1966-1987 are illustrated in Table II (30). Total red meat, poultry, and fish increased by 10 percent from 165.6 per capita to 184.0 within the past 20 years. But all red meat, including consumption of beef, veal, pork, and lamb had fallen by 2 to 40 percent within the same period. On the contrary, turkey, fish, and especially chicken, whose consumption was almost doubled, showed an upward trend. These meats accounted for the 10 percent increase in the total meat consumption.

### Nutritional Aspects and Beef Consumption

Consumer demand for healthy foods have been felt in all segments of the foodservice business and many experts expect it to keep growing. In fact, the whole health and fitness movement is more than a trend; rather, it is part of a fundamental lifestyle change (31).

Consumer attitude and life styles have favored foods that are "lighter", "lower in calories" and "good for you" (32). Beef, according to many consumers, does not fit such dietary requirements. People have begun to worry about what they are eating and try to avoid too

TABLE II  
 PER CAPITA CONSUMPTION OF RED MEAT,  
 POULTRY & FISH (BONELESS)  
 EQUIVALENT, 1966-87

Year	Beef	Veal	Pork	Lamb	Chicken	Turkey	Fish	Total Red Meat, Poultry and fish
1966	73.7	3.2	44.3	2.3	24.6	6.3	10.9	165.6
1967	75.3	2.8	48.4	2.5	25.2	6.8	10.6	171.7
1968	77.3	2.6	49.4	2.4	25.4	6.4	11.0	174.5
1969	77.8	2.3	47.9	2.3	26.5	6.6	11.2	174.5
1970	79.6	2.0	48.6	2.1	27.8	6.4	11.8	178.4
1971	79.0	1.9	52.6	2.1	27.8	6.6	11.5	181.5
1972	80.7	1.6	47.4	2.2	28.8	7.1	12.5	180.1
1973	75.9	1.2	42.4	1.7	27.9	6.7	12.8	168.7
1974	80.6	1.6	45.7	1.5	28.1	7.0	12.1	176.5
1975	83.0	2.8	37.1	1.3	27.6	6.7	12.2	170.7
1976	88.9	2.7	39.2	1.2	29.4	7.2	12.9	181.5
1977	86.2	2.6	40.5	1.1	30.4	7.2	12.7	180.7
1978	82.3	2.0	40.4	1.0	32.1	7.2	13.4	178.4
1979	73.5	1.4	45.8	1.0	34.8	7.8	13.0	177.3
1980	72.1	1.3	49.1	1.0	34.5	8.3	12.8	178.9
1981	72.7	1.3	46.8	1.0	35.5	8.5	12.9	178.8
1982	72.4	1.4	41.9	1.1	36.5	8.5	12.3	174.0
1983	73.8	1.4	44.0	1.1	37.0	8.9	13.1	179.2
1984	73.6	1.5	43.7	1.1	38.2	9.0	13.7	180.8
1985	74.3	1.5	44.1	1.1	39.8	9.5	14.4	184.7
1986	74.1	1.6	41.6	1.0	40.6	10.5	14.7	184.1
1987	69.2	1.3	41.9	1.0	43.4	11.9	15.4	184.0

Source: U.S. Department of Agriculture

much fat and cholesterol which are mostly contained in meats including beef and might cause fatal diseases.

A number of years ago, animal products were circumstantially incriminated as the cause of coronary heart disease in man. Keys (33) concluded that saturated fats were cholesteremic and that high cholesterol levels in the blood plasma greatly increased the incidence of coronary heart disease.

A recent report by Drasar (34) suggested that fat from animal products may contribute to cancer of the colon. These references gave a general overview of some controversial areas in which consumption of animal products, including beef, had been considered to be health related. Obviously, any health problems related to use of animal products may greatly influence future trends in meat consumption.

In light of the previously mentioned disadvantages, many nutrition professionals have confirmed that beef is still a nutritious food that fits everybody. Adolf (35) considered beef as a nutrient-dense food. It contained a high amount of nutrient per unit for the amount of calories it had. A three ounce serving of beef had only about 192 calories. But it contained 57 percent of the US RDA for protein for a female aged 25-50, 79 percent of a woman's vitamin B-12, 26 percent of her niacin, 36 percent of her riboflavin (B-2), 38 percent of her zinc and 15 percent

iron for RDA. Figures for men who generally were allowed a higher calorie intake were comparable.

Table III (14) shows the relationship between several main nutrients and energy contribution for adults in the United States food supply in beef. Since this data was based upon analysis of retail cuts where the trimmable fat was not removed, the energy content was overstated, and meat could have even higher nutrient density relative to energy.

According to Williams (36), beef was a good source of nutrient not only for men and women, for children as well. For children between the age of 7 and 10, beef provided 76 percent of their protein, 27 percent of their iron, 76 percent of vitamin B-12, 22 percent of niacin, 16 percent of riboflavin, 7 percent of thiamin and 60 percent of the zinc requirements. It provided only less than 8 percent of their daily caloric intake.

Some people have refrained from consuming beef because they perceive its cholesterol content to be excessively high. According, however, to the latest data from the USDA (18), a three-ounce serving of beef contained only 76 milligrams of cholesterol, as much as three ounces of roast chicken with its skin removed.

Saturated fat is another issue that is influencing the food industry frequently these days. According to the same report from the USDA (18), only 48 percent of

TABLE III  
NUTRIENT DENSITY OF BEEF RELATIVE  
TO ITS ENERGY CONTENT

Nutrient	Percent of Total
Food Energy	7
Zinc	24
Protein	16
Niacin	15
Vitamin B6	14
Iron	14
Vitamin B12	13

Source: Nutrition Today

TABLE IV  
NUTRIENT CONTENT OF SELECTED COMMON FOODS

	Lean Beef	Lean & Fat Beef	White Bread	Sugar	Vegetable Oil
Protein %	31	27	9	0	0
Fat %	7	19	3	0	100
Carbohydrate %	0	0	50	100	0
Vitamin B6 mcg/100g	435	0	40	0	0
Potassium mg/100g	370	0	105	3	0
Zinc mg/100 g	5.8	0	0.6	0.1	0.2

Source: Nutrition Today

the fat in beef was saturated. The remaining 52 percent was either monounsaturated or polyunsaturated.

Bull (37) indicated that beef was also a good choice for weight control because of its satiety or "satisfaction" value. Beef was digested more slowly, but more completely, therefore, it was better utilized by the body. This longer period of digestion made beef more filling and satisfying so that you did not get hungry again as quickly as you would be after eating other foods. Table IV shows a comparison of nutrient content of selected common food (14).

To summarize, beef production is an important sector of American agriculture. Its production and consumption has maintained a downward trend since 1977. There are many factors influencing this decrease. Customers' healthy eating trend, income, and large supply of other meats are considered as major causes.

Some nutritionists still propose that beef is a nutritious food and will be a main food for American people. The nutrition offered by beef, as well as some other advantages that beef contains are bringing many consumers back to the product. They will discover, in many cases rediscover, that beef plays an important role in the American diet.

## Foodservice In Hospitals

### Introduction

In categorizing the foodservice industry, the National Restaurant Association (NRA) referred to three major groups: commercial, institutional, and military food service. Institutional foodservice, of interest in this paper, includes hospital, educational, business, government, and other organizations that operate their own food services.

In these organizations, food is provided as an additional or supporting service to complement other major activities of the organizations. Making profit is not usually the aim of the foodservice activities. As a result, food is served principally as a convenience for patients, students, employees, or other clients of the organizations (38).

According to NRA (39), in 1985 hospital and nursing home food facilities in the United States took 52.6 percent (\$11.2 billion) of the total sales of institutional food services, followed by schools 26 percent (\$5.4 billion), employee feeding programs 9.3 percent (\$1.75 billion), and other food services 12.1 percent (\$2.1 billion).

Michela (40) indicated that food service in hospital was complicated because of the need to supply food to several different consumer groups from various health care disciplines such as patients, medical staff, employees,



visitors, and often students. The daily demand for food in hospitals was for special diet and regular menu items for patients; cafeteria and/or short order menu items for employees and others; and possibly banquet menu items for all three meals. Catering of beverages and snacks for different meetings of staff and employees happened from time to time. This placed an additional demand for food and service on the hospital foodservice.

Hospital employees represented a large group of potential customers for the food service because patient care demanded three shifts per day, 7 days a week. A USDA report (41) revealed that from 1978 to 1985, number of meals served to non-patients increased about 13 percent. This trend was expected to continue as more outpatient and community services were provided in hospitals.

Eckstein (42) indicated that during 1960s, four and five meal per day plan were developed to better meet the needs of patients. Currently, about 90 percent of all short-term general hospitals used a three-meal per day plan for patients; and about 88 percent employed a cycle menu system. According to Koncel (43), modified diets composed of 15 to 85 percent of the patient meals in hospitals. Typical modifications included diets of various types: soft, bland, low sodium, low fat, low residue, diabetic, calorie restricted, liquid, and so on. Modified diets were generally expected to be nutritiously adequate. Alternative selections on the

master menu would usually include suitable, or easily modified items for all these diets.

A primary responsibility of administrative dietitian in hospital foodservices was to meet the total nutritional needs of their "captive" patient clients within budget costs. These dietitians had to purchase materials, and services to manufacture specified menu items. Organizational constraints required that foodservice facilities prepared and served many different types of menu items in limited production periods (44).

#### Structure of Hospital Food service

According to Unklesbay (45), although alternative foodservice systems had evolved since the 1960s, the conventional system continued to be one of the major types of foodservices in the hospitals in the United States. Because of increasing labor cost, foodservice managers with conventional systems had gradually made changes in types of ingredients and menu items they purchased to help reduce the amount of labor needed for meal production. In the conventional systems currently used in American hospitals, food items varied from no processing to a limited amount of processing to purchasing menu items which had been completely processed. Figure I (45) depicted the food processing continuum in the conventional foodservice system in hospitals.

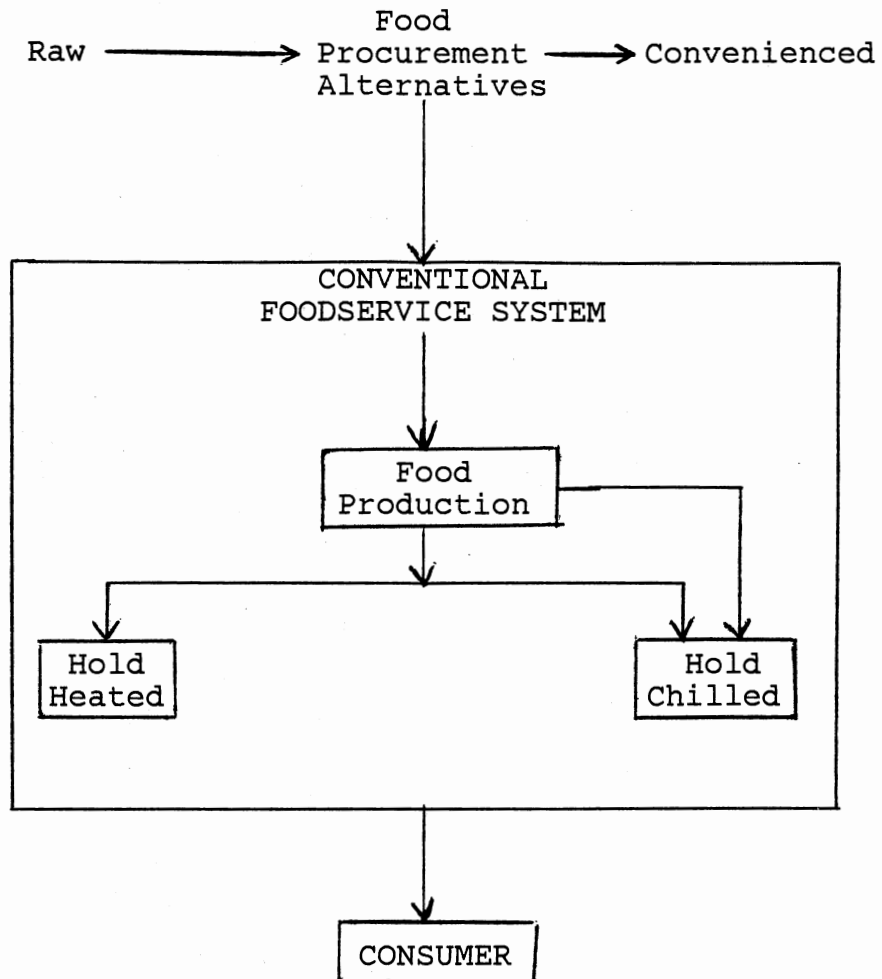
A survey done on 94 hospitals by Business Communication Co. Inc (46), revealed that 80 percent of the hospitals surveyed used a conventional preparation kitchen and tray line with a heat-maintenance delivery system. Franzeses's (47) study obtained a similar results. In her study, 94 percent of the hospitals used centralized food preparation and tray assembly, while only 6 percent used decentralized tray assembly from food carts that transported quantities of menu items to patient areas. Franzeses predicted that the trend in the past 20-25 years toward centralization of food preparation and tray assembly as a method of increasing productivity and control in hospital foodservice would continue and increase.

#### Characteristics of Hospital Foodservice

Since the production of meals appeared to be a routine event, the complexity of hospital food service was probably not fully appreciated, unless someone tried to solve daily problems. A few studies involving a large number of hospitals provided insight into some typical characteristics, under which foodservice facilities in hospitals operated.

Franzeses (47) found that selective and cycle menus were used in majority hospital foodservice facilities. Although some hospital foodservices offered different items on menus according to the seasons of the year, most of the facilities used the same menus throughout the

## FOOD PROCESSING CONTINUUM



Redrawn from: Unklesbay et al., 1977

FIGURE 1. FOOD PROCESSING/FOODSERVICE  
INTERFACE FOR CONVENTIONAL  
FOODSERVICE SYSTEMS

year. At the time of the survey, the majority of hospitals were using a combination of permanent and disposable service ware. Metal flatware was used in 65 percent of the hospitals.

Ruf (48) measured several factors that were believed to influence productivity in 25 hospital food services in Southern California. These factors included number of meals served, menu items, and responsibilities of administrative dietitians. He found out that each hospital had to prepare between 250 to 1,500 meals per day from one central area, assembled and distributed to patients. Menu items prepared could run from 116 to 425. The wide range of diet modifications varied significantly from one hospital to another. Administrative dietitians or foodservice managers needed to be responsible for as many as 30 to 50 functions and policies which placed considerable constraints on foodservice operations in hospitals.

Johnson's (49) survey found that about 75 percent of the foodservice labor force was composed of people who were either under 25 (36 percent) or over 45 (39 percent) years of age. Only about 25 percent of the foodservice employees in hospitals were within 25-45 years age group. Forty-three percent of the foodservice personnel had been employed in the hospital foodservice for one year or less.

Such employment practice would place stress on the daily operating conditions in hospital foodservice facilities and would limit managerial effectiveness and efficiency. All the characteristics mentioned above may be typical throughout the United States.

#### Purchasing in Hospital Foodservice

Unklesbay and David (50), described that hospital food purchasing was a major management function which might include foodservice, purchasing, administration and allied health personnel. Matthews' survey (44) indicated that hospital food service was a complex systems, functioning both as consumer-buyer and producer-servers of food. The administrative dietitian or foodservice manager had to purchase many different types of menu items in varying quantities to serve the health needs of customers.

According to Bryan and Lyon (51), rising food costs, a lack of qualified personnel, and the need for labor-saving, efficient methods of food production led to an increased use of convenience foods in hospitals since 1970s.

This meant that these foods had undergone preparation by food processors to decrease the amount of labor, equipment, energy usage, or other cost that would be incurred by on-site preparation in hospital food service. Morrison and Vaden (52) discovered in their

study that factors most frequently affected the purchase of convenience foods were the lack of freezer space, high cost, inadequacy of present kitchen staff, and unacceptable product quality. Among these factors, however, according to Buchanan (53), product quality was the major disadvantage to use convenience foods in hospitals.

To purchase these foods, Araullo (54) indicated that foodservice personnel in church controlled hospitals had frequent relationships with vendors. In these hospitals, purchasing personnel investigated the financial conditions of vendors and visited their operations more frequently than did those in other hospital foodservice facilities.

Araullo (54) found out some problems related to this kind of food purchasing in her study. She indicated that foodservice administrators obtained information about food products mainly from route salesmen, journals, and professional meetings. She questioned if these communication channels would facilitate an optimal flow of information between food processors and hospital foodservice facilities. Araullo reported the problems, which could result from inadequate communications between foodservice manager, found in her study which included limited product availability, lack of variety, and unreliable delivery.

To prevent these problems, other hospitals might be involved in a group purchasing systems because they

recognized that it could bring them considerable savings on necessary supplies, simplified ordering procedures, maintained quality products, and reduced purchasing cost. Through group purchasing, the hospital purchasing personnel needed to minimize the number of different items ordered and to maximize the dollar amount for each items ordered. Items were standardized and coded into computer (55).

According to Saucier (56), in an attempt to deal with these special needs and problems, a system known as the Computerized Food Purchasing Program (CFPP) had been designed to facilitate group purchasing of food in hospitals. Each month, suppliers met hospital purchasing personnel and submit prices for each item on the bidding list that had developed by hospital purchasing department before the briefing. These prices remained firm for one month and were coded into a computer. Participating member hospitals could use a cathode ray tube (CRT) to communicate directly with the computer that does price comparison and food ordering for them.

To summarize, foodservice in hospitals are both labor intensive and menu item intensive, more so than any other type of foodservice systems. Resources for the menu item production in hospital foodservices may include several skill levels of labor to cater various customer groups. Energy usage, special equipment to produce diets with specified nutrient contents for patients also



required special skills. Thus careful management of food service resources is needed.

To assist foodservice managers in the decision-making process, all information about menu item resources must be available. It is possible through the development of matrix computer system like CFPP to handle foodservice data.

Development in technological, social, economic, and political environment are forcing changes in management and information flow within hospital foodservices. Communication and feedback between clinical and administrative dietitians, patients and foodservice personnels, and hospital foodservice management and food suppliers are essential for the improvement of the quality of foodservice in hospitals.

## Dietetic Service in Hospital

### Introduction

Dietetics was the application of the science of nutrition to the feeding of people. It was the translating of nutritional principles into foods that fit the requirements of individuals (57).

The word "diet" was defined as "to eat", implicating that food and drink were selected and consumed for therapeutic purpose, such as the lose of weight.

"Therapy", a word which was often used in compound to

indicate that part of science related to treatment of disease (58).

Dietetic service in a hospital was the kind of service provided to both in and out patients by professionals to assess their nutritional status, control the symptoms and return the patients to a state of nutritional balance (59). These professionals, according to the statement of the chairperson of The American Dietetic Association in 1989 (60), were "recognized by the public, government, industry and allied professions as the experts on food and nutrition as they related to the quality of life. Registered Dietitians were widely accepted as the source of guidance about foods, nutrition, and well-being throughout life." The dietetic service team was made up of persons with different skills and interests and responsible to promote the public welfare and their own careers.

#### Evolution of Dietetic service

The practice of modifying diet to treat the needs of illness treatment could be traced back to early recorded history although, at that time, the recommendations might be a mixture of superstition and experience. In the beginning of last century, effective practice of diet therapy depended upon the application of chemistry and related sciences to the practice of medicine. Laroisier, Sanctorius, Bennet, and Banting were recognized as the

pioneers to reduce weight by controlling food intake and more excercises. The first nutrional principle discovered was the relation of energy intake to weight based on understanding the role of oxygen in the metabolic process (61).

Gastric digestion was the second area of metabolism to be explore in 19th century. Beaumont (62) did his observation on the presence of free hydrochloric acid and an unidentified chemical (later identified as pepsin) in the secretions of the stomach. He related what he found to the changes occuring in the food mass after eating. He noted that the kind and amount of food eaten determined the time and character of gastric digestion.

Combe (63) was considered the pioneer of dietetics. The rules he found in digestion and promulgated covering from not only the kind and the amount of food to be eaten but the timing of meals, relaxation before and after eating, and to the use of fluids with emphasis on the omission of ice and alcohol.

An entertaining approach to treatment of gastric distress appeared in 1872 under the title, *Our Digestion Or My Jolly Friends Secret*. In addition to gradual reduction of portion sizes by half, advice for weight loss included the limitation of sleep. Although these early studies had no scientific foundation, they had one thing in common which makes them good even today. This was the amazingly accurate observations (63).

The latter half of the 19th century marked the beginning of medical practice as it is known today. The period also marked the introduction of medical sciences into the curriculum (63).

The most significant event of this period for the dietetic service was the publication in 1896 of *The Chemical Composition of American Food Materials* by Atwater and Woods (64). This was the first compilation of data based on the analysis of the American food supply. This book was a summarization of analysis for nutrients. Other than protein, information on carbohydrate, fat, total salts, and water became available.

