

AN ABSTRACT OF THE THESIS OF

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Title: Interrelationships among Attitudes toward and Practice
of Nutrition and Health of Prepaid Health Plan Members

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Interrelationships among attitudes toward and practice of nutrition and health were determined from results of 335 responses to a survey mailed to members of a prepaid health plan in Portland, Oregon, in the Spring of 1981. The scales used to test attitudes included Subjective Index of General Well-Being, Health Locus of Control and the attitude "nutrition is important". Nutrition practices were determined from a one-day food record analyzed using Pennington's index nutrients. Health practices, including smoking, alcohol consumption, physical activity, hours of sleep, body weight in relation to standards and meal frequency, were analyzed to form a health practice score. Demographic characteristics of the population, including sex, age, marital status, employment status, education and income, were determined and correlated with all attitudes and practices. Interrelationships were tested using Pearson r and Chi-square correlations and multiple regression analysis.

The population studied was characterized as married, employed, well educated and middle income. They felt well and in control of their health. Approximately 52 percent practiced several desirable health practices, about 90 percent had a positive attitude toward nutrition and only 22 percent scored above at least 66 percent of Dietary Nutrient Score considered adequate for adults while 33 percent had diets which did not meet 50 percent of this score.

This study using members of a prepaid health plan supports the existing literature. Nutrition attitude, "nutrition is important," is correlated to nutrient intake. Health attitudes, general well-being and health locus of control, were correlated to health practices. In this study correlations among general well-being, health locus of control, nutrition attitude, health practices and nutrition practices were noted, however the correlations were not large enough to be predictive. Further study is recommended to define and develop these relationships.

Interrelationships Among Attitudes Toward
and Practice of Nutrition and Health
of Prepaid Health Plan Members

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INTERRELATIONSHIPS AMONG ATTITUDES TOWARD
AND PRACTICE OF NUTRITION AND HEALTH
OF PREPAID HEALTH PLAN MEMBERS

I. INTRODUCTION

"Nutrition education cannot be successful unless based on knowledge of attitudes, beliefs and values of the people to be influenced and how they pass these on to their children and on an understanding of those concepts of human behavior which relate to food selection and spread of innovations." (Ritchie, 1967, p. 30)

In the field of nutrition, an interest in improving food habits began almost as soon as nutrients were identified. In the early 1900's interest was focused on teaching people how to cure and prevent dietary deficiencies (Whitehead, 1957a). Stimulated by two world wars and an economic depression, government programs and political influence had an effect on nutrition education (Pye, 1976). Food shortages and the rationing of food generated the need to inform people about selecting adequate diets. In this period the Recommended Dietary Allowances (National Academy of Science, 1943) were first formulated and food guides and other tools for assessment and teaching were developed (Hertzler and Anderson, 1974). There were many studies that dealt with the relationship of nutrition

knowledge and dietary habits (Whitehead, 1957a). The impact of various teaching techniques on the application of nutrition and dietary practices were not related. The White House Conference on Food, Nutrition and Health (United States White House, 1970) recorded commitment to research in nutrition education. Research methodologies from the behavioral and social sciences began to be adapted to the study of nutrition, specifically to explore the role of attitudes on learning facts about nutrition and applying the facts to improving one's diet.

Investigators have noted that concern for health is an attitude which mediates food selection. In a survey conducted for the Food and Drug Administration (1972) it was reported that many people literally believe that "you are what you eat". Their first thought upon not feeling right is that they "must not be eating right". In a report entitled "Who Eats for Health?", Wolff (1973) found the underlying reason for the purchase of health foods was to have a healthier diet for better personal health. Bremer and Weatherholtz (1975) learned from their survey of a university community that those who indicated the greatest interest in nutrition scored best on factual questions. The participants also expressed greatest confidence in the relationship between diet and health maintenance. Cross et al. (1975) studied the effect of the family life-cycle stage on food selection. In a survey of 1000 households in the Greater Philadelphia area, menu planning and food

buying practices which reflect concerns about health, economy and convenience were investigated. Food selection practices differed significantly among life-cycle stages. Middle-aged households were most concerned with health related practices such as limiting intake of calories and cholesterol-containing foods. Schafer (1978) also noted that regard for health influenced food choices of families when he studied factors affecting husbands' and wives' diets. Two-thirds of households surveyed by the United States Department of Agriculture in 1979 (Jones and Weimer, 1981) reported concerns about health and the impact of nutrition on health as reasons for dietary changes. Reduction of animal fat, increased consumption of fresh fruits and vegetables, substitution of whole grains for refined flour and sugar were reported.

In defining the influence of attitudes on dietary behavior, several studies (Eppright et al., 1970, Schwartz, 1975, Sims, 1976, 1978 and Grotkowski and Sims, 1978) have shown that attitudes have a strong influence on both knowledge of nutrition and application to dietary behavior. A correlation was noted between the attitude "nutrition is important" and diets that were higher in nutrients in studies of high school graduates (Schwartz, 1975), mothers of preschool children (Eppright et al., 1970 and Sims, 1976), lactating women (Sims, 1978), and the elderly (Grotkowski and Sims, 1978). Sims (1978) has

suggested that this attitude may be predictive of dietary behavior as well.

Research on health behavior has produced two models of attitude-behavior relationships which relate attitudes to the outcome of health behaviors. One is the Health Belief Model (Becker, 1974) which focuses on general motivation and