This basic information on food composition was later classified in 1950 into similar nutrient values and turned into an exchange list jointly by representatives of the American Dietetic Association, the American Diabetes Association, and the United States Public Health service (65). The original Exchange List considered protein, fat and carbohydrate as the composition of foods and were designed primarily for being used in treating the patient with diabetes mellitus. It was adapted to the management of obesity and other conditions where control of caloric intakes was desired later.

The dietitian of today, in the sense of the trained individual, did not exist before World War I. Early diets interpreted into meals in the hospital would be the

function of the cook or steward. World War I marked the emergence of the trained dietitian and the beginning of change in the practice of diet therapy. This development paralleled the growth of the biologic sciences and the practice of medicine. Since then, the chemical analysis of blood, urine, and other body fluids was introduced as routine procedure in medical diagnosis (63).

The establishment of professional organizations like the American Dietetic Association and the development of food and nutrition programs in higher education institutions in the early years of this century have helped to build up the social position and the contemporary dietetic professionals (65).

Presently, with the close relationship between the nutritional status of the patient and the outcome of serious disease increasingly being accepted by the health professions, the dietary department has become one of the three largest and most costly departments in a hospital and the only one that offers direct service to patients, personnel and visitors on a daily basis (65). Dietitians, supported by nutrition science and experimental experience, are advising clinicians and hospital staff on the state of nutrition of patients in hospitals, providing dietetic service to all the society wherever it is needed and also conducting research in improving human health by means of modifying diets.

### Dimension of Dietetics Service in Hospital

The role of diet in health promotion and disease prevention has always been obvious to the health profession and nutrition community. In a hospital, dietitians work as a team to provide in and out patients with dietetic service. As a task force, according to the New York Academy of Medicine (66), the dietetic professions should jointly take following responsibilities:

- 1) Preparation and periodic review of the diet manual of the hospital which is to be revised as often as new information requires;
- 2) Development and supervision of a hospitalwide system for rapid initial assessment of nutritional status of patients, recommendations for adequate support, and periodic follow-up;
- 3) Assurance that food and nutrients offered meet nutritional requirements of the patient;
- 4) Evaluation of adequacies of methods used to provide nutrients in an effort to achieve as adequate an intake as possible regardless of the modality of feeding (i.e., oral, tube, or parenteral);
- 5) Evaluation of newer technologies in nutritional therapeutic modalities for possible incorporation into hospital practice in relation to clinical effectiveness and cost;
- 6) Periodic reports to the medical board on the nutritional status of in- and outpatient populations based on surveys with adequate documentation;
- 7) Assurance of an adequate nutrition education program for medical attendings,

house-staff, nurses, dietitians, and pharmacists;

8) Establishment and monitoring of adequate professional standards for education, experience, and performance of the professional staff of the Dietary Department;

9) Periodic review of personnel utilization and space requirements in the Dietary-Department; and

10) Responsibility for assuring the inclusion in the medical audit of pertinent criteria concerning nutritional care.

Among these responsibilities, for hospital in-patients, clinical dietitian generally: a) take responsibility for overall nutritional standards; b) integrate with medical and nursing staff in determining the most appropriate way of feeding the ward patient; and c) translate nutritional requirements into specific diets for patients with certain diseases, e.g. diabetes, renal failure, hepatic failure, coeliac disease and other disorders of absorption; d) work with nursing and medical staff to monitor food intake and progress of patients presenting with nutritional problems; and e) advise and help run the nutrition service with special responsibility for enteral feeding (67).

For hospital out-patients, clinical dietitian should: a) provide a practical service for dietary and nutritional assessment; b) provide an educational service for patients; c) play a role in special clinics (e.g., for patients with diabetes, cystic fibrosis) and possibly organize and run clinics for the obese (68).

Different from clinical, administrative dietitians take care another part of the mission which is translating the dietary recommendations given by clinical dietitians into food selection. In the business of altering patients' eating habits, assisting them to get appropriate nutritious food which may bring them back to nutrition balance and cure the disease, administrative dietitians are at the sharp end (69).

Besides dealing with patients, administrative dietitians associate more with hospital employees like medical professions, nursing staff, foodservice and purchasing members as well as hospital administrative personnel. Unlike clinical dietitians, administrative dietitians' work involves more responsibilities in management perspectives.

Research done by Jensen and Dudrick (70) showed that administrative dietitians in hospital, spend over 60 percent of their working time in management responsibilities including a) personnel management, training, and education; b) financial management, and computer use; c) facility, and equipment management; d) consumer (patients) relations, and e) sanitation and safe food handling. Thirty percent of their time was used on dealing with patients and another 10 percent of the working time was used on improving relationship between the hospital and the community.



What Pickworth (71) found supported Jensen's findings. Pickworth's survey was a literature review relating to the responsibilities of administrative dietetics in leading professional journals, and an annotated bibliography compiled of pertinent articles from the Journal of American Dietetic Association from 1965 to 1982. Also, the survey abstracted annual publications by the Society for the Advancement of Foodservice Research consolidated for the period 1971-1982.

Analysis of over 500 professional articles and research abstracts indicated that personnel management was the most frequently studied area by professionals followed by financial management, productivity and nutritional consultation. According to Pickworth, the rank of importance of administrative dietitians' responsibilities could be clarified based on the findings from these researches.

#### Linkage Between Administrative and Clinical Dietitians

Entering the 1980s, some studies indicated that the profession of dietetics was in a state of confusion. The elements that produced the confusion included the political issues of the popularity of nutrition and could be administrative and clinical dietitian existed in the same professional organization. Questions have been stated as:

1) Why should the education of a dietitian include food service management when the role of the dietitian is nutrition care?

2) What do foodservice management have to do with clinical dietetics?

3) Are administrative dietitians really dietitians?

4) Should the American Dietetic Association be a professional organization for health care clinical dietitians and eliminate other specialists from membership (72)?

These questions gave people an impression that dietetic professionals were technically trained as specialists. Beside nutritional assessment of patients, they could be so inadequately prepared to do anything else like allocating resources and monitoring work flow (73).

Research done by Rinke indicated that knowledge for a dietitian beyond nutrition should not be limited because people expected them to be able to plan, understand and manage a budget, work with and manage people, translate technical knowledge into understandable and useful terms, and be assertive and influential (72).

To clarify the competencies a dietitian should have, and the professional position of administrative dietitians, the American Dietetic Association issued a position paper to define the dietetic service as " the process by which beliefs; attitude, environmental influences and

understanding about food lead to practices that are scientifically sound, practical, and consistent with individual needs and available food resources" (74). This definition emphasized the linkage between clinical and administrative dietitians -- food.

The Committee on Goals of Education for Dietetics described in its report that it was necessary to expand the definition to say: dietetics was a profession in which knowledge of food, nutrition, and management was applied to provide nutrition services and care to people (75). The key words were food, nutrition, management, and people. These four were the prominent elements in the composition of the knowledge a dietitian should have and they could not be separated when curriculum development was considered for dietetic education.

Young (76) described the importance of food as strong and effective tools and unique characteristic of a dietitian. She pointed out that food was the speciality of being a dietitian. Its nutritive value, its use in meeting nutritive needs, its planning, purchase, handling, preparation, and service could assist and perfect both clinical and administrative dietitians' performance.

To summarize, dietetic service is the combination of the sciences of nutrition, food, and management. Dietetic professionals including clinical and administrative dietitians work together as a team to provide this practice to hospitalized patients and the people whoever

need it in the society. To accomplish this profession requires different skills covering from nutrition status assessment, food item production, to resources and personnel management.

## CHAPTER III

### METHODOLOGY AND PROCEDURES

#### Introduction

This study was a component of a series of research projects on demand for and consumer behaviour towards different food products such as seafood, snacks, sugar, fruits, vegetables, dairy products, and others. The objective of this study was to determine the influencing factors on beef consumption patterns in hospital food service institutions. The design of research, population, samples, data collection, and analysis of data will be included in this chapter.

#### Design of Research

This study was a descriptive status survey which was concerned with hypothesis formulation, testing and analysis of relationship between variables. According to Gay (77):

Descriptive study involves collecting data in order to test hypotheses or answer questions concerning the current status of the subject of the study. A descriptive study determines and reports the way things are. One common type of descriptive research involves

assessing attitude or opinions. Descriptive data are typically collected through a questionnaire survey, and interview, or observation.

In this study, the survey method was used to identify and interpret the data obtained from the administrative dietitians in the 1,125 hospitals in the selected Midwestern states of the United States. Dependent variables in this study consist of the response to questions in a questionnaire relating to consumer attitude, purchasing habits, and consumption patterns.

#### Population of the Study

The subjects in this study were selected from a entire population of the administrative dietitians or food service manager in hospitals in the selected Midwestern states of the United States. The states participating in this study were Kansas, Missouri, Nebraska, Oklahoma, and Texas. The hospitals included in this study were listed in the American Hospital Association Guide to the Health Care Field 1986 Edition (9). Table V on page 41 presents the distribution of the hospitals in the five states on the AHA list. Among the total number of 1,153 hospitals, 28 hospitals did not have complete addresses stated in the AHA Guide. Therefore, only 1,125 hospitals were included into the population of this study.

TABLE V  
HOSPITAL DISTRIBUTION FOR THE STUDY

States	Total Number of Hospitals	Number of Hospital with 50 bed or more & percentage of the Total in Each State	
1. Kansas	166	85	51.27%
2. Missouri	171	139	81.29
3. Nebraska	109	52	47.70
4. Oklahoma	143	96	67.13
5. Texas	564	489	86.72
Total	1153		

Source: American Hospital Association Guide to the Health Care Field 1986 Edition.

#### Data Collection

##### Research Instrument Development

The research instrument, a questionnaire (Appendix A) was developed by the researcher of this study after reviewing a consumer preference survey for red meat conducted by Yankelovich, et al (16) for the American Meat Institute and Natinal Live Stock and Meat Board in August, 1985. Several questions were taken from the survey to meet the objectives in this study.

The questionnaire contained 36 questions. The first section contained demographic data and identified both personal and institutional variables. Personal variables

include: respondent's age, sex, education level, and major of study.

The institutional variables include: location, size (number of beds), annual admission, specification, and type of institution of the hospital participated in the research. The institutional variables also include type of foodservice system, size (number of meals served) menu style, length of cyclical menu, menu planning and evaluation, and purchasing personnel of the surveyed hospital foodservice facilities.

The second section of the questionnaire contained data of hospital foodservice purchasing specifications, cyclical menu items, and overall beef consumption. A conscious effort was made to develop the questionnaire brief and clear. The confidentiality of responses was guaranteed.

#### Preliminary Study

The first draft of the questionnaire was reviewed by the researcher and his major adviser. The questionnaire was then sent to 25 hospitals in the state of Oklahoma on January 15, 1988 as a pilot test for its content validity, format, and clarity. The administrative dietitians in these 25 hospitals were encouraged to complete the questionnaire and to comment on any area that was unclear. Twelve questionnaires were returned and two questions were edited for their format following this pilot test.



### Distribution

The instrument was printed on three sheets of lavender-colored paper; both front and back sides were used. A cover letter was included to explain the increased need for updated and accurate information on beef consumption in hospital foodservice environment. Mailing information codes and return postage were printed on the back side of the final page of the questionnaire. The instrument could be returned by refolding and stapling (no envelope was required).

Eleven hundreds and twenty-five questionnaires were mailed, First Class, on August 15, 1988, through the University Central Mailing Service.

### Procedure

Data obtained from the questionnaire were coded on a personnel computer disk and analyzed at the Oklahoma State University Computing center. The Statistical Analysis System (SAS) program was used for the purpose of data analysis for this study.

A frequency distribution was performed to identify of personal and institutional characteristics in the questionnaire responses. Chi-square tests were then employed to determine if there were significant associations existing between the variables. In addition to the data analysis on computer, information like attitudes

toward beef, nutrient content of beef, use of beef in dietary therapies, and purchasing sources was also obtained and analyzed.

## CHAPTER IV

### Results And Discussion

#### Introduction

The objective of this study was to identify those factors that influenced the use of beef in a hospital foodservice department. The research obtained information concerning hospital foodservice, factors that influenced the inclusion of beef entrees on cyclical menus, and overall beef utilization in hospital foodservice.

This chapter presents the findings of the study in five sections. The first section describes the participants. In the following three sections, statistical and descriptive data on characteristics of individuals, institutions, and hospital foodservice departments are analyzed. The last section discusses the hypothesis testing.

#### Description of the Participants

The respondents in this study were administrative dietitians representing an entire population of 1,125 hospitals in the selected Midwestern states including: Kansas, Nebraska, Missouri, Oklahoma, and Texas. These

hospitals were listed in the American Hospital Association Guide to the Health Care Field 1986 Edition (10). The questionnaires were mailed first class to 1,125 administrative dietitians on August 15, 1988. Responses were received through September 25, 1988. Three hundreds and twenty-two survey instruments were returned, of which 300 were usable (26.8 percent response rate) for the purpose of this study.

### Characteristics of Respondents

#### Age And Sex

Table VI presents the age and sex of the respondents. The age of the administrative dietitians in this research was in the range of under 30 years old to 60 or older.

The largest group of the respondents were in the range of 30 to 39 years of age (36.7 percent, N=110), while the smallest group was the 60 or older age range (8.0 percent, N=24). Forty-one (13.7 percent) of the administrative dietitians were under 30 years of age, while 53 (17.7 percent) of them were between the ages of 50 to 59. Sixty-six (22.0 percent) of the respondents were between the age of 40 to 49.

The researcher used chi-square analysis to determine the association between demographic characteristics of the administrative dietitians with a) purchasing specifications, and b) inclusion of beef items in hospital

TABLE VI  
 FREQUENCY AND PERCENTAGE OF SUBJECTS  
 ACCORDING TO AGE AND SEX

Age & Sex	N	Percentage
<u>Age</u>		
Under 30	41	13.7
30 - 39	110	36.7
40 - 49	66	22.0
50 - 59	53	17.7
60 or older	24	8.0
No Response	6	2.0
Total	300	100.0
<u>Sex</u>		
Female	276	92.0
Male	19	6.3
No Response	5	1.7
Total	300	100.0

TABLE VII  
 CHI SQUARE ASSOCIATION BETWEEN AGE OF  
 THE RESPONDENTS BY MENU ITEMS USED  
 IN HOSPITAL FOODSERVICE  
 (df=1)

Menu Items	$\chi^2$	p	49 & Under	50 & Over
Beef Cubed Chop Suey (R)	9.69	0.002	85.99	14.01
Schoolboy/Bun (M)	4.66	0.031	98.09	1.91
Salisbury Steak (M)	5.69	0.017	35.67	64.33
Sicilian Chopped Steak (M)	3.61	0.047	73.25	26.75
Baked Steak (R)	7.71	0.005	92.36	7.64
Baked Steak (M)	4.20	0.040	54.78	45.22
Swiss Steak (M)	4.40	0.036	70.06	29.94
Creamed Chipped Beef/ Baked Potato (R)	9.23	0.002	52.75	47.25

R = Regular diet  
 M = Modified diet

foodservice menus. Statistical associations were found between the age of the respondents and wholesale beef cut, i.e., Carcass (df=1,  $X^2 = 4.673$ ,  $p=0.031$ ) and prefabricated cut, i.e., Ground Beef Patties with Textured Vegetable Protein Added (df=1,  $X^2 = 4.471$ ,  $p=0.034$ ). The age of the respondents was statistically associated with some of the beef items (df=1,  $X^2 \geq 3.84$ ,  $p \leq 0.05$ ) on regular and modified menus used by the hospital foodservices (Table VII).

The chi-square analysis indicated that most of the dietitians, who were under 50 years old preferred to include all beef items in Table VII except Salisbury Steak into hospital foodservice menus (see the chi-square tables 10, 18, 28, 36, 37, and 39 in Appendix III). The rationale for the selection may be linked to perceived patient satisfaction, more protein, and less cholesterol of the beef items.

The majority of the administrative dietitians (92.0 percent,  $N=276$ ) were female, while 6.3 percent ( $N=19$ ) were male. Statistical analysis (Table VIII) had shown that sex of the respondents to be associated with some of the menu items used in hospital foodservices (df=1,  $X^2 \geq 3.84$ ,  $p \leq 0.05$ ). Table VIII shows that male dietitians preferred to incorporate all the beef items except Italian Spaghetti and Baked Steak into hospital foodservice menus (see chi-square tables 7, 8, 12, 14, 21, 24, 26, 27, 32, 33, and 35 in Appendix III). The selection of

TABLE VIII  
 CHI SQUARE ASSOCIATION OF SEX OF THE  
 RESPONDENTS BY MENU ITEMS USED  
 IN HOSPITAL FOODSERVICE  
 (df=1)

Menu Items	X <sup>2</sup>	p	Female	Male
Beef Hamburger/Bun (R)	6.71	0.016	19.20	80.80
Beef Hamburger/Bun (M)	8.10	0.004	12.32	87.68
Beef Stew (R)	10.79	0.001	10.14	89.86
Beef Stew (M)	15.28	0.006	16.67	83.33
Meat Balls/Spaghetti(R)	7.01	0.006	50.36	49.64
Lasagna (M)	3.84	0.050	28.26	71.74
Italian Spaghetti (R)	5.37	0.020	36.96	63.04
Baked Pepper Steak (M)	5.73	0.019	6.52	93.48
Roast Beef (M)	11.23	0.001	4.35	95.65
Beef Patty (R)	4.26	0.039	62.32	37.68
Baked Steak (M)	8.32	0.004	37.32	62.68
Swiss Steak (R)	4.10	0.043	11.93	88.07

R = Regular diet  
 M = Modified diet

these entrees may represent an overall adaptability to modified and regular diets, for instance, low fat and sodium recommendations.

#### Education Level and Majors

Table X presents the education level and field of study of the respondents. The majority of the administrative dietitians (60.7 percent, N=182) had bachelors degrees, while 23.7 percent (N=71) had masters degrees. Only 0.3 percent (N=1) of the administrative dietitians obtained a doctoral degree. The remaining 40 (13.3 percent) of the dietitians had an education level lower than a bachelor degree.

Statistical analysis had shown that education level of the respondents to be associated with wholesale cut, i.e. bonless Rib Eye Steak (df=1,  $X^2 = 5.309$ ,  $p=0.027$ ), and prefabricated cuts, i.e., Boneless Rib Steaks (df=1,  $X^2 = 4.926$ ,  $p=0.026$ ), Rib Eye Steaks (df=1,  $X^2 = 5.579$ ,  $p=0.018$ ). Significant associations (Table XI) also existed between education levels of the respondents and some of the beef menu items used in hospital foodservice. Table XI (see chi-square tables 5, 16, 19, 20, 22, 23, 30, 34, and 41 in Appendix III) shows that the administrative dietitians with bachelor degrees included most of the beef items in hospital foodservice menus except Salisbury Steak, Spaghetti with Meat Balls, and Ground Beef Patty.



The predominant field of study (87.0 percent, N=261) for the administrative dietitians was food and nutrition, while only 0.3 percent (N=1) had received a degree in the field of food science, and 3.0 percent (N=9) in institution administration. Two percent (N=6) of the respondents obtained degrees in education, while 1.7 percent (N=5) majored hotel and restaurant administration. The remaining 11 (2.3 percent) administrative dietitians obtained degrees in allied areas including business administration, hospital administration, and psychology.

Statistical associations were found (see chi-square table 6, 8, 9, 11, 17, 31, and 38 in Appendix III) between the field of study of the respondents and some of the beef menu entrees used in hospital foodservice menus ( $df=1$ ,  $X^2 \geq 3.84$ ,  $p \leq 0.05$ ). The administrative dietitians with food and nutrition degrees did not include all the beef entrees in their hospital foodservice menus except for Chili Macaroni and Creamed Chip Beef with Baked Potatoes. This preference was perhaps because these two entree items could be used more readily in both regular and modified diets.

#### Characteristics of the Hospital

##### Location, Size, And In-patient Admission

Table XII presents the location, size, and in-patient admission of the responding hospitals. The

TABLE IX  
 CHI SQUARE ASSOCIATION BETWEEN THE  
 FIELD OF STUDY OVER BEEF MENU  
 ITEMS USED IN HOSPITAL  
 FOODSERVICE  
 (df=1)

Menu Items	X <sup>2</sup>	p	Food	Other
			Nutrition Majors	Majors
Beef Hamburger/Bun (M)	8.24	0.004	18.39	81.61
Beef Stew (R)	7.34	0.007	37.76	62.24
Beef Stew (M)	9.70	0.002	19.78	80.22
Braised Beef & Noodle (R)	3.96	0.047	37.66	62.34
Chili (R)	6.72	0.014	10.34	89.66
Baked Pepper Steak (R)	4.35	0.037	85.06	14.96
Chili Mac (M)	4.50	0.034	4.60	95.40
Salisbury Steak (R)	4.66	0.031	88.51	11.49
Roast Beef (M)	4.29	0.038	3.27	96.73
BBQ Beef Brisket(R)	5.88	0.015	26.33	73.67

R = Regular Diet  
 M = Modified Diet

TABLE X  
 FREQUENCY AND PERCENTAGE OF SUBJECTS  
 ACCORDING TO EDUCATION  
 LEVEL AND MAJOR

Education Level & Majors	N	Percentage
<u>Education Level</u>		
Bachelors	182	60.7
Masters	71	23.7
Doctors	1	0.3
Others		
No Response	6	2.0
Total	300	100.0
<u>Major</u>		
Food and Nutrition	261	87.0
Food Science	1	0.3
Institution Administration	9	3.0
Education	6	2.0
Hotel and Restaurant Administration	5	1.7
Others	11	3.7
No Response	7	2.3
Total	300	100.0

TABLE XI  
 CHI SQUARE ASSOCIATION BETWEEN  
 EDUCATION LEVEL OF THE  
 RESPONDENTS BY THE  
 BEEF MENU ITEMS  
 USED IN HOSPITAL  
 FOODSERVICE  
 (df=1)

Menu Items	2		Bachelor Dgree	Other Degree
	X	p		
BBQ Beef/Bun (R)	5.59	0.012	73.63	26.37
Taco Beef (R)	5.58	0.018	93.96	6.04
Hungarian Goulash (R)	4.63	0.031	68.68	31.32
Beef Paprika (R)	4.02	0.045	71.43	28.57
Beef Paprika (M)	3.96	0.041	19.78	80.22
Meat Balls/Spaghetti (R)	5.60	0.018	25.27	74.73
Lasagna (M)	4.40	0.036	30.22	69.78
Salisbury Steak (R)	3.87	0.049	93.96	6.04
Spanish Rice (R)	4.10	0.043	26.37	73.63
Beef Patty (R)	4.04	0.044	88.51	11.49
Beef Patty (M)	4.97	0.026	89.14	11.86
Breaded Grill Steak (M)	4.94	0.026	70.23	29.77
Creamed Chipped Beef/ Baked Potato (M)	8.32	0.004	18.97	91.03

R = Regular Diet  
 M = Modified Diet

TABLE XII  
 FREQUENCY AND PERCENTAGE OF SUBJECTS  
 ACCORDING TO LOCATION,  
 SIZE, AND ADMISSION

Hospital Characteristics	N	Percentage
<u>Location</u>		
Less than 10,000	112	37.3
10,000 to 49,999	73	24.3
50,000 to 99,999	30	10.0
100,000 to 150,000	20	6.7
More than 150,000	60	20.0
No Response	5	1.7
Total	300	100.0
<u>Size (number of beds)</u>		
50-99	145	48.3
100-199	72	24.0
200-299	31	10.3
300-399	15	5.0
400-499	13	4.3
500 or more	19	6.3
No Response	5	1.7
Total	300	100.0
<u>Admission</u>		
Less than 1,000	59	19.7
1,000-2,999	78	26.1
3,000-5,999	53	17.7
6,000-9,999	24	8.0
More than 10,000	45	15.1
No Response	41	13.4
Total	300	100.0

cities in which the hospitals were located ranged from less than 10,000 to more than 150,000 inhabitants.

One hundred and twelve (37.3 percent) of the hospitals were located in cities with less than 10,000 inhabitants, while 20 (6.7 percent) were located in a city with population ranging from 100,000 to 150,000. There were 73 (24.3 percent) hospital located in cities with population ranging from 10,000 to 49,999, while 30 (10.0 percent) of the hospitals in a city with 50,000 to 99,999 population. In the 150,000 or over population range, frequency response was 20.0 percent (N=60).

Size (number of beds) of the hospitals ranged from 50 to 500 or more. Over 248 of the hospitals (82.6 percent) had 50 to 299 beds, while 28 of the hospitals (9.3 percent) had 300 to 499 beds. Nineteen (6.3 percent) of the hospitals had 500 or more beds.

The annual in-patient admission of the hospitals in 1987 ranged from less than 1,000 to more than 10,000. In 1987, 19.7 percent (N=59) of the hospitals had admissions less than 1,000, while 15.1 percent (N=45) had more than 10,000. Over 43.8 percent (N=131) of the hospitals had admissions of 1,000 to 5,999, while 8.0 percent (N=24) had 6,000 to 9,999 patients.

#### Type of Institution & Specialization

Table XIII presents the type of institutions, specialization, and length of stay. Eighty (26.7 percent) of

TABLE XIII  
 FREQUENCY AND PERCENTAGE OF SUBJECTS  
 ACCORDING TO TYPE OF INSTITUTION  
 AND SPECIALIZATION

Census	N	Percentage
<u>Institution</u>		
Government-owned non-profit	80	26.7
Privately Owned Non-profit	113	37.7
Privately Owned for Profit	54	18.0
Teaching Hospital	10	3.3
Others	36	12.0
No Response	7	2.3
Total	300	100.0
<u>Specialization</u>		
Yes	64	21.3
No	230	76.7
No Response	6	2.0
Total	300	100.0
<u>Length of Stay</u>		
Less than one day	5	1.7
1 to 5 days	163	54.3
6 to 9 days	74	24.7
10 to 19 days	14	4.7
More than 20 days	35	11.7
No Response	9	3.0
Total	300	100.0

the hospitals were owned by the government, while 113 hospitals (37.7 percent) were privately owned and nonprofit and 54 hospitals (18.0 percent) were privately owned. The majority of the hospitals (76.7 percent, N=230) had no specialization while 21.3 percent (N=64) specialized in rehabilitation, pediatrics, mental health, psychiatric, and renal transplant.

Over 163 (54.3 percent) of the hospitals indicated that their patients' length of stay was 1 to 5 days, while only in 5 (1.7 percent) of the hospitals, patients stayed less than one day. In 88 (29.4 percent) of the hospitals the length of stay was 6 to 19 days, while in 14 (4.7 percent) it was longer than 20 days.

#### Food Service in Hospital

##### General Information

Table XIV shows the type and size (meals served per day) of the hospital foodservices. The majority of the hospital foodservices (90.7 percent, N=272) utilized a conventional foodservice systems while only 9.3 percent (N=25) of the foodservices were assembly-serve, commissary or other systems. This was similar to the findings obtained by Unklesbay (45) and Business Communication Co. Inc. (46). In their research, over 80 percent of the hospitals were using a conventional foodservice system.



TABLE XIV  
 FREQUENCY AND PERCENTAGE OF SUBJECTS  
 ACCORDING TO THE TYPE AND SIZE  
 OF THE HOSPITAL FOODSERVICES

Type and Size of the Foodservices	N	Percentage
<u>Type</u>		
Conventional System	272	90.7
Assembly-serve System	10	3.3
Commissary System	7	2.3
Others	8	2.7
No Response	3	1.0
Total	300	100.0
<u>Size</u>		
Less than 200	120	40.0
200 to 399	72	24.0
400 to 599	35	11.7
600 to 799	14	4.7
800 to 1,000	17	5.7
More than 1,000	39	13.0
No Response	3	1.0
Total	300	100.0

The statistical analysis indicates that the type of the hospital foodservices to be associated with the prefabri-cated cuts, Boneless Rib Steaks ( $df=1, X^2=8.508, p=0.004$ ) and Intermediate T-Bone Steaks ( $df=1, X^2=3.586, p=0.058$ ). Association ( $df=1, X^2 \geq 3.84, p \leq 0.05$ ) were also shown between the type of the hospital foodservices and some of the wholesale cuts (Table XV) and some of the beef menu items (Table XVI).

Table XV (see chi-square tables 55, 56, 105, 106, 57, and 68 in Appendix III) indicated that most of the hospital foodservice systems did not purchase all the beef items listed in the table. This occurrence could be explained through cost savings in labor when purchasing prefabricated beef cuts and purchasing primal beef cuts. Since labor cost has already been high for conventional system, most of them excluded the beef items.

Table XVI (see chi-square table 49, 51, 53, 64, 73, 85, 86, 88, and 95 in Appendix III) shows that hospital foodservice with a conventional system did not include most of the beef entrees into their menus. A possible reason for this may be nonadaptability to modified diets and presentation of nutrient content.

Most of the hospital foodservices (64.4 percent, N=192) were relatively small in size and served less than 399 meals per day. Sixty-six (22.1 percent) of the hospital foodservices provided 400 to 1,000 meals per day, while 39 (13.0 percent) served more than 1,000 meals per day.

TABLE XV  
 CHI SQUARE ASSOCIATION OF THE TYPE  
 OF HOSPITAL FOODSERVICE SYSTEM  
 BY THE WHOLESALE CUTS

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Wholesale Cuts	X <sup>2</sup>	p	Conven tional System	Others System
Brisket Deckle On	4.71	0.030	40.07	59.33
Round Inside	4.13	0.042	38.66	61.40
Strip Loin	4.71	0.030	37.13	62.87
Short Loin	7.19	0.007	40.07	59.33
Bottom Sirloin	4.41	0.036	37.87	62.13
Short Tender Loin	5.32	0.021	36.40	63.60
Full Tender Loin	3.81	0.043	11.67	88.33
Flank Steak	3.85	0.050	60.00	40.00
Hindquarter	4.09	0.047	100.00	0.00

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TABLE XVI  
 CHI SQUARE ASSOCIATION OF THE TYPE  
 OF HOSPITAL FOODSERVICE SYSTEM  
 BY THE MENU ITEMS

Menu Items	$\chi^2$	p	Conven tional System	Other System
Hungarian Goulash (M)	5.06	0.024	16.18	83.82
Beef Stew (R)	7.53	0.006	78.68	21.32
Beef Stew (M)	6.57	0.010	38.60	61.40
Lasagna (R)	8.41	0.004	10.66	89.34
Hot Tamale Pie (M)	13.52	0.001	30,15	69.85
Pot Roast of Beef/ Vegetables (R)	4.06	0.044	51.47	48.53
BBQ Beef Brisket (M)	6.72	0.010	98.16	1.84
Liver & Onions (R)	4.61	0.032	86.40	13.60

R = Regular diet  
 M = Modified diet

The statistical analysis (see chi-square table 50, 66, 69, 71, 72, 75, 76, 83, 84, 89, 92, and 96 in Appendix III) indicates that number of meals served per day (size) of the hospital foodservice departments was associated with some of the beef menu items used in hospital foodservices ( $df=1$ ,  $X^2 \geq 3.84$ ,  $p \leq 0.05$ ) (Table XVII). The entrees may have been selected to reflect production and labor cost savings. Since most of the foodservice departments were relatively small, the administrative dietitians needed to maintain an effective system.

#### Menu Information

TABLE XVIII presents the menu categories used in the hospital food services. The majority of the hospital foodservice departments (80.0 percent,  $N=240$ ) were using cyclical menus. Among these cyclical menus, 134 were selective, while 106 were non-selective. Only 18.9 percent ( $N=57$ ) of the hospital use fixed and other menus. This finding supports Eckstein's research (42) that 88 percent of the hospital foodservices departments employed a cycle menu.

The type of menu used in hospital food services was found statistically associated with some of the wholesale cuts (Table XIX) and menu items (Table XX) ( $df=1$ ,  $X^2 > 3.84$ ,  $p < 0.05$ ). The reasons for the associations showing in Table XIX and XX could be ease of preparation and more equitable cost of production. The nutritional qualities

TABLE XVII  
 CHI SQUARE ASSOCIATION OF THE SIZE  
 OF HOSPITAL FOODSERVICE  
 DEPARTMENTS BY  
 MENU ITEMS

Menu Items	2 X	p	Under 400 Meals	Over 400 Meals
Beef Chop Suey (R)	4.67	0.031	95.83	4.17
Beef Chop Suey (M)	10.65	0.001	82.81	17.19
Beef Paprika (M)	5.05	0.025	97.38	2.62
Salisbury Steak (M)	4.39	0.036	56.77	43.23
Hamburger Steak (R)	10.77	0.001	43.23	56.77
Hamburger Steak (M)	6.37	0.012	46.88	53.13
Italian Spaghetti (R)	4.21	0.040	25.52	74.48
Pot Roast of Beef/ Vegetables (R)	4.10	0.043	32.29	67.71
Roast Beef (M)	4.29	0.038	48.96	51.04
Beef Patty (R)	7.12	0.008	29.17	70.83
Beef Patty (M)	9.14	0.003	59.38	40.63
Baked Steak	10.43	0.001	60.42	39.58

R = Regular diet  
 M = Modified diet

TABLE XVIII  
 FREQUENCY AND PERCENTAGE OF SUBJECTS  
 ACCORDING TO TYPE, LENGTH, AND  
 PERIOD OF MENU

Menu Category	N	Percentage
<u>Menu Type</u>		
Selective Fixed Menu	25	8.3
Non-selective Fixed Menu	25	8.3
Selective Cyclical Menu	134	44.7
Non-selective Cyclical Menu	106	35.3
Others	7	2.3
No Response	3	1.0
Total	300	100.0
<u>Menu Length</u>		
One Week	62	20.7
15 days	25	8.3
22 days	39	13.0
4 weeks	59	19.7
5 weeks	23	7.7
Others	80	26.7
No Response	12	4.0
Total		
<u>Menu Period</u>		
3 meals per day	267	89.6
4 meals per day	11	3.7
5 meals per day	3	1.0
Others	13	4.4
No Response	6	1.3
Total	300	100.0
<u>Nourishment Menu</u>		
Yes	115	38.3
No	179	59.7
No Response	6	2.0
Total	300	100.0

TABLE XIX

CHI SQUARE ASSOCIATION OF THE  
TYPE OF MENUS USED IN  
HOSPITAL FOODSERVICES  
BY WHOLESALE CUTS

Wholesale Cuts	$\chi^2$	p	Fixed Menu	Cyclical Menu
Side	3.97	0.040	26.67	73.33
Quater	4.73	0.030	28.33	71.67
Rib Primal	4.09	0.042	26.67	73.33
Ribeye Roll	3.87	0.045	28.33	71.67
Spencer Roll	5.30	0.021	30.00	70.00
Chuck Cross Cut	4.03	0.045	12.98	87.02
Chuck Square-cut	7.74	0.003	3.99	96.01
Shoulder Cold	3.84	0.050	19.76	80.24

TABLE XX

CHI SQUARE ASSOCIATION OF THE  
TYPE OF MENUS USED IN  
HOSPITAL FOODSERVICES  
BY MENU ITEMS

Menu Items	$\chi^2$	p	Fixed Menu	Cyclical Menu
Hot Beef Sandwich (R)	3.96	0.042	46.67	53.33
Beef Stew (R)	6.04	0.012	21.67	78.37
Chili (M)	9.26	0.002	86.67	13.33
Baked Pepper Steak (R)	9.16	0.002	100.00	0
Hot Tamale Pie	4.77	0.029	95.00	5.00
Roast Beef	5.05	0.023	81.67	18.33
Creamed Chipped Beef/ Toast Cups	5.935	0.019	11.67	88.33

R = Regular diet  
M = Modified diet



of beef should be an important factor when establishing purchasing and menu planning criteria.

The length of the cyclical menus varied. Sixty-two (20.7 percent) of the hospital foodservice departments used a 7 day menu cycle, while 25 (8.3 percent) use 15 day cycle. A 22 day menu cycle was used by 39 (13.0 percent) of the hospital foodservice departments, while 4 week and 5 week menu cycles were used by 59 (19.7 percent) and 23 (7.7 percent) of the hospital foodservice departments respectively.

The majority of the hospital foodservice departments (89.6 percent, N=267) served a menu with 3 meals per day, while only 9.1 percent (N=27) of the foodservice departments served more than three meals per day. One hundred and seventy-nine (59.7 percent) of the hospital foodservice departments did not have a nourishment menu, while 115 (38.3 percent) offered nourishments to their patients. These findings were similar to Eckstein's research (42) relative to the number of meals served per day. In 1970, Eckstein determined that 90 percent of the hospital foodservice departments served 3 meals per day.

#### Menu Planning and Evaluation

Data in Table XXI presents information on menu planning and evaluation by hospital foodservice management and staff. Over 15.7 percent (N=47) of the hospital foodservice menus were designed by foodservice

managers, while in 86 (28.6 percent) hospitals, menus were designed by dietitians. In 122 (40.7 percent) hospital foodservice department, menus were designed through the cooperation of foodservice managers and dietitians, while in 36 ( 12.0 percent) hospitals menus were designed by other people.

Menu analysis and modification were conducted irregularly in the hospital foodservice departments. The time length between the analyses ranged from less than a month to once a year. In 55.0 percent (N=165) of the hospitals menu analysis was conducted twice or once a year, while in 39.6 percent (N=119) of the hospital, menu analysis was done quarterly.

Data in Table XXII presents beef purchasing information of the respondents. Beef purchasing in the hospital foodservice departments was done primarily by foodservice managers and administrative dietitians.

In 52.0 percent (N=156) of the hospitals beef was purchased by foodservice managers, while in 24.3 percent (N=73) of the hospitals the purchasing was performed by administrative dietitians. In only 9 (3.0 percent) of the hospitals, beef purchasing was conducted by clinical dietitians, while in other 27 (9.0 percent) it was done by catering departments or central purchasing within the hospitals. In the remaining 28 (9.3 percent) of the hospitals, beef was purchased through other channels

TABLE XXI  
 FREQUENCY AND PERCENTAGE OF SUBJECTS  
 ACCORDING TO MENU PLANNING  
 AND EVALUATION

---

Menu Planning and Evaluation	N	Percentage
<u>Menu Planned by</u>		
Foodservice Manager	47	15.7
Clinical Dietitian	31	10.3
Administrative Dietitian	55	18.3
Cooperation of Dietitian and Foodservice manager	122	40.7
Others	36	12.0
No Response	9	3.0
Total	300	100.0
<u>Menu Evaluated in</u>		
Less than one Month	34	11.3
Every Two Months	18	6.0
Every Three Months	36	12.0
Every Four Months	31	10.3
Twice a Year	95	31.7
Once a year	70	23.3
No Response	16	5.3
Total	300	100.0

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TABEL XXII  
 FREQUENCY AND PERCENTAGE OF SUBJECTS  
 ACCORDING TO BEEF PURCHASING

Procurement Management	N	Percentage
<u>Purchased by</u>		
Administrative Dietitian	73	24.3
Clinical Dietitian	9	3.0
Foodservice Manager	156	52.0
Catering Department	6	2.0
Centralized by the Hospital Purchasing Department	17	5.7
With Other Organizations	4	1.3
Others	28	9.3
No Response	7	2.3
<b>Total</b>	<b>300</b>	<b>100.0</b>
<u>Purchasing Source</u>		
Wholesale Meat Outlet	217	72.6
Retail Meat Outlet	43	14.4
Rancher	2	0.7
Others	29	9.7
No Response	8	2.7
<b>Total</b>	<b>300</b>	<b>100.0</b>
<u>Purchasing Category</u>		
Bone-in	26	8.7
Boneless	237	79.0

including cooperation with other hospitals and from foodservice contract purveyors.

Most of the respondents chose not to answer the questions related to purchasing specifications. The reason was probably because they were not in charge of purchasing and unfamiliar with the purchasing terms. However, the responses obtained still indicated that some of the wholesale cuts were frequently purchased by many hospital foodservice departments.

The majority of the hospital foodservice departments (72.6 percent, N=217) purchased beef from wholesale meat purveyors, while 43 (14.4 percent) of the hospital foodservice departments bought beef from retail outlets. Only 0.7 percent (N=2) of the hospitals obtained beef from ranchers directly, and 29 (9.7 percent) hospitals obtained beef from other outlets.

When purchasing beef, the majority of the hospital foodservice departments (63.2 percent, N=189) purchased both wholesale, prefabricated and oven prepared cuts. Only 11.3 (N=34) of the hospital foodservices just purchased wholesale cuts, while 20.4 percent (N=61) and 15.1 percent (N=45) bought only prefabricated cuts and oven prepared cuts respectively. Boneless beef was purchased by most of the hospital foodservice departments (79.9 percent, N=237), while only 8.7 percent (N=26) purchased beef with bone in.

Table XXIII presents information on beef consumption of the respondents. Two hundred and eighteen (72.7 percent) of the hospital foodservice departments consumed more beef than other meats. Over 21.0 percent (N=63) of the hospital foodservice departments consumed beef as same as other meats, while only in 5.3 percent (N=16) beef consumption was less than other meats.

The majority of the hospital (82.3 percent, N=247) foodservice departments consumed less than 5,000 pounds of beef in the first three months of 1988, while 8 (2.7 percent) consumed 5,000 to 9,999 pounds of beef in the same period. Twenty-five (8.3 percent) hospitals consumed more than 10,000 pounds of beef in the first three months of 1988.

The researcher conducted statistical analyses on the relationship between purchasing personnel, purchasing sources in hospital foodservice to purchasing specifications and menu items. Statistical association was found (Table XXIII) between purchasing personnel and some of the menu items in both regular and modified diets ( $df=1$ ,  $X^2 \geq 3.84$ ,  $p \leq 0.05$ ). The relationship between beef items on menu and purchasing personnel might exist depending on the degree of processing needed for each beef item. Because of the high cost of labor, the purchasing personnel may purchase more prefabricated and convenience products.

TABLE XXIII  
 FREQUENCY AND PERCENTAGE OF SUBJECTS  
 ACCORDING TO BEEF CONSUMPTION

Beef Consumption	N	Percentage
<u>Beef Consumption is</u>		
Much more than other meats	93	31.0
A little more than other meats	125	41.7
Same as other meats	63	21.0
Less than other meats	16	5.3
No Response	3	1.0
Total	300	100.0
<u>Overall Beef Consumption</u>		
Less than 1,000 pounds	115	38.3
1,000 to 2,999 pounds	74	24.7
3,000 to 4,999 pounds	27	9.0
5,000 to 5,999 pounds	18	6.0
6,000 to 6,999 pounds	13	4.3
7,000 to 7,999 pounds	5	1.7
8,000 to 8,999 pounds	2	0.7
9,000 to 9,999 pounds	1	0.3
More than 10,000 pounds	25	8.3
No Response	20	6.7
Total	300	100.0

TABEL XXIV

CHI SQUARE ASSOCIATION OF PURCHASING  
IN HOSPITAL FOODSERVICES  
BY MENU ITEMS

Menu Items	X <sup>2</sup>	p	Food Service Manager	Other
Hungarian Goulash (R)	3.85	0.050	63.46	36.54
Spanish Rice (R)	4.93	0.026	60.26	39.74
Broiled Steak (R)	4.87	0.028	60.80	39.74
Breaded Grill Steak (R)	11.11	0.001	75.64	24.36
Baked Steak (R)	4.78	0.029	60.90	39.10
Breaded Beef Cutlet (R)	4.87	0.027	64.74	35.25
Bar B-Q Steak (R)	0.04	4.084	61.22	38.78

R = Regular diet  
M = Modified diet

TABLE XXV

CHI SQUARE ASSOCIATION OF OVERALL BEEF  
CONSUMPTION IN HOSPITAL FOODSERVICES  
BY CHARACTERISTICS OF HOSPITAL AND  
HOSPITAL FOODSERVICE

Characteristics	df	X <sup>2</sup>	p
<u>Hospital</u>			
Location	1	22.511	0.000
Number of Beds	1	40.548	0.000
Admission	1	39.875	0.000
Specification	1	9.917	0.002
<u>Hospital Foodservice</u>			
Meals Served Per Day	1	59.177	0.000
Purchasing Personnel	1	4.350	0.037



Statistical associations (Table XXV) were found between overall beef consumption and a) all the institutional characteristics except the type of institution, and b) meals served per day, purchasing personnel in hospital foodservice department variables (df=1,  $X^2 > 3.84$ ,  $p < 0.05$ ).

### Hypothesis Testing

In this study, the factors that influenced beef consumption in hospital foodservice department were evaluated using a frequency distribution and chi-square tests of independence. The result of the testing of the seven null hypotheses are indicated as follows:

H1: There will be no significant association between beef purchasing specifications in hospital foodservice and selected personnel demographic variables including age, sex education level, and major of study.

All the demographic characteristics were found to be not significantly associated with the purchasing specifications, hence, the researcher failed to reject the null hypothesis.

H2: There will be no significant association between inclusion of beef items in the hospital foodservice menus and selected demographic variables as in H 1.

All the demographic characteristics were found to be significantly associated with some of the beef

items in hospital foodservice menus (Table VII-IX).

Hence, the researcher rejected the null hypothesis for all categories except in instances where  $X^2 \leq 3.84$  and  $p \geq 0.05$ .

H3: There will be no significant associations between inclusion of beef items into hospital foodservice menus and selected hospital foodservice department variables including type of foodservice system, size (number of meals served per day), menu style, length of cyclical menu, menu planning and evaluation, and purchasing personnel.

All hospital foodservice characteristics were found to be significantly associated with some of the beef items in hospital foodservice menus (Table XVI, XVII, XX, XXIV). Therefore, the researcher rejected the null hypothesis for all categories except in instances where  $X^2 < 3.84$  and  $p > 0.05$ .

H 4: There will be no significant association between beef purchasing specifications and selected foodservice department variables as in H 3.

When considering type of foodservice system, (Table XV) and menu style (Table XIX), the researcher rejected the null hypothesis. When you consider size of foodservice departments, length of menu, menu planning and evaluation and purchasing personnel, the researcher failed to reject the null hypothesis.

H 5: There will be no significant association between overall beef consumption and

selected hospital foodservice department variables as in H 3.

When considering size of the hospital foodservice departments (number of meals served per day), and purchasing personnel, the researcher rejected the null hypothesis. When you consider type of foodservice system, menu style, length of the menus, menu planning and evaluation, and purchasing personnel, the researcher failed to reject the null hypothesis.

H 6: There will be no significant association between overall beef consumption and selected institutional characteristic variables including location, size (number of beds), annual admission, specification, and type of institution.

All hospital characteristics, except for type of institutions were found to be significantly associated with overall beef consumption (Table XXV). Hence, the researcher rejected the null hypothesis except in <sup>2</sup> instances where  $X \leq 3.84$  and  $p \geq 0.05$ .

H 7: There will be no significant association between purchasing specification and selected institutional characteristic variables as in H 6.

All hospital characteristic variables were found not significantly associated with overall beef consumption. Hence, the researcher failed to reject the null hypotheses.

## CHAPTER V

### SUMMARY, AND RECOMMENDATIONS

This study was to identify those factors which influenced beef utilization in hospital foodservice departments in selected Midwestern states including: Kansas, Nebraska, Missouri, Oklahoma and Texas. The objectives of this study were: 1) to obtain information on foodservice in hospital and other issues related to the consumption of beef in hospital; 2) to identify those factors that influenced the inclusion of beef entrees in hospital foodservice menus, 3) to identify those factors that influence beef purchasing specifications; and 4) to identify the factors that influenced overall beef consumption in hospital foodservice departments.

The review of literature for this study focused on beef production, consumption and the factors that could influence them in the United States. In addition, hospital foodservice and the role and responsibilities of both clinical and administrative dietitians. Results of this study may indicate whether there are relationships between beef consumption patterns and the characteristics of the hospital, foodservice department in hospital and respondents who are in charge of the foodservice.

The survey instrument was a questionnaire administered by the researcher for data collection. The names and addresses of the hospitals were obtained from the American Hospital Association Guide to the Health Care Field 1986 Edition (9). Table V on page 41 presents the distribution of the hospitals in the five states. The questionnaire was mailed to 1,125 hospitals addressed to the administrative dietitians. The response rate was 26.8 percent. The data were analyzed for frequency of subject's response and also for significant associations as related to beef consumption.

#### Characteristics of the Respondents

Over 36.7 percent of the administrative dietitians were 30 to 39 years of age, while 13.7 percent were under 30 and 47.7 percent were over 40 years old. The majority of the administrative dietitians (92 percent) were female while only 6.3 percent were male.

Most of the administrative dietitians (60.7 percent) had bachelor degrees, while only 0.3 percent of the respondents had doctoral degree and 13.3 percent had degrees lower than a bachelor degree. Among the administrative dietitians, 23.7 percent obtained master degrees.

The predominant field of study (87 percent) for the administrative dietitians was food and nutrition. The remaining majors included food science (4.3 percent),

institution administration (3.0 percent), education (2 percent), hotel and restaurant administration (1.7 percent), business administration and hospital administration (6 percent). Statistical analysis showed that significant association existed between beef items in the hospital foodservice menus and the age, sex, education level, field of study of the characteristics of the administrative dietitians.

#### Characteristics of the Institution

Over 37.3 percent of the hospitals were located in cities with population under 10,000, while 20 percent of the hospitals were in cities that had over 150,000 inhabitants. Forty-one percent of the hospitals were located in the cities with inhabitants from 10,000 to 150,000.

Most of these hospitals (82.6 percent) were licenced to have from 50 to 299 beds, while 9.3 percent had 300 to 499 beds and 6.3 percent had 500 or more. In 1987, 19.7 percent of the hospitals had less than 1,000 admission, while 15.1 percent had more than 10,000. The majority of the hospitals (51.8 percent) had admission from 1,000 to 9,999.

Over 26.7 percent of the hospitals were owned by the government, while 55.7 percent were privately owned. Most of the hospitals (76.7 percent) were general hospitals, while 21.3 percent specialized on certain diseases.

In 54.3 of the hospitals, patients stayed from 1 to 5 days, while in 1.7 percent and 11.7 percent patients stayed less than one day and more than 20 days respectively. All characteristics except type of institution were found significantly associated with overall beef consumption in hospital foodservice departments.

#### Characteristics of the Hospital Foodservices

The majority of the hospital foodservice departments (90.7 percent) utilized a conventional foodservice system, while only 9.3 percent were assembly and serve and commissary systems. Most of the hospital foodservice (64.0 percent) were small in size. They served less than 399 meals per day, while 13.0 percent of the departments served more than 1,000 meals per day and 22.1 percent served from 400 to 1,000 meals per day.

Eighty percent of these hospital foodservice departments, use cyclical menus, while only 18.9 percent of them utilized fixed or other menus. The menu period in majority of the hospital foodservice departments (89.6 percent) served 3 meals per day, while 10.4 percent of the departments had menus that offered more than 3 meals per day.

In over 20.7 percent of the hospital foodservice departments, the menu cycle was one week, while 8.3 percent and 13 percent were 15 days and 22 days respectively. In

27.4 percent of the departments, the menu cycle was 4 weeks or longer.

In 40.7 percent of the hospital foodservice departments, the menus were designed through the cooperation of dietitians and foodservice managers, while in 10.3 percent and 18.3 percent of the departments, the menus were planned by clinical dietitian and administrative dietitians respectively. In 15.7 percent of the departments, the menus were designed by only the foodservice manager.

In 52.0 percent of the hospital foodservice departments, beef purchasing was conducted by foodservice managers, while administrative dietitians and clinical dietitians did the purchasing in 24.3 percent and 3 percent of the departments respectively. In 18.3 percent of the departments, beef was purchased through other methods.

Wholesale meat outlet was the most popular way for the hospital foodservice departments (72.6 percent) to get beef, while retail meat outlet supplied 14.4 percent of the foodservice departments. In 13.1 percent of the departments beef was purchased from other channels.

In the characteristics of hospital foodservice department, type of foodservice system and type of menu were significantly associated with purchasing specifications, while type and size of the hospital foodservice departments, and type of the menu and purchasing personnel were associated with beef items in hospital foodservice menus.



### Beef Consumption and Influencing Factors

Over 72.7 percent of the hospitals consumed more beef than other meats, while 5.3 percent consumed less beef than other meats, and 21.0 percent of the hospital foodservice departments, consumed as much beef as other meats. In the first three months of 1987, over 63.0 percent of the hospital foodservice departments consumed less than 3,000 pounds of beef, while 8.3 percent consumed more than 10,000 pounds in the same period. Twenty-two percent of the departments consumed from 3,000 to 9,999 pounds of beef. Statistical analysis showed that characteristics of hospitals and their foodservice departments were significantly associated with the overall beef consumption.

Based on the findings of this study, the researcher arrived at several conclusions. First, beef is the most popular menu items in hospital foodservice. In turn, patients seem to consume more beef than other meats. Second, characteristics of the respondents in charge of the hospital foodservice have clearly influenced the inclusion of beef items in the hospital foodservice menus. Third, beef consumption in hospital environment could be influenced by the characteristics of hospital and their foodservice departments. Lastly, purchasing is an important element in hospital foodservice

departments. It could greatly influence beef consumption in hospital foodservice environment.

Recommendation for Further Study  
and Research

1) A similar study with a different population, such as patients, is needed to determine the beef consumption patterns and the factors that influence consumer behavior in hospital foodservice department.

2) A further research concerning the effectiveness of marketing strategies and sale methods on beef consumption in hospital foodservice is needed in order to find out the factors that influence beef consumption in hospital foodservice departments from the supply side.

3) Further analysis of hospital food purchasing is needed to determine purchasing specifications, sources and personnel who are in charge in order to assist to improve efficiency and performance of purchasing in hospital foodservice departments.

4) It is suggested that more study be carried out the extent of nutrition aspects of beef about which administrative dietitians and foodservice manager are knowledgeable about. The result may help to improve the recognition of beef as a nutritious food and increase beef consumption in hospital foodservice departments.

5) A study to determine specific educational needs about beef purchasing, cooking and menu planning is needed.

6) Recommendations for the questionnaire:

a: The questionnaire can be improved by reducing the length of some of the questions and the total number of the questions.

b: The purchasing specification questions can be clarified by having the respondents give "yes" or "no" answers.

c: When the questionnaire is used to survey different respondents, the questions should be modified to obtain accurate and timely information.

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APPENDIX I

RESEARCH INSTRUMENT

Department of Food, Nutrition And Institution Administration  
Oklahoma State University

Survey of Factors That Influence Use of Beef  
on Menus and in Hospital Foodservice

This survey concerns about beef consumption in hospital foodservice environment. The survey contains 36 questions and is being conducted in the Midwestern part of the country. Your assistance will be important to a successful completion and is greatly appreciated. The confidentiality of your response is guaranteed. If you have any questions, please call Mr. Yan Min Zhang at (405) 624-3701 or Dr. Jerrold Leong at (405) 624-5309.

I. Questions on demographic information

1. We would like to know if you are
  - a. \_\_\_\_\_ female or,
  - b. \_\_\_\_\_ Male.
  
2. Your age is in the range of
  - a. \_\_\_\_\_ under 30,
  - b. \_\_\_\_\_ 30-39,
  - c. \_\_\_\_\_ 40-49
  - d. \_\_\_\_\_ 50-59,
  - e. \_\_\_\_\_ 60 or older.
  
3. Highest degree you have obtained is: (Please check all that apply.)
  - a. \_\_\_\_\_ Bachelor degree,
  - b. \_\_\_\_\_ Master degree,
  - c. \_\_\_\_\_ Doctoral degree,
  - d. \_\_\_\_\_ other Please specify \_\_\_\_\_
  
4. The emphasis in your undergraduate (U) and graduate (G) education is: (Please place the correct letter beside the appropriate response).
  - a. \_\_\_\_\_ dietetics and/or food and nutrition
  - b. \_\_\_\_\_ food science

(question 4 continued)

- c. \_\_\_\_\_ institutional administration
  - d. \_\_\_\_\_ education
  - e. \_\_\_\_\_ hotel and restaurant administration
  - f. \_\_\_\_\_ other please specify \_\_\_\_\_
5. The location of your hospital is in a city with population of \_\_\_\_\_.
- a. \_\_\_\_\_ less than 10,000
  - b. \_\_\_\_\_ 10,000 to 49,999
  - c. \_\_\_\_\_ 50,000 to 99,999
  - d. \_\_\_\_\_ 100,000 to 150,000
  - e. \_\_\_\_\_ more than 150,000
6. Your hospital is licensed for \_\_\_\_\_ beds.
- a. \_\_\_\_\_ 50-99,
  - b. \_\_\_\_\_ 100-199,
  - c. \_\_\_\_\_ 200-299,
  - d. \_\_\_\_\_ 300-399,
  - e. \_\_\_\_\_ 400-499,
  - f. \_\_\_\_\_ 500 or more.
7. The annual in-patient admission of your hospital in 1987 was in the range of:
- a. \_\_\_\_\_ less than 1,000
  - b. \_\_\_\_\_ 1,000-2,999
  - c. \_\_\_\_\_ 3,000-5,999
  - d. \_\_\_\_\_ 6,000-9,999
  - e. \_\_\_\_\_ more than 10,000.
8. Is your hospital specialized in a certain disease or you treat a certain kind of patients?
- a. \_\_\_\_\_ Yes,
  - b. \_\_\_\_\_ No.
- If yes, please specify \_\_\_\_\_
9. The occupancy percentage of your hospital in 1987 is in the range of
- a. \_\_\_\_\_ lower than 50 percent,
  - b. \_\_\_\_\_ 50 to 59 percent
  - c. \_\_\_\_\_ 60 to 69 percent,
  - d. \_\_\_\_\_ 70 to 79 percent,
  - e. \_\_\_\_\_ 80 to 89 percent,
  - f. \_\_\_\_\_ 90 percent or more.
10. The average daily census of your hospital is
- a. \_\_\_\_\_ less than 50,
  - b. \_\_\_\_\_ 50 to 99,
  - c. \_\_\_\_\_ 100 to 199,
  - d. \_\_\_\_\_ 200 to 299,
  - e. \_\_\_\_\_ 300 to 399,
  - f. \_\_\_\_\_ 400 to 499
  - g. \_\_\_\_\_ more than 500.

11. Your hospital is a \_\_\_\_\_ institution. (Please check only one.)
- \_\_\_\_\_ government-owned non-profit
  - \_\_\_\_\_ privately owned non-profit
  - \_\_\_\_\_ privately owned for profit
  - \_\_\_\_\_ teaching hospital
  - \_\_\_\_\_ other please specify \_\_\_\_\_
12. The average length of stay is
- \_\_\_\_\_ less than one day.
  - \_\_\_\_\_ 1 to 5 days.
  - \_\_\_\_\_ 6 to 9 days.
  - \_\_\_\_\_ 10 to 19 days.
  - \_\_\_\_\_ more than 20 days.

## II. Questions on the foodservice

13. The type of foodservice in your hospital is:
- \_\_\_\_\_ conventional foodservice system (production and service of quality food within a foodservice operation while effectively utilizing all renewable and non-renewable resources).
  - \_\_\_\_\_ assembly-serve foodservice system (food products are only procured after a considerable degree of processing; only storage, assembly, heating and service functions are done on the site).
  - \_\_\_\_\_ commissary foodservice system (centralized food procurement and production functions with distribution of prepared menu items to several remote areas for final preparation and service).
  - \_\_\_\_\_ other please specify \_\_\_\_\_.
14. The food service in your hospital serves \_\_\_\_\_ meals per day.
- \_\_\_\_\_ less than 200
  - \_\_\_\_\_ 200 - 399
  - \_\_\_\_\_ 400 - 599
  - \_\_\_\_\_ 600 - 799
  - \_\_\_\_\_ 800 - 1,000
  - \_\_\_\_\_ more than 1,000

15. The foodservice in your hospital uses a \_\_\_\_\_ menu.
- \_\_\_\_\_ selective fixed menu,
  - \_\_\_\_\_ non-selective fixed menu,
  - \_\_\_\_\_ selective cyclical menu,
  - \_\_\_\_\_ non-selective cyclical menu,
  - \_\_\_\_\_ other Please specify\_\_\_\_\_
16. If you use cyclical menu, the term of the cyclical is:
- \_\_\_\_\_ one week,
  - \_\_\_\_\_ 15 days
  - \_\_\_\_\_ 22 days,
  - \_\_\_\_\_ 4 weeks,
  - \_\_\_\_\_ five weeks,
  - \_\_\_\_\_ other kind Please specify\_\_\_\_\_
17. The menu period is:
- \_\_\_\_\_ 3 meals per day,
  - \_\_\_\_\_ 4 meals per day,
  - \_\_\_\_\_ 5 meals per day,
  - \_\_\_\_\_ other Please specify\_\_\_\_\_
18. Do you have a nourishment menu?
- \_\_\_\_\_ Yes,
  - \_\_\_\_\_ No.
- If yes, please specify\_\_\_\_\_.
19. If you have a nourishment menu, the menu is:
- \_\_\_\_\_ selective fixed menu,
  - \_\_\_\_\_ non-selective fixed menu,
  - \_\_\_\_\_ selective cyclical menu,
  - \_\_\_\_\_ non-selective cyclical menu,
  - \_\_\_\_\_ other Please specify\_\_\_\_\_.
20. If you have a cyclical nourishment menu. The term is:
- \_\_\_\_\_ one week,
  - \_\_\_\_\_ 15 days,
  - \_\_\_\_\_ 22 days,
  - \_\_\_\_\_ four weeks,
  - \_\_\_\_\_ five weeks,
  - \_\_\_\_\_ other Please specify\_\_\_\_\_.
21. In your hospital, the menu is planned by
- \_\_\_\_\_ foodservice manager,
  - \_\_\_\_\_ clinical dietitian,
  - \_\_\_\_\_ administrative dietitian,
  - \_\_\_\_\_ cooperation of dietitian and food service manager.
  - \_\_\_\_\_ other Please specify\_\_\_\_\_.

22. How often do you conduct menu analysis or modify your menu?

- a. \_\_\_\_\_ less than one month,
- b. \_\_\_\_\_ every two months,
- c. \_\_\_\_\_ every three months,
- d. \_\_\_\_\_ every four months,
- e. \_\_\_\_\_ twice a year,
- f. \_\_\_\_\_ once a year.

23. Who is in charge of the menu analysis?

- a. \_\_\_\_\_ foodservice manager,
- b. \_\_\_\_\_ clinical dietitian,
- c. \_\_\_\_\_ administrative dietitian,
- d. \_\_\_\_\_ cooperation of dietitian and foodservice manager.

### III. Questions on purchasing

24. In your hospital, food purchasing is done by:

- a. \_\_\_\_\_ administrative dietitian,
- b. \_\_\_\_\_ clinical dietitian,
- c. \_\_\_\_\_ foodservice manager
- d. \_\_\_\_\_ catering department
- e. \_\_\_\_\_ centralized by the hospital purchasing dept.
- f. \_\_\_\_\_ with other hospitals or organizations  
(group purchasing)
- g. \_\_\_\_\_ other Please specify \_\_\_\_\_

25. How do you purchase beef for your foodservice? (Check only one that applies)

- a. \_\_\_\_\_ wholesale cuts
- b. \_\_\_\_\_ prefabricated cuts
- c. \_\_\_\_\_ oven-prepared cuts
- d. \_\_\_\_\_ combination of a, b, c,
- e. \_\_\_\_\_ other Please specify \_\_\_\_\_

26. If you buy wholesale, which of the following categories do you buy the most frequently (M) and which ones do you buy the least frequently (L)? Please check all categories that apply by placing correct letter in the space.

- 1. \_\_\_\_\_ carcass
- 2. \_\_\_\_\_ side
- 3. \_\_\_\_\_ quater
- 4. \_\_\_\_\_ rib primal
- 5. \_\_\_\_\_ rib oven-prepared
- 6. \_\_\_\_\_ rib roast ready
- 7. \_\_\_\_\_ ribeye roll
- 8. \_\_\_\_\_ spencer roll
- 9. \_\_\_\_\_ chuck armbone
- 10. \_\_\_\_\_ chuck cross cut
- 11. \_\_\_\_\_ chuck roll
- 12. \_\_\_\_\_ chuck square-cut

(question 16 continued)

13. \_\_\_\_\_ shoulder cold
  14. \_\_\_\_\_ brisket deckle on
  15. \_\_\_\_\_ brisket deckle off
  16. \_\_\_\_\_ Round rump
  17. \_\_\_\_\_ round outside
  18. \_\_\_\_\_ eye of round
  19. \_\_\_\_\_ top round
  20. \_\_\_\_\_ round shank off
  21. \_\_\_\_\_ strip loin
  22. \_\_\_\_\_ short loin
  23. \_\_\_\_\_ full loin
  24. \_\_\_\_\_ bottom sirloin
  25. \_\_\_\_\_ top sirloin
  26. \_\_\_\_\_ butt sirloin
  27. \_\_\_\_\_ tender loin
  28. \_\_\_\_\_ short tender loin
  29. \_\_\_\_\_ butt tender loin
  30. \_\_\_\_\_ full tender loin
  31. \_\_\_\_\_ flank steak
  32. \_\_\_\_\_ hindquarter
  33. \_\_\_\_\_ other Please specify\_\_\_\_\_.
27. When you buy beef wholesale, you usually buy:  
 a. \_\_\_\_\_ bone-in,                      b. \_\_\_\_\_ boneless
28. When you purchase prefabricated beef, which of the following categories do you buy the most frequently (M) and which do you buy the least frequently (L)? Please check all that apply by placing correct letter in the space.
1. \_\_\_\_\_ cubed steaks
  2. \_\_\_\_\_ braising steaks
  3. \_\_\_\_\_ boneless rib steaks
  4. \_\_\_\_\_ rib eye roll steaks
  5. \_\_\_\_\_ rib eye rill lipin steaks
  6. \_\_\_\_\_ ground beef patties regular
  7. \_\_\_\_\_ ground beef patties with textured vegetable protein added
  8. \_\_\_\_\_ top round steaks
  9. \_\_\_\_\_ bottom round steaks
  10. \_\_\_\_\_ intermediate porter house steaks
  11. \_\_\_\_\_ short cut porter house steaks
  12. \_\_\_\_\_ intermediate T bone steaks
  13. \_\_\_\_\_ short cut T bone steaks
  14. \_\_\_\_\_ intermediate strip loin steaks
  15. \_\_\_\_\_ short cut strip loin steaks
  16. \_\_\_\_\_ extra short cut strip loin steaks
  17. \_\_\_\_\_ top sirloin steaks
  18. \_\_\_\_\_ semi-center cut sirloin steaks
  19. \_\_\_\_\_ center cut sirloin steaks
  20. \_\_\_\_\_ tender loin steaks



(question 28 continued)

21. \_\_\_\_\_ defatted with side muscle on tender loin steaks  
 22. \_\_\_\_\_ special tender loin steaks  
 23. \_\_\_\_\_ skinned tender loin steaks  
 24. \_\_\_\_\_ other Please specify \_\_\_\_\_.
29. The beef is purchased from:  
 a. \_\_\_\_\_ wholesale meat outlet  
 b. \_\_\_\_\_ retail meat outlet  
 c. \_\_\_\_\_ rancher  
 d. \_\_\_\_\_ other please specify \_\_\_\_\_
30. Do you have the following beef entrees in the cyclical menu of your patient foodservice? Please check all that apply to regular diets (R) and modified diets (M) or to both by placing correct letter beside.

Sandwiches

1. \_\_\_\_\_ BBQ Beef/Bun  
 2. \_\_\_\_\_ Hot Beef Sandwich  
 3. \_\_\_\_\_ Beef Hamburger/Bun  
 4. \_\_\_\_\_ Tacos Beef  
 5. \_\_\_\_\_ Grilled Corned Beef Sandwich  
 6. \_\_\_\_\_ other Please specify \_\_\_\_\_.

Beef - Cubed

7. \_\_\_\_\_ Beef Stroganoff/Rice  
 8. \_\_\_\_\_ Hungarian Goulash  
 9. \_\_\_\_\_ Beef Stew  
 10. \_\_\_\_\_ Escalloped Beef  
 11. \_\_\_\_\_ Beef Chop Suey  
 12. \_\_\_\_\_ Braised Beef & Noodles  
 13. \_\_\_\_\_ Beef Pot Pie/Crust  
 14. \_\_\_\_\_ Beef Paprikash  
 15. \_\_\_\_\_ other Please specify \_\_\_\_\_.

Beef - Ground

16. \_\_\_\_\_ Chili  
 17. \_\_\_\_\_ Meat Balls/Spaghetti  
 18. \_\_\_\_\_ Lasagna  
 19. \_\_\_\_\_ Schoolboy/Bun  
 20. \_\_\_\_\_ Chili Mac  
 21. \_\_\_\_\_ Salisbury Steak  
 22. \_\_\_\_\_ Hamburger Steak  
 23. \_\_\_\_\_ Italian Spaghetti  
 24. \_\_\_\_\_ Beef Biscuit Roll  
 25. \_\_\_\_\_ Chuck Wagon Steak  
 26. \_\_\_\_\_ Baked Pepper Steak  
 27. \_\_\_\_\_ Spanish Rice

(question 30 continued)

28. \_\_\_\_\_ Hot Tamale Pie  
 29. \_\_\_\_\_ Sicilian Chopped Steak  
 30. \_\_\_\_\_ Beef Croquettes  
 31. \_\_\_\_\_ other Please specify \_\_\_\_\_.

Beef - Whole Meat

32. \_\_\_\_\_ Roast Beef  
 33. \_\_\_\_\_ Pot Roast of Beef/Vegetables  
 34. \_\_\_\_\_ Beef Patty  
 35. \_\_\_\_\_ Bar B-Q Beef Brisket  
 36. \_\_\_\_\_ other Please specify \_\_\_\_\_.

Beef - Steaks

37. \_\_\_\_\_ Broiled Steak  
 38. \_\_\_\_\_ Smothered Steak  
 39. \_\_\_\_\_ Breaded Grill Steak  
 40. \_\_\_\_\_ Baked Steak  
 41. \_\_\_\_\_ Breaded Chopped Sirloin Steak  
 42. \_\_\_\_\_ Country Fried Steak  
 43. \_\_\_\_\_ Breaded Beef Cutlet  
 44. \_\_\_\_\_ Swiss Steak  
 45. \_\_\_\_\_ Grilled Chopped T-Bone  
 46. \_\_\_\_\_ Bar B-Q Steak

Miscellaneous

47. \_\_\_\_\_ Creamed Chipped Beef/Baked Potato  
 48. \_\_\_\_\_ Creamed Chipped Beef/Toast Cups  
 49. \_\_\_\_\_ Liver & Onions  
 50. \_\_\_\_\_ other Please specify \_\_\_\_\_.

IV. Questions on Opinions

31. In your opinion beef is more nutritious than other meat.  
 a. \_\_\_\_\_ strongly agree,  
 b. \_\_\_\_\_ agree,  
 c. \_\_\_\_\_ do not know,  
 d. \_\_\_\_\_ disagree,  
 e. \_\_\_\_\_ strongly disagree.
32. Beef consumption in your patient food service is:  
 a. \_\_\_\_\_ much more than other meat.  
 b. \_\_\_\_\_ a little more than other meat.  
 c. \_\_\_\_\_ same as other meat.  
 d. \_\_\_\_\_ less than other meat.

33. In modified diets, to which following categories of patients do you recommend decrease beef consumption. Please check all that apply.
- a. \_\_\_\_\_ gastrointestinal disease
  - b. \_\_\_\_\_ diabetes mellitus
  - c. \_\_\_\_\_ cardiovascular disease
  - d. \_\_\_\_\_ respiratory disease
  - e. \_\_\_\_\_ malnutrition
  - f. \_\_\_\_\_ renal disease
  - g. \_\_\_\_\_ liver disease
  - h. \_\_\_\_\_ lung disease
  - i. \_\_\_\_\_ cerebral disease
  - j. \_\_\_\_\_ pregnant
  - k. \_\_\_\_\_ cancer
  - l. \_\_\_\_\_ post-surgical
  - m. \_\_\_\_\_ anemia, low serum iron
  - n. \_\_\_\_\_ hyperlipidemia
34. Please indicate that what are the reasons that make patients hesitate to take beef entrees in their diets. Please check all that apply.
- a. \_\_\_\_\_ cholesterol content
  - b. \_\_\_\_\_ dietitian`s/physicians` recommendation
  - c. \_\_\_\_\_ more expensive than other meats
  - d. \_\_\_\_\_ avoiding red meat
  - e. \_\_\_\_\_ disease abstain
  - f. \_\_\_\_\_ taste
  - g. \_\_\_\_\_ religious reason
  - h. \_\_\_\_\_ do not like the type of cooking
  - i. \_\_\_\_\_ influenced by people other than medical staff
  - j. \_\_\_\_\_ vegetarian
  - k. \_\_\_\_\_ poorly tolerated
  - l. \_\_\_\_\_ other please specify \_\_\_\_\_
35. The approximate average amount of beef consumption in last three months (Jan., Feb, March, 1988) in your patient foodservice is:
- a. \_\_\_\_\_ less than 1,000 pounds
  - b. \_\_\_\_\_ 1,000 to 1,999 pounds
  - c. \_\_\_\_\_ 2,000 to 2,999 pounds
  - d. \_\_\_\_\_ 3,000 to 3,999 pounds
  - e. \_\_\_\_\_ 4,000 to 4,999 pounds
  - f. \_\_\_\_\_ 5,000 to 5,999 pounds
  - g. \_\_\_\_\_ 6,000 to 6,999 pounds
  - h. \_\_\_\_\_ 7,000 to 7,999 pounds
  - i. \_\_\_\_\_ 8,000 to 8,999 pounds
  - j. \_\_\_\_\_ 9,000 to 9,999 pounds
  - k. \_\_\_\_\_ more than 10,000 pounds

36. From what sources do you get institutional foodservice information with respect to beef?  
Please specify in detail \_\_\_\_\_

---

APPENDIX II

CORRESPONDENCES

August 14, 1988

Dear Collleague:

We need your help in obtaining important information relative to factors influencing beef-consumption of patient food service in hospitals.

We would appreciate your assistance in completing the attached questionnaire, and returning it to us within three weeks from your receipt of this letter. Your response will be kept strictly confidential.

Please fold the back page so it will show: CENTRAL MAILING SERVICES, STILLWATER OKLAHOMA 74075-9988.

Thank you for taking time from your busy schedule to complete this questionnaire. Your response will be extremely important in this testification. We look forward to hearing from you in the near future.

Sincerely,

Yan Min Zhang  
Research Assistant

Jerrold Leong, Ph.D.  
Associate Professor

## APPENDIX III CHI-SQUARE TABLES

SAS

TABLE OF SPEC BY AV

SPEC	AV		TOTAL
FREQUENCY	1	2	
1	30	34	64
	40.7	23.3	
	2.83436	4.96664	21.33
	10.00	11.33	
	46.88	53.13	
	15.71	31.19	
2	161	75	236
	150.3	85.7	
	.768641	1.34688	78.67
	53.67	25.00	
	68.22	31.78	
	84.29	68.81	
TOTAL	191	109	300
	63.67	36.33	100.00

STATISTICS FOR TABLE OF SPEC BY AV

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	9.917	0.00

SAS

TABLE OF BED BY AV

BED	AV		TOTAL
FREQUENCY	1	2	
1	178	70	248
	157.9	90.1	
	2.56045	4.48666	82.67
	59.33	23.33	
	71.77	28.23	
	93.19	64.22	
2	13	39	52
	33.1	18.9	
	12.2114	21.3979	17.33
	4.33	13.00	
	25.00	75.00	
	6.81	35.78	
TOTAL	191	109	300
	63.67	36.33	100.00

STATISTICS FOR TABLE OF BED BY AV

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	40.656	0.00

SAS

TABLE OF LOCATION BY AV

LOCATION	AV		TOTAL
FREQUENCY	1	2	
1	137	48	185
	117.8	67.2	
	3.13525	5.49388	61.67
	45.67	16.00	
	74.05	25.95	
	71.73	44.04	
2	54	61	115
	73.2	41.8	
	5.04366	8.83798	38.33
	18.00	20.33	
	46.96	53.04	
	28.27	55.96	
TOTAL	191	109	300
	63.67	36.33	100.00

STATISTICS FOR TABLE OF LOCATION BY AV

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	22.511	0.00

SAS

TABLE OF AGE BY PFF7

AGE	PFF7		TOTAL
FREQUENCY	1	2	
1	68	89	157
	59.1	97.9	
	1.32843	.802739	52.33
	22.67	29.67	
	43.31	56.69	
	60.18	47.59	
2	45	98	143
	53.9	89.1	
	1.45848	.881328	47.67
	15.00	32.67	
	31.47	68.53	
	39.82	52.41	
TOTAL	113	187	300
	37.67	62.33	100.00

STATISTICS FOR TABLE OF AGE BY PFF7

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.471	0.03

SAS

TABLE OF DEGREE BY BFCBR8

DEGREE		BFCBR8		TOTAL
FREQUENCY	EXPECTED	CELL CHI2	PERCENT	
ROW PCT	COL PCT	1	2	
1	134	48		182
	125.6	56.4		
	.564552	1.25658		60.67
	44.67	16.00		
	73.63	26.37		
	64.73	51.61		
2	73	45		118
	81.4	36.6		
	.870749	1.93812		39.33
	24.33	15.00		
	61.86	38.14		
	35.27	48.39		
TOTAL	207	93		300
	69.00	31.00		100.00

5

SAS

TABLE OF MAJOR BY SWM3

MAJOR		SWM3		TOTAL
FREQUENCY	EXPECTED	CELL CHI2	PERCENT	
ROW PCT	COL PCT	1	2	
1	48	213		261
	54.8	206.2		
	.846125	2.24919		87.00
	16.00	71.00		
	18.39	81.61		
	76.19	89.87		
2	15	24		39
	8.2	30.8		
	5.66253	1.50523		13.00
	5.00	8.00		
	38.46	61.54		
	23.81	10.13		
TOTAL	63	237		300
	21.00	79.00		100.00

6

STATISTICS FOR TABLE OF DEGREE BY BFCBR8

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.630	0.03

STATISTICS FOR TABLE OF MAJOR BY SWM3

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	8.239	0.00

SAS

TABLE OF SEX BY SWM3

SEX		SWM3		TOTAL
FREQUENCY	EXPECTED	CELL CHI2	PERCENT	
ROW PCT	COL PCT	1	2	
1	53	223		276
	58.0	218.0		
	.424458	1.12831		92.00
	17.67	74.33		
	19.20	80.80		
	84.13	94.09		
2	10	14		24
	5.0	19.0		
	4.88127	1.29755		8.00
	3.33	4.67		
	41.67	58.33		
	15.87	5.91		
TOTAL	63	237		300
	21.00	79.00		100.00

7

SAS

TABLE OF SEX BY SWR3

SEX		SWR3		TOTAL
FREQUENCY	EXPECTED	CELL CHI2	PERCENT	
ROW PCT	COL PCT	1	2	
1	34	242		276
	38.6	237.4		
	.557184	.090704		92.00
	11.33	80.67		
	12.32	87.68		
	80.95	93.80		
2	8	16		24
	3.4	20.6		
	6.40762	1.0431		8.00
	2.67	5.33		
	33.33	66.67		
	19.05	6.20		
TOTAL	42	258		300
	14.00	86.00		100.00

8

STATISTICS FOR TABLE OF SEX BY SWM3

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	6.716	0.01

STATISTICS FOR TABLE OF SEX BY SWR3

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	8.099	0.004

SAS  
TABLE OF MAJOR BY BFCBR12

MAJOR	BFCBR12		TOTAL
FREQUENCY	1	2	
1	97	164	261
EXPECTED	102.7	158.3	
CELL CHI2	.312055	.202322	
PERCENT	32.33	54.67	87.00
ROW PCT	37.16	62.84	
COL PCT	82.20	90.11	
2	21	18	39
EXPECTED	15.3	23.7	
CELL CHI2	2.08837	1.354	
PERCENT	7.00	6.00	13.00
ROW PCT	53.85	46.15	
COL PCT	17.80	9.89	
TOTAL	118	182	300
	39.33	60.67	100.00

9

SAS  
TABLE OF AGE BY BFCBR11

AGE	BFCBR11		TOTAL
FREQUENCY	1	2	
1	135	22	157
EXPECTED	124.0	33.0	
CELL CHI2	.970256	3.65001	
PERCENT	45.00	7.33	52.33
ROW PCT	85.99	14.01	
COL PCT	56.96	34.92	
2	102	41	143
EXPECTED	113.0	30.0	
CELL CHI2	1.06525	4.00736	
PERCENT	34.00	13.67	47.67
ROW PCT	71.33	28.67	
COL PCT	43.04	65.08	
TOTAL	237	63	300
	79.00	21.00	100.00

10

STATISTICS FOR TABLE OF MAJOR BY BFCBR12 11

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	3.957	0.047

STATISTICS FOR TABLE OF AGE BY BFCBR11 12

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	9.693	0.002

SAS  
TABLE OF MAJOR BY BFCBR9

MAJOR	BFCBR9		TOTAL
FREQUENCY	1	2	
1	27	234	261
EXPECTED	32.2	228.8	
CELL CHI2	.836785	.117723	
PERCENT	9.00	78.00	87.00
ROW PCT	10.34	89.66	
COL PCT	72.97	88.97	
2	10	29	39
EXPECTED	4.8	34.2	
CELL CHI2	5.60002	.787836	
PERCENT	3.33	9.67	13.00
ROW PCT	25.64	74.36	
COL PCT	27.03	11.03	
TOTAL	37	263	300
	12.33	87.67	100.00

11

SAS  
TABLE OF SEX BY BFCBR9

SEX	BFCBR9		TOTAL
FREQUENCY	1	2	
1	28	248	276
EXPECTED	34.0	242.0	
CELL CHI2	1.07173	.150775	
PERCENT	9.33	82.67	92.00
ROW PCT	10.14	89.86	
COL PCT	75.68	94.30	
2	9	15	24
EXPECTED	3.0	21.0	
CELL CHI2	12.3249	1.73392	
PERCENT	3.00	5.00	8.00
ROW PCT	37.50	62.50	
COL PCT	24.32	5.70	
TOTAL	37	263	300
	12.33	87.67	100.00

12

STATISTICS FOR TABLE OF MAJOR BY BFCBR9

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	7.342	0.007

STATISTICS FOR TABLE OF SEX BY BFCBR9

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	15.281	0.001



SAS  
TABLE OF SEX BY BFCBM15

SEX	BFCBM15		TOTAL
FREQUENCY	1	2	
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	266	8	274
	263.0	11.0	
	.034995	.834044	
	89.26	2.68	91.95
	97.08	2.92	
	93.01	66.67	
2	20	4	24
	23.0	1.0	
	.399524	9.522	
	6.71	1.34	8.05
	83.33	16.67	
	6.99	33.33	
TOTAL	286	12	298
	95.97	4.03	100.00

FREQUENCY MISSING = 2

13

SAS  
TABLE OF SEX BY BFCBM9

SEX	BFCBM9		TOTAL
FREQUENCY	1	2	
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	46	230	276
	49.7	226.3	
	.272593	.059837	
	15.33	76.67	92.00
	16.67	83.33	
	85.19	93.50	
2	8	16	24
	4.3	19.7	
	3.13481	0.68813	
	2.67	5.33	8.00
	33.33	66.67	
	14.81	6.50	
TOTAL	54	246	300
	18.00	82.00	100.00

14

STATISTICS FOR TABLE OF SEX BY BFCBM15

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	10.791	0.001

15

STATISTICS FOR TABLE OF SEX BY BFCBM9

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.155	0.04

16

SAS  
TABLE OF SEX BY BFCBR15

SEX	BFCBR15		TOTAL
FREQUENCY	1	2	
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	263	13	276
	260.4	15.6	
	.026769	.445627	
	87.67	4.33	92.00
	95.29	4.71	
	92.93	76.47	
2	20	4	24
	22.6	1.4	
	.307845	5.12471	
	6.67	1.33	8.00
	83.33	16.67	
	7.07	23.53	
TOTAL	283	17	300
	94.33	5.67	100.00

15

SAS  
TABLE OF DEGREE BY BFCBR14

DEGREE	BFCBR14		TOTAL
FREQUENCY	1	2	
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	171	11	182
	166.2	15.8	
	0.13707	1.44451	
	57.00	3.67	60.67
	93.96	6.04	
	62.41	42.31	
2	103	15	118
	107.8	10.2	
	.211413	2.22797	
	34.33	5.00	39.33
	87.29	12.71	
	37.59	57.69	
TOTAL	274	26	300
	91.33	8.67	100.00

16

STATISTICS FOR TABLE OF SEX BY BFCBR15

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	5.905	0.016

STATISTICS FOR TABLE OF DEGREE BY BFCBR14

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.021	0.045

SAS  
TABLE OF MAJOR BY BFGRM20

MAJOR	BFGRM20		TOTAL
	1	2	
FREQUENCY	222	39	261
EXPECTED	226.2	34.8	
CELL CHI2	.077984	.506897	
PERCENT	74.00	13.00	87.00
ROW PCT	85.06	14.94	
COL PCT	85.38	97.50	
<hr/>			
	38	1	39
EXPECTED	33.8	5.2	
CELL CHI2	.521893	3.39231	
PERCENT	12.67	0.33	13.00
ROW PCT	97.44	2.56	
COL PCT	14.62	2.50	
<hr/>			
TOTAL	260	40	300
	86.67	13.33	100.00

17

SAS  
TABLE OF AGE BY BFGRM19

AGE	BFGRM19		TOTAL
	1	2	
FREQUENCY	154	3	157
EXPECTED	150.2	6.8	
CELL CHI2	.096309	2.12621	
PERCENT	51.33	1.00	52.33
ROW PCT	98.09	1.91	
COL PCT	53.66	23.08	
<hr/>			
	133	10	143
EXPECTED	136.8	6.2	
CELL CHI2	.105738	2.33438	
PERCENT	44.33	3.33	47.67
ROW PCT	93.01	6.99	
COL PCT	46.34	76.92	
<hr/>			
TOTAL	287	13	300
	95.67	4.33	100.00

18

STATISTICS FOR TABLE OF MAJOR BY BFGRM20

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.499	0.034

19

STATISTICS FOR TABLE OF AGE BY BFGRM19

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.663	0.031

20

SAS  
TABLE OF DEGREE BY BFGRM18

DEGREE	BFGRM18		TOTAL
	1	2	
FREQUENCY	125	57	182
EXPECTED	116.5	65.5	
CELL CHI2	.623201	1.10791	
PERCENT	41.67	19.00	60.67
ROW PCT	68.68	31.32	
COL PCT	65.10	52.78	
<hr/>			
	67	51	118
EXPECTED	75.5	42.5	
CELL CHI2	.961208	1.70881	
PERCENT	22.33	17.00	39.33
ROW PCT	56.78	43.22	
COL PCT	34.90	47.22	
<hr/>			
TOTAL	192	108	300
	64.00	36.00	100.00

19

SAS  
TABLE OF DEGREE BY BFGRM27

DEGREE	BFGRM27		TOTAL
	1	2	
FREQUENCY	130	52	182
EXPECTED	121.9	60.1	
CELL CHI2	.532751	1.08165	
PERCENT	43.33	17.33	60.67
ROW PCT	71.43	28.57	
COL PCT	64.68	52.53	
<hr/>			
	71	47	118
EXPECTED	79.1	38.9	
CELL CHI2	0.8217	1.6683	
PERCENT	23.67	15.67	39.33
ROW PCT	60.17	39.83	
COL PCT	35.32	47.47	
<hr/>			
TOTAL	201	99	300
	67.00	33.00	100.00

20

STATISTICS FOR TABLE OF DEGREE BY BFGRM18

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.401	0.034

STATISTICS FOR TABLE OF DEGREE BY BFGRM27

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.104	0.043

SAS  
TABLE OF SEX BY BFGRR23

21

SEX	BFGRR23		TOTAL
FREQUENCY	1	2	
1	139	137	276
EXPECTED	144.4	131.6	
CELL CHI2	.204885	.224944	
PERCENT	46.33	45.67	92.00
ROW PCT	50.36	49.64	
COL PCT	88.54	95.80	
2	18	6	24
EXPECTED	12.6	11.4	
CELL CHI2	2.35618	2.58685	
PERCENT	6.00	2.00	8.00
ROW PCT	75.00	25.00	
COL PCT	11.46	4.20	
TOTAL	157	143	300
	52.33	47.67	100.00

SAS  
TABLE OF DEGREE BY BFGRR21

22

DEGREE	BFGRR21		TOTAL
FREQUENCY	1	2	
1	36	146	182
EXPECTED	43.1	138.9	
CELL CHI2	1.16155	.360133	
PERCENT	12.00	48.67	60.67
ROW PCT	19.78	80.22	
COL PCT	50.70	63.76	
2	35	83	118
EXPECTED	27.9	90.1	
CELL CHI2	1.79155	.555459	
PERCENT	11.67	27.67	39.33
ROW PCT	29.66	70.34	
COL PCT	49.30	36.24	
TOTAL	71	229	300
	23.67	76.33	100.00

STATISTICS FOR TABLE OF SEX BY BFGRR23

23

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	5.373	0.020

STATISTICS FOR TABLE OF DEGREE BY BFGRR21

24

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	3.869	0.048

SAS  
TABLE OF DEGREE BY BFGRR17

23

DEGREE	BFGRR17		TOTAL
FREQUENCY	1	2	
1	46	136	182
EXPECTED	55.2	126.8	
CELL CHI2	1.53537	.668511	
PERCENT	15.33	45.33	60.67
ROW PCT	25.27	74.73	
COL PCT	50.55	65.07	
2	45	73	118
EXPECTED	35.8	82.2	
CELL CHI2	2.36811	1.03109	
PERCENT	15.00	24.33	39.33
ROW PCT	38.14	61.86	
COL PCT	49.45	34.93	
TOTAL	91	209	300
	30.33	69.67	100.00

SAS  
TABLE OF SEX BY BFGRR17

24

SEX	BFGRR17		TOTAL
FREQUENCY	1	2	
1	78	198	276
EXPECTED	83.7	192.3	
CELL CHI2	.390807	0.17016	
PERCENT	26.00	66.00	92.00
ROW PCT	28.26	71.74	
COL PCT	85.71	94.74	
2	13	11	24
EXPECTED	7.3	16.7	
CELL CHI2	4.49429	1.95684	
PERCENT	4.33	3.67	8.00
ROW PCT	54.17	45.83	
COL PCT	14.29	5.26	
TOTAL	91	209	300
	30.33	69.67	100.00

STATISTICS FOR TABLE OF DEGREE BY BFGRR17

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	5.603	0.018

STATISTICS FOR TABLE OF SEX BY BFGRR17

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	7.012	0.008

SAS  
TABLE OF AGE BY BFWMR36

AGE	BFWMR36		TOTAL
FREQUENCY	1	2	
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	146	11	157
	149.7	7.3	
	.090152	1.84168	52.33
	48.67	3.67	
	92.99	7.01	
	51.05	78.57	
2	140	3	143
	136.3	6.7	
	.098978	2.02198	47.67
	46.67	1.00	
	97.90	2.10	
	48.95	21.43	
TOTAL	286	14	300
	95.33	4.67	100.00

25

SAS  
TABLE OF SEX BY BFWMR34

SEX	BFWMR34		TOTAL
FREQUENCY	1	2	
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	102	174	276
	106.7	169.3	
	.208756	.131607	92.00
	34.00	58.00	
	36.96	63.04	
	87.93	94.57	
2	14	10	24
	9.3	14.7	
	2.40069	1.51348	8.00
	4.67	3.33	
	58.33	41.67	
	12.07	5.43	
TOTAL	116	184	300
	38.67	61.33	100.00

26

STATISTICS FOR TABLE OF AGE BY BFWMR36

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.053	0.04

27

STATISTICS FOR TABLE OF SEX BY BFWMR34

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.255	0.039

28

SAS  
TABLE OF SEX BY BFWMR32

SEX	BFWMR32		TOTAL
FREQUENCY	1	2	
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	18	258	276
	22.1	253.9	
	.753913	.065558	92.00
	6.00	86.00	
	6.52	93.48	
	75.00	93.48	
2	6	18	24
	1.9	22.1	
	8.67	.753913	8.00
	2.00	6.00	
	25.00	75.00	
	25.00	6.52	
TOTAL	24	276	300
	8.00	92.00	100.00

27

SAS  
TABLE OF AGE BY BFGRM21

AGE	BFGRM21		TOTAL
FREQUENCY	1	2	
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	56	101	157
	46.6	110.4	
	1.90652	.804171	52.33
	18.67	33.67	
	35.67	64.33	
	62.92	47.87	
2	33	110	143
	42.4	100.6	
	2.09317	.882901	47.67
	11.00	36.67	
	23.08	76.92	
	37.08	52.13	
TOTAL	89	211	300
	29.67	70.33	100.00

28

STATISTICS FOR TABLE OF SEX BY BFWMR32

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	10.243	0.001

STATISTICS FOR TABLE OF AGE BY BFGRM21

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	5.687	0.01

SAS  
TABLE OF AGE BY BFWMM36

29

AGE	BFWMM36		TOTAL
	1	2	
FREQUENCY	149	8	157
EXPECTED	152.3	4.7	
CELL CHI2	.071076	2.29811	
PERCENT	49.67	2.67	52.33
ROW PCT	94.90	5.10	
COL PCT	51.20	88.89	
<hr/>			
	142	1	143
	138.7	4.3	
	.078034	2.5231	
	47.33	0.33	47.67
	99.30	0.70	
	48.80	11.11	
<hr/>			
TOTAL	291	9	300
	97.00	3.00	100.00

SAS  
TABLE OF DEGREE BY BFWMM34

30

DEGREE	BFWMM34		TOTAL
	1	2	
FREQUENCY	55	127	182
EXPECTED	63.1	118.9	
CELL CHI2	1.03818	.550869	
PERCENT	18.33	42.33	60.67
ROW PCT	30.22	69.78	
COL PCT	52.88	64.80	
<hr/>			
	49	69	118
	40.9	77.1	
	1.60126	.849646	
	16.33	23.00	39.33
	41.53	58.47	
	47.12	35.20	
<hr/>			
TOTAL	104	196	300
	34.67	65.33	100.00

STATISTICS FOR TABLE OF AGE BY BFWMM36

31

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.970	0.026

STATISTICS FOR TABLE OF DEGREE BY BFWMM34

32

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.040	0.044

SAS  
TABLE OF MAJOR BY BFWMM32

31

MAJOR	BFWMM32		TOTAL
	1	2	
FREQUENCY	12	249	261
EXPECTED	14.8	246.2	
CELL CHI2	.526308	.031616	
PERCENT	4.00	83.00	87.00
ROW PCT	4.60	95.40	
COL PCT	70.59	87.99	
<hr/>			
	5	34	39
	2.2	36.8	
	3.52222	.211582	
	1.67	11.33	13.00
	12.82	87.18	
	29.41	12.01	
<hr/>			
TOTAL	17	283	300
	5.67	94.33	100.00

SAS  
TABLE OF SEX BY BFWMM32

32

SEX	BFWMM32		TOTAL
	1	2	
FREQUENCY	12	264	276
EXPECTED	15.6	260.4	
CELL CHI2	.847161	0.05089	
PERCENT	4.00	88.00	92.00
ROW PCT	4.35	95.65	
COL PCT	70.59	93.29	
<hr/>			
	5	19	24
	1.4	22.6	
	9.74235	0.58523	
	1.67	6.33	8.00
	20.83	79.17	
	29.41	6.71	
<hr/>			
TOTAL	17	283	300
	5.67	94.33	100.00

STATISTICS FOR TABLE OF MAJOR BY BFWMM32

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.292	0.038

STATISTICS FOR TABLE OF SEX BY BFWMM32

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	11.226	0.001

SAS  
TABLE OF SEX BY BFSTM40

SEX	BFSTM40		TOTAL
	1	2	
FREQUENCY			
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	172 178.5 .235267 57.33 62.32 88.66	104 97.5 .430582 34.67 37.68 98.11	276 92.00
2	22 15.5 2.70557 7.33 91.67 11.34	2 8.5 4.9517 0.67 8.33 1.89	24 8.00
TOTAL	194 64.67	106 35.33	300 100.00

33

SAS  
TABLE OF DEGREE BY BFSTM39

DEGREE	BFSTM39		TOTAL
	1	2	
FREQUENCY			
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	171 165.6 .174764 57.00 93.96 62.64	11 16.4 1.76706 3.67 6.04 40.74	182 60.67
2	102 107.4 .269551 34.00 86.44 37.36	16 10.6 2.72546 5.33 13.56 59.26	118 39.33
TOTAL	273 91.00	27 9.00	300 100.00

34

STATISTICS FOR TABLE OF SEX BY BFSTM40

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	8.323	0.004

35

STATISTICS FOR TABLE OF DEGREE BY BFSTM39

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.937	0.026

36

SAS  
TABLE OF SEX BY BFSTR44

SEX	BFSTR44		TOTAL
	1	2	
FREQUENCY			
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	103 107.6 .200015 34.33 37.32 88.03	173 168.4 .127878 57.67 62.68 94.54	276 92.00
2	14 9.4 2.30017 4.67 58.33 11.97	10 14.6 1.4706 3.33 41.67 5.46	24 8.00
TOTAL	117 39.00	183 61.00	300 100.00

37

SAS  
TABLE OF AGE BY BFSTR40

AGE	BFSTR40		TOTAL
	1	2	
FREQUENCY			
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	115 103.6 1.2498 38.33 73.25 58.08	42 53.4 2.42608 14.00 26.75 41.18	157 52.33
2	83 94.4 1.37216 27.67 58.04 41.92	60 48.6 2.6636 20.00 41.96 58.82	143 47.67
TOTAL	198 66.00	102 34.00	300 100.00

38

STATISTICS FOR TABLE OF SEX BY BFSTR44

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.099	0.043

STATISTICS FOR TABLE OF AGE BY BFSTR40

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	7.712	0.005

SAS  
TABLE OF AGE BY MISR47

AGE	MISR47		TOTAL
	1	2	
1	145	12	157
	136.1	20.9	
	0.58651	3.81231	52.33
	48.33	4.00	
	92.36	7.64	
	55.77	30.00	
2	115	28	143
	123.9	19.1	
	0.64393	4.18555	47.67
	38.33	9.33	
	80.42	19.58	
	44.23	70.00	
TOTAL	260	40	300
	86.67	13.33	100.00

37

SAS  
TABLE OF MAJOR BY MISR47

MAJOR	MISR47		TOTAL
	1	2	
1	231	30	261
	226.2	34.8	
	.101857	.662069	87.00
	77.00	10.00	
	88.51	11.49	
	88.85	75.00	
2	29	10	39
	33.8	5.2	
	.681657	4.43077	13.00
	9.67	3.33	
	74.36	25.64	
	11.15	25.00	
TOTAL	260	40	300
	86.67	13.33	100.00

38

STATISTICS FOR TABLE OF AGE BY MISR47

STATISTIC	DF	VALUE	PROB
---	1	9.228	0.002

39

STATISTICS FOR TABLE OF MAJOR BY MISR47

STATISTIC	DF	VALUE	PROB
---	1	5.876	0.015

40

SAS  
TABLE OF AGE BY BFSTM44

AGE	BFSTM44		TOTAL
	1	2	
1	86	71	157
	76.9	80.1	
	1.06935	1.02741	52.33
	28.67	23.67	
	54.78	45.22	
	58.50	46.41	
2	61	82	143
	70.1	72.9	
	1.17404	1.128	47.67
	20.33	27.33	
	42.66	57.34	
	41.50	53.59	
TOTAL	147	153	300
	49.00	51.00	100.00

39

SAS  
TABLE OF AGE BY BFSTM40

AGE	BFSTM40		TOTAL
	1	2	
1	110	47	157
	101.5	55.5	
	.707178	1.29427	52.33
	36.67	15.67	
	70.06	29.94	
	56.70	44.34	
2	84	59	143
	92.5	50.5	
	.776412	1.42098	47.67
	28.00	19.67	
	58.74	41.26	
	43.30	55.66	
TOTAL	194	106	300
	64.67	35.33	100.00

40

STATISTICS FOR TABLE OF AGE BY BFSTM44

STATISTIC	DF	VALUE	PROB
---	1	4.399	0.036

STATISTICS FOR TABLE OF AGE BY BFSTM40

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.199	0.040

SAS  
TABLE OF DEGREE BY SWR1

DEGREE	SWR1		TOTAL
FREQUENCY	1	2	
1	48	134	182
EXPECTED	57.6	124.4	
CELL CHI2	1.6102	0.74619	
PERCENT	16.00	44.67	60.67
ROW PCT	26.37	73.63	
COL PCT	50.53	65.37	
2	47	71	118
EXPECTED	37.4	80.6	
CELL CHI2	2.48353	1.1509	
PERCENT	15.67	23.67	39.33
ROW PCT	39.83	60.17	
COL PCT	49.47	34.63	
TOTAL	95	205	300
	31.67	68.33	100.00

41

SAS  
TABLE OF PURCHASE BY AV

PURCHASE	AV		TOTAL
FREQUENCY	1	2	
1	108	48	156
EXPECTED	99.3	56.7	
CELL CHI2	.758582	1.32926	
PERCENT	36.00	16.00	52.00
ROW PCT	69.23	30.77	
COL PCT	56.54	44.04	
2	83	61	144
EXPECTED	91.7	52.3	
CELL CHI2	.821798	1.44003	
PERCENT	27.67	20.33	48.00
ROW PCT	57.64	42.36	
COL PCT	43.46	55.96	
TOTAL	191	109	300
	63.67	36.33	100.00

42

STATISTICS FOR TABLE OF DEGREE BY SWR1

43

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	5.991	0.014

STATISTICS FOR TABLE OF PURCHASE BY AV

44

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.350	0.034

SAS  
TABLE OF MEALSPD BY AV

MEALSPD	AV		TOTAL
FREQUENCY	1	2	
1	153	39	192
EXPECTED	122.2	69.8	
CELL CHI2	7.74033	13.5633	
PERCENT	51.00	13.00	64.00
ROW PCT	79.69	20.31	
COL PCT	80.10	35.78	
2	38	70	108
EXPECTED	68.8	39.2	
CELL CHI2	13.7606	24.1126	
PERCENT	12.67	23.33	36.00
ROW PCT	35.19	64.81	
COL PCT	19.90	64.22	
TOTAL	191	109	300
	63.67	36.33	100.00

43

SAS  
TABLE OF PURCHASE BY MISM50

PURCHASE	MISM50		TOTAL
FREQUENCY	1	2	
1	155	1	156
EXPECTED	152.4	3.6	
CELL CHI2	.045744	1.91473	
PERCENT	51.67	0.33	52.00
ROW PCT	99.36	0.64	
COL PCT	52.90	14.29	
2	138	6	144
EXPECTED	140.6	3.4	
CELL CHI2	.049556	2.07429	
PERCENT	46.00	2.00	48.00
ROW PCT	95.83	4.17	
COL PCT	47.10	85.71	
TOTAL	293	7	300
	97.67	2.33	100.00

44

STATISTICS FOR TABLE OF MEALSPD BY AV

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	59.177	0.000

STATISTICS FOR TABLE OF PURCHASE BY MISM50

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.084	0.043



SAS  
TABLE OF MENUSTYL BY BMF7

MENUSTYL	BMF7		TOTAL
FREQUENCY	1	2	
1	16	44	60
EXPECTED	22.6	37.4	
CELL CHI2	1.92743	1.16471	20.00
PERCENT	5.33	14.67	
ROW PCT	26.67	73.33	
COL PCT	14.16	23.53	
2	97	143	240
EXPECTED	90.4	149.6	
CELL CHI2	.481858	.291176	80.00
PERCENT	32.33	47.67	
ROW PCT	40.42	59.58	
COL PCT	85.84	76.47	
TOTAL	113	187	300
	37.67	62.33	100.00

45

SAS  
TABLE OF DEGREE BY PFF3

DEGREE	PFF3		TOTAL
FREQUENCY	1	2	
1	82	100	182
EXPECTED	72.8	109.2	
CELL CHI2	1.16264	.775092	60.67
PERCENT	27.33	33.33	
ROW PCT	45.05	54.95	
COL PCT	68.33	55.56	
2	38	80	118
EXPECTED	47.2	70.8	
CELL CHI2	1.79322	1.19548	39.33
PERCENT	12.67	26.67	
ROW PCT	32.20	67.80	
COL PCT	31.67	44.44	
TOTAL	120	180	300
	40.00	60.00	100.00

46

STATISTICS FOR TABLE OF MENUSTYL BY BMF7

47

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	3.865	0.048

STATISTICS FOR TABLE OF DEGREE BY PFF3

48

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.926	0.026

SAS  
TABLE OF DEGREE BY BMF7

DEGREE	BMF7		TOTAL
FREQUENCY	1	2	
1	78	104	182
EXPECTED	68.6	113.4	
CELL CHI2	1.30175	.786621	60.67
PERCENT	26.00	34.67	
ROW PCT	42.86	57.14	
COL PCT	69.03	55.61	
2	35	83	118
EXPECTED	44.4	73.6	
CELL CHI2	2.00779	1.21326	39.33
PERCENT	11.67	27.67	
ROW PCT	29.66	70.34	
COL PCT	30.97	44.39	
TOTAL	113	187	300
	37.67	62.33	100.00

47

SAS  
TABLE OF AGE BY BMF1

AGE	BMF1		TOTAL
FREQUENCY	1	2	
1	75	82	157
EXPECTED	65.9	91.1	
CELL CHI2	1.24482	.901423	52.33
PERCENT	25.00	27.33	
ROW PCT	47.77	52.23	
COL PCT	59.52	47.13	
2	51	92	143
EXPECTED	60.1	82.9	
CELL CHI2	1.36669	.989674	47.67
PERCENT	17.00	30.67	
ROW PCT	35.66	64.34	
COL PCT	40.48	52.87	
TOTAL	126	174	300
	42.00	58.00	100.00

48

STATISTICS FOR TABLE OF DEGREE BY BMF7

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	5.309	0.021

STATISTICS FOR TABLE OF AGE BY BMF1

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.503	0.034

SAS  
TABLE OF SERVICE BY BFCBM9

SERVICE		BFCBM9		TOTAL
FREQUENCY	EXPECTED	1	2	
CELL CHI2				
PERCENT				
ROW PCT				
COL PCT				
1		44	228	272
		49.0	223.0	
		.502484	.110301	90.67
		14.67	76.00	
		16.18	83.82	
		81.48	92.68	
2		10	18	28
		5.0	23.0	
		4.88127	1.0715	9.33
		3.33	6.00	
		35.71	64.29	
		18.52	7.32	
TOTAL		54	246	300
		18.00	82.00	100.00

49

SAS  
TABLE OF MEALSPD BY BFCBM11

MEALSPD		BFCBM11		TOTAL
FREQUENCY	EXPECTED	1	2	
CELL CHI2				
PERCENT				
ROW PCT				
COL PCT				
1		184	8	192
		176.6	15.4	
		.306667	3.52667	64.00
		61.33	2.67	
		95.83	4.17	
		66.67	33.33	
2		92	16	108
		99.4	8.6	
		.545185	6.26963	36.00
		30.67	5.33	
		85.19	14.81	
		33.33	66.67	
TOTAL		276	24	300
		92.00	8.00	100.00

50

STATISTICS FOR TABLE OF SERVICE BY BFCBM9

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	6.566	0.01L

51

STATISTICS FOR TABLE OF MEALSPD BY BFCBM11

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	10.648	0.00.

52

SAS  
TABLE OF SERVICE BY BFCBM8

SERVICE		BFCBM8		TOTAL
FREQUENCY	EXPECTED	1	2	
CELL CHI2				
PERCENT				
ROW PCT				
COL PCT				
1		214	58	272
		218.5	53.5	
		.092949	.379674	90.67
		71.33	19.33	
		78.68	21.32	
		88.80	98.31	
2		27	1	28
		22.5	5.5	
		.002936	3.68826	9.33
		9.00	0.33	
		96.43	3.57	
		11.20	1.69	
TOTAL		241	59	300
		80.33	19.67	100.00

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SAS  
TABLE OF MENUFORM BY BFCBR15

MENUFORM		BFCBR15		TOTAL
FREQUENCY	EXPECTED	1	2	
CELL CHI2				
PERCENT				
ROW PCT				
COL PCT				
1		110	12	122
		115.1	6.9	
		.224823	3.74265	40.67
		36.67	4.00	
		90.16	9.84	
		38.87	70.59	
2		173	5	178
		167.9	10.1	
		.154092	2.56519	59.33
		57.67	1.67	
		97.19	2.81	
		61.13	29.41	
TOTAL		283	17	300
		94.33	5.67	100.00

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STATISTICS FOR TABLE OF SERVICE BY BFCBM8

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	5.064	0.024

STATISTICS FOR TABLE OF MENUFORM BY BFCBR15

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	6.687	0.010

SAS  
TABLE OF SERVICE BY BMF14

SERVICE	BMF14		TOTAL
	1	2	
FREQUENCY			
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	105	167	272
	99.7	172.3	
	.278119	.161017	90.67
	35.00	55.67	
	38.60	61.40	
	95.45	87.89	
2	5	23	28
	10.3	17.7	
	2.70173	1.56416	9.33
	1.67	7.67	
	17.86	82.14	
	4.55	12.11	
TOTAL	110	190	300
	36.67	63.33	100.00

53

SAS  
TABLE OF MENUSTYL BY BMF12

MENUSTYL	BMF12		TOTAL
	1	2	
FREQUENCY			
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	14	46	60
	23.4	36.6	
	3.77607	2.41421	20.00
	4.67	15.33	
	23.33	76.67	
	11.97	25.14	
2	103	137	240
	93.6	146.4	
	.944017	.603552	80.00
	34.33	45.67	
	42.92	57.08	
	88.03	74.86	
TOTAL	117	183	300
	39.00	61.00	100.00

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STATISTICS FOR TABLE OF SERVICE BY BMF14

STATISTICS FOR TABLE OF MENUSTYL BY BMF12

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.705	0.030

103

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	7.738	0.005

104

SAS  
TABLE OF MENUSTYL BY BMF10

MENUSTYL	BMF10		TOTAL
	1	2	
FREQUENCY			
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	17	43	60
	23.8	36.2	
	1.94286	1.27735	20.00
	5.67	14.33	
	28.33	71.67	
	14.29	23.76	
2	102	138	240
	95.2	144.8	
	.485714	.319337	80.00
	34.00	46.00	
	42.50	57.50	
	85.71	76.24	
TOTAL	119	181	300
	39.67	60.33	100.00

103

SAS  
TABLE OF MENUSTYL BY BMF8

MENUSTYL	BMF8		TOTAL
	1	2	
FREQUENCY			
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	16	44	60
	23.8	36.2	
	2.5563	1.68066	20.00
	5.33	14.67	
	26.67	73.33	
	13.45	24.31	
2	103	137	240
	95.2	144.8	
	.639076	.420166	80.00
	34.33	45.67	
	42.92	57.08	
	86.55	75.69	
TOTAL	119	181	300
	39.67	60.33	100.00

104

STATISTICS FOR TABLE OF MENUSTYL BY BMF10

STATISTICS FOR TABLE OF MENUSTYL BY BMF8

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.025	0.045

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	5.296	0.021

SAS  
TABLE OF SERVICE BY BMF28

SERVICE		BMF28		TOTAL
FREQUENCY	EXPECTED	1	2	
1	109	163		272
	103.4	168.6		
	.307755	.188624		
	36.33	54.33		90.67
	40.07	59.93		
	95.61	87.63		
2	5	23		28
	10.6	17.4		
	2.98962	1.83235		
	1.67	7.67		9.33
	17.86	82.14		
	4.39	12.37		
TOTAL	114	186		300
	38.00	62.00		100.00

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SAS  
TABLE OF SERVICE BY BMF20

SERVICE		BMF20		TOTAL
FREQUENCY	EXPECTED	1	2	
1	105	167		272
	99.7	172.3		
	.278119	.161017		
	35.00	55.67		90.67
	38.60	61.40		
	95.45	87.89		
2	5	23		28
	10.3	17.7		
	2.70173	1.56416		
	1.67	7.67		9.33
	17.86	82.14		
	4.55	12.11		
TOTAL	110	190		300
	36.67	63.33		100.00

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STATISTICS FOR TABLE OF SERVICE BY BMF28

105

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	5.318	0.02

STATISTICS FOR TABLE OF SERVICE BY BMF20

106

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.705	0.03

SAS  
TABLE OF SERVICE BY BMF21

SERVICE		BMF21		TOTAL
FREQUENCY	EXPECTED	1	2	
1	101	171		272
	96.1	175.9		
	.249147	.136132		
	33.67	57.00		90.67
	37.13	62.87		
	95.28	88.14		
2	5	23		28
	9.9	18.1		
	2.42029	1.32243		
	1.67	7.67		9.33
	17.86	82.14		
	4.72	11.86		
TOTAL	106	194		300
	35.33	64.67		100.00

105

SAS  
TABLE OF SERVICE BY BMF22

SERVICE		BMF22		TOTAL
FREQUENCY	EXPECTED	1	2	
1	109	163		272
	102.5	169.5		
	.418326	.252785		
	36.33	54.33		90.67
	40.07	59.93		
	96.46	87.17		
2	4	24		28
	10.5	17.5		
	4.06373	2.45563		
	1.33	8.00		9.33
	14.29	85.71		
	3.54	12.83		
TOTAL	113	187		300
	37.67	62.33		100.00

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STATISTICS FOR TABLE OF SERVICE BY BMF21

105

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.128	0.04

STATISTICS FOR TABLE OF SERVICE BY BMF22

106

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	7.190	0.007

SAS

TABLE OF SERVICE BY BMF24

SERVICE		BMF24		TOTAL
FREQUENCY	EXPECTED	1	2	
1	103	169		272
	97.9	174.1		
	.263546	.148244		90.67
	34.33	56.33		
	37.87	62.13		
	95.37	88.02		
2	5	23		28
	10.1	17.9		
	2.56016	1.44009		9.33
	1.67	7.67		
	17.86	82.14		
	4.63	11.98		
TOTAL	108	192		300
	36.00	64.00		100.00

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SAS

TABLE OF MENUSTYL BY BMF4

MENUSTYL		BMF4		TOTAL
FREQUENCY	EXPECTED	1	2	
1	16	44		60
	22.8	37.2		
	2.02807	1.24301		20.00
	5.33	14.67		
	26.67	73.33		
	14.04	23.66		
2	98	142		240
	91.2	148.8		
	.507018	.310753		80.00
	32.67	47.33		
	40.83	59.17		
	85.96	76.34		
TOTAL	114	186		300
	38.00	62.00		100.00

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STATISTICS FOR TABLE OF SERVICE BY BMF24

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.412	0.034

STATISTICS FOR TABLE OF MENUSTYL BY BMF4

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.089	0.044

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60

SAS

TABLE OF MENUSTYL BY BMF3

MENUSTYL		BMF3		TOTAL
FREQUENCY	EXPECTED	1	2	
1	17	43		60
	24.4	35.6		
	2.24426	1.5382		20.00
	5.67	14.33		
	28.33	71.67		
	13.93	24.16		
2	105	135		240
	97.6	142.4		
	.561066	.384551		80.00
	35.00	45.00		
	43.75	56.25		
	86.07	75.84		
TOTAL	122	178		300
	40.67	59.33		100.00

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60

SAS

TABLE OF MENUSTYL BY BMF2

MENUSTYL		BMF2		TOTAL
FREQUENCY	EXPECTED	1	2	
1	18	42		60
	24.8	35.2		
	1.86452	1.31364		20.00
	6.00	14.00		
	30.00	70.00		
	14.52	23.86		
2	106	134		240
	99.2	140.8		
	.466129	.328409		80.00
	35.33	44.67		
	44.17	55.83		
	85.48	76.14		
TOTAL	124	176		300
	41.33	58.67		100.00

STATISTICS FOR TABLE OF MENUSTYL BY BMF3

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.728	0.030

STATISTICS FOR TABLE OF MENUSTYL BY BMF2

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	3.973	0.047

SAS  
TABLE OF MENUSTYL BY SWR2

MENUSTYL		SWR2		TOTAL
FREQUENCY	EXPECTED	CELL CHI2	PERCENT	
ROW PCT	COL PCT	1	2	
1	28	32		60
	21.4	38.6		
	2.03551	1.1285		20.00
	9.33	10.67		
	46.67	53.33		
	26.17	16.58		
2	79	161		240
	85.6	154.4		
	.508879	.282124		80.00
	26.33	53.67		
	32.92	67.08		
	73.83	83.42		
TOTAL	107	193		300
	35.67	64.33		100.00

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SAS  
TABLE OF PURCHASE BY BFCBR8

PURCHASE		BFCBR8		TOTAL
FREQUENCY	EXPECTED	CELL CHI2	PERCENT	
ROW PCT	COL PCT	1	2	
1	99	57		156
	107.6	48.4		
	.693512	1.54362		52.00
	33.00	19.00		
	63.46	36.54		
	47.83	61.29		
2	108	36		144
	99.4	44.6		
	.751304	1.67226		48.00
	36.00	12.00		
	75.00	25.00		
	52.17	38.71		
TOTAL	207	93		300
	69.00	31.00		100.00

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STATISTICS FOR TABLE OF MENUSTYL BY SWR2

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	3.955	0.04

STATISTICS FOR TABLE OF PURCHASE BY BFCBR8

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.661	0.03

SAS  
TABLE OF MENUSTYL BY BFCBR9

MENUSTYL		BFCBR9		TOTAL
FREQUENCY	EXPECTED	CELL CHI2	PERCENT	
ROW PCT	COL PCT	1	2	
1	13	47		60
	7.4	52.6		
	4.23784	.596198		20.00
	4.33	15.67		
	21.67	78.33		
	35.14	17.87		
2	24	216		240
	29.6	210.4		
	1.05946	.149049		80.00
	8.00	72.00		
	10.00	90.00		
	64.86	82.13		
TOTAL	37	263		300
	12.33	87.67		100.00

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SAS  
TABLE OF SERVICE BY BFCBR9

SERVICE		BFCBR9		TOTAL
FREQUENCY	EXPECTED	CELL CHI2	PERCENT	
ROW PCT	COL PCT	1	2	
1	29	243		272
	33.5	238.5		
	.616222	.086693		90.67
	9.67	81.00		
	10.66	89.34		
	78.38	92.40		
2	8	20		28
	3.5	24.5		
	5.98615	.842158		9.33
	2.67	6.67		
	28.57	71.43		
	21.62	7.60		
TOTAL	37	263		300
	12.33	87.67		100.00

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STATISTICS FOR TABLE OF MENUSTYL BY BFCBR9

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	6.043	0.01

STATISTICS FOR TABLE OF SERVICE BY BFCBR9

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	7.531	0.00

SAS  
TABLE OF MENUFORM BY BFCBR9

MENUFORM	BFCBR9		TOTAL
	1	2	
FREQUENCY	21	101	122
EXPECTED	15.0	107.0	
CELL CHI2	2.35548	0.33138	40.67
PERCENT	7.00	33.67	
ROW PCT	17.21	82.79	
COL PCT	56.76	38.40	
<hr/>			
	16	162	178
EXPECTED	22.0	156.0	
CELL CHI2	1.61443	.227126	59.33
PERCENT	5.33	54.00	
ROW PCT	8.99	91.01	
COL PCT	43.24	61.60	
<hr/>			
TOTAL	37	263	300
	12.33	87.67	100.00

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SAS  
TABLE OF MEALSPD BY BFCBR11

MEALSPD	BFCBR11		TOTAL
	1	2	
FREQUENCY	159	33	192
EXPECTED	151.7	40.3	
CELL CHI2	.353259	1.32893	64.00
PERCENT	53.00	11.00	
ROW PCT	82.81	17.19	
COL PCT	67.09	52.38	
<hr/>			
	78	30	108
EXPECTED	85.3	22.7	
CELL CHI2	.628017	2.36254	36.00
PERCENT	26.00	10.00	
ROW PCT	72.22	27.78	
COL PCT	32.91	47.62	
<hr/>			
TOTAL	237	63	300
	79.00	21.00	100.00

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STATISTICS FOR TABLE OF MENUFORM BY BFCBR9

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.528	0.033

STATISTICS FOR TABLE OF MEALSPD BY BFCBR11

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.673	0.031

SAS  
TABLE OF SERVICE BY PFF3

SERVICE	PFF3		TOTAL
	1	2	
FREQUENCY	116	156	272
EXPECTED	108.8	163.2	
CELL CHI2	.476471	.317647	90.67
PERCENT	38.67	52.00	
ROW PCT	42.65	57.35	
COL PCT	96.67	86.67	
<hr/>			
	4	24	28
EXPECTED	11.2	16.8	
CELL CHI2	4.62857	3.08571	9.33
PERCENT	1.33	8.00	
ROW PCT	14.29	85.71	
COL PCT	3.33	13.33	
<hr/>			
TOTAL	120	180	300
	40.00	60.00	100.00

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SAS  
TABLE OF SERVICE BY BMF31

SERVICE	BMF31		TOTAL
	1	2	
FREQUENCY	99	173	272
EXPECTED	94.3	177.7	
CELL CHI2	.234934	.124659	90.67
PERCENT	33.00	57.67	
ROW PCT	36.40	63.60	
COL PCT	95.19	88.27	
<hr/>			
	5	23	28
EXPECTED	9.7	18.3	
CELL CHI2	2.28222	1.21097	9.33
PERCENT	1.67	7.67	
ROW PCT	17.86	82.14	
COL PCT	4.81	11.73	
<hr/>			
TOTAL	104	196	300
	34.67	65.33	100.00

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STATISTICS FOR TABLE OF SERVICE BY PFF3

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	8.508	0.004

STATISTICS FOR TABLE OF SERVICE BY BMF31

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	3.853	0.050

SAS

TABLE OF MEALSPD BY BFCBM14

MEALSPD		BFCBM14		TOTAL
FREQUENCY	EXPECTED	CELL	CHI2	
PERCENT	ROW PCT	COL PCT		
		1	2	
1	186	5	191	
	182.1	8.9		
	.085404	1.73858		
	62.21	1.67	63.88	
	97.38	2.62		
	65.26	35.71		
2	99	9	108	
	102.9	5.1		
	.151039	3.07471		
	33.11	3.01	36.12	
	91.67	8.33		
	34.74	64.29		
TOTAL	285	14	299	
	95.32	4.68	100.00	

FREQUENCY MISSING = 1

STATISTICS FOR TABLE OF MEALSPD BY BFCBM14

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	5.050	0.025

SAS

TABLE OF MEALSPD BY BFCBR15

MEALSPD		BFCBR15		TOTAL
FREQUENCY	EXPECTED	CELL	CHI2	
PERCENT	ROW PCT	COL PCT		
		1	2	
1	185	7	192	
	181.1	10.9		
	.083118	1.38368		
	61.67	2.33	64.00	
	96.35	3.65		
	65.37	41.18		
2	98	10	108	
	101.9	6.1		
	.147766	2.45987		
	32.67	3.33	36.00	
	90.74	9.26		
	34.63	58.82		
TOTAL	283	17	300	
	94.33	5.67	100.00	

STATISTICS FOR TABLE OF MEALSPD BY BFCBR15

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.074	0.04

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SAS

TABLE OF MEALSPD BY BFGRR23

MEALSPD	BFGRR23		TOTAL
FREQUENCY	1	2	
1	109	83	192
EXPECTED	100.5	91.5	
CELL CHI2	.722436	.793164	
PERCENT	36.33	27.67	64.00
ROW PCT	56.77	43.23	
COL PCT	69.43	58.04	
2	48	60	108
EXPECTED	56.5	51.5	
CELL CHI2	1.28433	1.41007	
PERCENT	16.00	20.00	36.00
ROW PCT	44.44	55.56	
COL PCT	30.57	41.96	
TOTAL	157	143	300
	52.33	47.67	100.00

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SAS

TABLE OF MEALSPD BY BFGRR22

MEALSPD	BFGRR22		TOTAL
FREQUENCY	1	2	
1	83	109	192
EXPECTED	96.6	95.4	
CELL CHI2	1.92518	1.95102	
PERCENT	27.67	36.33	64.00
ROW PCT	43.23	56.77	
COL PCT	54.97	73.15	
2	68	40	108
EXPECTED	54.4	53.6	
CELL CHI2	3.42255	3.46849	
PERCENT	22.67	13.33	36.00
ROW PCT	62.96	37.04	
COL PCT	45.03	26.85	
TOTAL	151	149	300
	50.33	49.67	100.00

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STATISTICS FOR TABLE OF MEALSPD BY BFGRR23

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.210	0.040

STATISTICS FOR TABLE OF MEALSPD BY BFGRR22

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	10.767	0.001

SAS

TABLE OF SERVICE BY BFGRR18

SERVICE	BFGRR18		TOTAL
FREQUENCY	1	2	
1	82	190	272
EXPECTED	88.9	183.1	
CELL CHI2	.528603	.256451	
PERCENT	27.33	63.33	90.67
ROW PCT	30.15	69.85	
COL PCT	83.67	94.06	
2	16	12	28
EXPECTED	9.1	18.9	
CELL CHI2	5.135	2.49124	
PERCENT	5.33	4.00	9.33
ROW PCT	57.14	42.86	
COL PCT	16.33	5.94	
TOTAL	98	202	300
	32.67	67.33	100.00

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SAS

TABLE OF MENUFORM BY BFCBM15

MENUFORM	BFCBM15		TOTAL
FREQUENCY	1	2	
1	113	9	122
EXPECTED	117.1	4.9	
CELL CHI2	.142677	3.40046	
PERCENT	37.92	3.02	40.94
ROW PCT	92.62	7.38	
COL PCT	39.51	75.00	
2	173	3	176
EXPECTED	168.9	7.1	
CELL CHI2	.098901	2.35713	
PERCENT	58.05	1.01	59.06
ROW PCT	98.30	1.70	
COL PCT	60.49	25.00	
TOTAL	286	12	298
	95.97	4.03	100.00

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FREQUENCY MISSING = 2

STATISTICS FOR TABLE OF SERVICE BY BFGRR18

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	8.411	0.004

STATISTICS FOR TABLE OF MENUFORM BY BFCBM15

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	5.999	0.014

SAS

TABLE OF MEALSPD BY BFGRM22

MEALSPD	BFGRM22		TOTAL
FREQUENCY	1	2	
1	90	102	192
EXPECTED	100.5	91.5	
CELL CHI2	1.09306	1.20007	64.00
PERCENT	30.00	34.00	
ROW PCT	46.88	53.13	
COL PCT	57.32	71.33	
2	67	41	108
EXPECTED	56.5	51.5	
CELL CHI2	1.94321	2.13346	36.00
PERCENT	22.33	13.67	
ROW PCT	62.04	37.96	
COL PCT	42.68	28.67	
TOTAL	157	143	300
	52.33	47.67	100.00

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SAS

TABLE OF MEALSPD BY BFGRM21

MEALSPD	BFGRM21		TOTAL
FREQUENCY	1	2	
1	49	143	192
EXPECTED	57.0	135.0	
CELL CHI2	1.11239	.469206	64.00
PERCENT	16.33	47.67	
ROW PCT	25.52	74.48	
COL PCT	55.06	67.77	
2	40	68	108
EXPECTED	32.0	76.0	
CELL CHI2	1.97758	.834144	36.00
PERCENT	13.33	22.67	
ROW PCT	37.04	62.96	
COL PCT	44.94	32.23	
TOTAL	89	211	300
	29.67	70.33	100.00

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STATISTICS FOR TABLE OF MEALSPD BY BFGRM22

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	6.370	0.012

STATISTICS FOR TABLE OF MEALSPD BY BFGRM21

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.393	0.036

SAS

TABLE OF MENUSTYL BY BFGRM16

MENUSTYL	BFGRM16		TOTAL
FREQUENCY	1	2	
1	52	8	60
EXPECTED	42.4	17.6	
CELL CHI2	2.17358	5.23636	20.00
PERCENT	17.33	2.67	
ROW PCT	86.67	13.33	
COL PCT	24.53	9.09	
2	160	80	240
EXPECTED	169.6	70.4	
CELL CHI2	.543396	1.30909	80.00
PERCENT	53.33	26.67	
ROW PCT	66.67	33.33	
COL PCT	75.47	90.91	
TOTAL	212	88	300
	70.67	29.33	100.00

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SAS

TABLE OF MEALSPD BY BFGRR31

MEALSPD	BFGRR31		TOTAL
FREQUENCY	1	2	
1	182	10	192
EXPECTED	176.6	15.4	
CELL CHI2	.162645	1.87042	64.00
PERCENT	60.67	3.33	
ROW PCT	94.79	5.21	
COL PCT	65.94	41.67	
2	94	14	108
EXPECTED	99.4	8.6	
CELL CHI2	.289147	3.32519	36.00
PERCENT	31.33	4.67	
ROW PCT	87.04	12.96	
COL PCT	34.06	58.33	
TOTAL	276	24	300
	92.00	8.00	100.00

78

STATISTICS FOR TABLE OF MENUSTYL BY BFGRM16

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	9.262	0.002

STATISTICS FOR TABLE OF MEALSPD BY BFGRR31

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	5.647	0.017

SAS

TABLE OF MENUSTYL BY BFGR30

MENUSTYL	BFGR30		TOTAL
	1	2	
FREQUENCY			
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	60	0	60
	56.4	3.6	
	.229787	3.6	
	20.00	0.00	20.00
	100.00	0.00	
	21.28	0.00	
2	222	18	240
	225.6	14.4	
	.057447	0.9	
	74.00	6.00	80.00
	92.50	7.50	
	78.72	100.00	
TOTAL	282	18	300
	94.00	6.00	100.00

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SAS

TABLE OF MENUSTYL BY BFGR28

MENUSTYL	BFGR28		TOTAL
	1	2	
FREQUENCY			
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	57	3	60
	51.8	8.2	
	.522008	3.29756	
	19.00	1.00	20.00
	95.00	5.00	
	22.01	7.32	
2	202	38	240
	207.2	32.8	
	.130502	0.82439	
	67.33	12.67	80.00
	84.17	15.83	
	77.99	92.68	
TOTAL	259	41	300
	86.33	13.67	100.00

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STATISTICS FOR TABLE OF MENUSTYL BY BFGR30

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.787	0.026

STATISTICS FOR TABLE OF MENUSTYL BY BFGR28

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.774	0.026

SAS

TABLE OF PURCHASE BY BFGR27

PURCHASE	BFGR27		TOTAL
	1	2	
FREQUENCY			
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	94	62	156
	104.5	51.5	
	1.05884	2.14977	
	31.33	20.67	52.00
	60.26	39.74	
	46.77	62.63	
2	107	37	144
	96.5	47.5	
	1.14708	2.32892	
	35.67	12.33	48.00
	74.31	25.69	
	53.23	37.37	
TOTAL	201	99	300
	67.00	33.00	100.00

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SAS

TABLE OF MENUSTYL BY BFGR26

MENUSTYL	BFGR26		TOTAL
	1	2	
FREQUENCY			
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	49	11	60
	39.0	21.0	
	2.5641	4.7619	
	16.33	3.67	20.00
	81.67	18.33	
	25.13	10.48	
2	146	94	240
	156.0	84.0	
	.641026	1.19048	
	48.67	31.33	80.00
	60.83	39.17	
	74.87	89.52	
TOTAL	195	105	300
	65.00	35.00	100.00

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STATISTICS FOR TABLE OF PURCHASE BY BFGR27

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	6.685	0.010

STATISTICS FOR TABLE OF MENUSTYL BY BFGR26

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	9.158	0.003

SAS  
TABLE OF MEALSPD BY BFWMR34

MEALSPD	BFWMR34		TOTAL
FREQUENCY	1	2	
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	62	130	192
	74.2	117.8	
	2.01802	1.27223	
	20.67	43.33	64.00
	32.29	67.71	
	53.45	70.65	
2	54	54	108
	41.8	66.2	
	3.58759	2.26174	
	18.00	18.00	36.00
	50.00	50.00	
	46.55	29.35	
TOTAL	116	184	300
	38.67	61.33	100.00

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SAS  
TABLE OF MEALSPD BY BFWMR33

MEALSPD	BFWMR33		TOTAL
FREQUENCY	1	2	
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	94	98	192
	102.4	89.6	
	.689062	0.7875	
	31.33	32.67	64.00
	48.96	51.04	
	58.75	70.00	
2	66	42	108
	57.6	50.4	
	1.225	1.4	
	22.00	14.00	36.00
	61.11	38.89	
	41.25	30.00	
TOTAL	160	140	300
	53.33	46.67	100.00

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STATISTICS FOR TABLE OF MEALSPD BY BFWMR34

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	9.140	0.003

STATISTICS FOR TABLE OF MEALSPD BY BFWMR33

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.102	0.04

SAS  
TABLE OF SERVICE BY BFWMR33

SERVICE	BFWMR33		TOTAL
FREQUENCY	1	2	
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	140	132	272
	145.1	126.9	
	.176961	.202241	
	46.67	44.00	90.67
	51.47	48.53	
	87.50	94.29	
2	20	8	28
	14.9	13.1	
	1.71905	1.96463	
	6.67	2.67	9.33
	71.43	28.57	
	12.50	5.71	
TOTAL	160	140	300
	53.33	46.67	100.00

STATISTICS FOR TABLE OF SERVICE BY BFWMR33

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.063	0.04

SAS  
TABLE OF SERVICE BY BFGRM28

SERVICE	BFGRM28		TOTAL
FREQUENCY	1	2	
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	267	5	272
	263.8	8.2	
	.037847	1.22373	
	89.00	1.67	90.67
	98.16	1.84	
	91.75	55.56	
2	24	4	28
	27.2	0.8	
	.367658	11.8876	
	8.00	1.33	9.33
	85.71	14.29	
	8.25	44.44	
TOTAL	291	9	300
	97.00	3.00	100.00

STATISTICS FOR TABLE OF SERVICE BY BFGRM28

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	13.517	0.00

85

86

SAS  
TABLE OF SERVICE BY BFWMM36

SERVICE	BFWMM36		TOTAL
	1	2	
FREQUENCY			
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	266 263.8 .017683 88.67 97.79 91.41	6 8.2 .571765 2.00 2.21 66.67	272 90.67
2	25 27.2 .171782 8.33 89.29 8.59	3 0.8 5.55429 1.00 10.71 33.33	28 9.33
TOTAL	291 97.00	9 3.00	300 100.00

87

SAS  
TABLE OF SERVICE BY BFWMM35

SERVICE	BFWMM35		TOTAL
	1	2	
FREQUENCY			
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	235 230.3 .096193 78.33 86.40 92.52	37 41.7 .531155 12.33 13.60 80.43	272 90.67
2	19 23.7 .934451 6.33 67.86 7.48	9 4.3 5.15979 3.00 32.14 19.57	28 9.33
TOTAL	254 84.67	46 15.33	300 100.00

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STATISTICS FOR TABLE OF SERVICE BY BFWMM36

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	6.316	0.012

STATISTICS FOR TABLE OF SERVICE BY BFWMM35

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	6.722	0.010

SAS  
TABLE OF MEALSPD BY BFWMM34

MEALSPD	BFWMM34		TOTAL
	1	2	
FREQUENCY			
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	56 66.6 1.67538 18.67 29.17 53.85	136 125.4 0.88898 45.33 70.83 69.39	192 64.00
2	48 37.4 2.97846 16.00 44.44 46.15	60 70.6 1.58041 20.00 55.56 30.61	108 36.00
TOTAL	104 34.67	196 65.33	300 100.00

89

SAS  
TABLE OF MENUSTYL BY BFWMM32

MENUSTYL	BFWMM32		TOTAL
	1	2	
FREQUENCY			
EXPECTED			
CELL CHI2			
PERCENT			
ROW PCT			
COL PCT			
1	7 3.4 3.81176 2.33 11.67 41.18	53 56.6 .228975 17.67 88.33 18.73	60 20.00
2	10 13.6 .952941 3.33 4.17 58.82	230 226.4 .057244 76.67 95.83 81.27	240 80.00
TOTAL	17 5.67	283 94.33	300 100.00

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STATISTICS FOR TABLE OF MEALSPD BY BFWMM34

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	7.123	0.008

STATISTICS FOR TABLE OF MENUSTYL BY BFWMM32

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	5.051	0.024

SAS  
TABLE OF PURCHASE BY BFSTR40

PURCHASE	BFSTR40		TOTAL
	1	2	
1	94	62	156
	103.0	53.0	
	.779736	1.5136	
	31.33	20.67	52.00
	60.26	39.74	
	47.47	60.78	
2	104	40	144
	95.0	49.0	
	.844714	1.63974	
	34.67	13.33	48.00
	72.22	27.78	
	52.53	39.22	
TOTAL	198	102	300
	66.00	34.00	100.00

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SAS  
TABLE OF MEALSPD BY BFSTR40

MEALSPD	BFSTR40		TOTAL
	1	2	
1	114	78	192
	126.7	65.3	
	1.27682	2.47853	
	38.00	26.00	64.00
	59.38	40.63	
	57.58	76.47	
2	84	24	108
	71.3	36.7	
	2.2699	4.40627	
	28.00	8.00	36.00
	77.78	22.22	
	42.42	23.53	
TOTAL	198	102	300
	66.00	34.00	100.00

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STATISTICS FOR TABLE OF PURCHASE BY BFSTR40

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.778	0.025

STATISTICS FOR TABLE OF MEALSPD BY BFSTR40

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	10.432	0.001

SAS  
TABLE OF PURCHASE BY BFSTR39

PURCHASE	BFSTR39		TOTAL
	1	2	
1	118	38	156
	129.0	27.0	
	.931464	4.44237	
	39.33	12.67	52.00
	75.64	24.36	
	47.58	73.08	
2	130	14	144
	119.0	25.0	
	1.00909	4.81256	
	43.33	4.67	48.00
	90.28	9.72	
	52.42	26.92	
TOTAL	248	52	300
	82.67	17.33	100.00

93

SAS  
TABLE OF PURCHASE BY BFSTR37

PURCHASE	BFSTR37		TOTAL
	1	2	
1	95	61	156
	104.0	52.0	
	.778846	1.55769	
	31.67	20.33	52.00
	60.90	39.10	
	47.50	61.00	
2	105	39	144
	96.0	48.0	
	0.84375	1.6875	
	35.00	13.00	48.00
	72.92	27.08	
	52.50	39.00	
TOTAL	200	100	300
	66.67	33.33	100.00

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STATISTICS FOR TABLE OF PURCHASE BY BFSTR39

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	11.195	0.001

STATISTICS FOR TABLE OF PURCHASE BY BFSTR37

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.868	0.027

SAS  
TABLE OF SERVICE BY MISR49

SERVICE		MISR49		TOTAL
FREQUENCY EXPECTED CELL CHI2 PERCENT ROW PCT COL PCT	1	2		
1	108 113.3 0.25098 36.00 39.71 86.40	164 158.7 179272 54.67 60.29 93.71	272 90.67	
2	17 11.7 2.4381 5.67 60.71 13.60	11 16.3 1.7415 3.67 39.29 6.29	28 9.33	
TOTAL	125 41.67	175 58.33	300 100.00	

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SAS  
TABLE OF MEALSPD BY BFSTM40

MEALSPD		BFSTM40		TOTAL
FREQUENCY EXPECTED CELL CHI2 PERCENT ROW PCT COL PCT	1	2		
1	116 124.2 .536289 38.67 60.42 59.79	76 67.8 981509 25.33 39.58 71.70	192 64.00	
2	78 69.8 953402 26.00 72.22 40.21	30 38.2 1.74491 10.00 27.78 28.30	108 36.00	
TOTAL	194 64.67	106 35.33	300 100.00	

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STATISTICS FOR TABLE OF SERVICE BY MISR49

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.610	0.032

STATISTICS FOR TABLE OF MEALSPD BY BFSTM40

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.216	0.041

SAS  
TABLE OF MENUSTYL BY BFSTM37

MENUSTYL		BFSTM37		TOTAL
FREQUENCY EXPECTED CELL CHI2 PERCENT ROW PCT COL PCT	1	2		
1	36 42.0 .857143 12.00 60.00 17.14	24 18.0 2 8.00 40.00 26.67	60 20.00	
2	174 168.0 2.14286 58.00 72.50 82.86	66 72.0 0.5 22.00 27.50 73.33	240 80.00	
TOTAL	210 70.00	90 30.00	300 100.00	

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SAS  
TABLE OF PURCHASE BY BFSTR43

PURCHASE		BFSTR43		TOTAL
FREQUENCY EXPECTED CELL CHI2 PERCENT ROW PCT COL PCT	1	2		
1	101 109.7 .693022 33.67 64.74 47.87	55 46.3 1.64301 18.33 35.26 61.80	156 52.00	
2	110 101.3 .750774 36.67 76.39 52.13	34 42.7 1.77993 11.33 23.61 38.20	144 48.00	
TOTAL	211 70.33	89 29.67	300 100.00	

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STATISTICS FOR TABLE OF MENUSTYL BY BFSTM37

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	3.571	0.059

STATISTICS FOR TABLE OF PURCHASE BY BFSTR43

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	4.867	0.027

SAS  
TABLE OF DEGREE BY PFF5

DEGREE	PFF5		TOTAL
FREQUENCY EXPECTED CELL CHI2 PERCENT ROW PCT COL PCT	1	2	
1	90 80.1 1.22885 30.00 49.45 68.18	92 101.9 .965526 30.67 50.55 54.76	182  60.67
2	42 51.9 1.89535 14.00 35.59 31.82	76 66.1 1.4892 25.33 64.41 45.24	118  39.33
TOTAL	132 44.00	168 56.00	300 100.00

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SAS  
TABLE OF MEALSPD BY MISM50

MEALSPD	MISM50		TOTAL
FREQUENCY EXPECTED CELL CHI2 PERCENT ROW PCT COL PCT	1	2	
1	192 187.5 .107031 64.00 100.00 65.53	0 4.5 4.48 0.00 0.00 0.00	192  64.00
2	101 105.5 .190277 33.67 93.52 34.47	7 2.5 7.96444 2.33 6.48 100.00	108  36.00
TOTAL	293 97.67	7 2.33	300 100.00

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STATISTICS FOR TABLE OF DEGREE BY PFF5

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	5.579	0.016

STATISTICS FOR TABLE OF MEALSPD BY MISM50

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	12.742	0.00

SAS  
TABLE OF MENUSTYL BY MISM48

MENUSTYL	MISM48		TOTAL
FREQUENCY EXPECTED CELL CHI2 PERCENT ROW PCT COL PCT	1	2	
1	60 55.6 .348201 20.00 100.00 21.58	0 4.4 4.4 0.00 0.00 0.00	60  20.00
2	218 222.4 0.08705 72.67 90.83 78.42	22 17.6 1.1 7.33 9.17 100.00	240  80.00
TOTAL	278 92.67	22 7.33	300 100.00

101

SAS  
TABLE OF MEALSPD BY MISR50

MEALSPD	MISR50		TOTAL
FREQUENCY EXPECTED CELL CHI2 PERCENT ROW PCT COL PCT	1	2	
1	190 187.5 .032799 63.33 98.96 64.85	2 4.5 1.37286 0.67 1.04 28.57	192  64.00
2	103 105.5 .058309 34.33 95.37 35.15	5 2.5 2.44063 1.67 4.63 71.43	108  36.00
TOTAL	293 97.67	7 2.33	300 100.00

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STATISTICS FOR TABLE OF MENUSTYL BY MISM48

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	5.935	0.01

STATISTICS FOR TABLE OF MEALSPD BY MISR50

STATISTIC	DF	VALUE	PROB
CHI-SQUARE	1	3.905	0.04



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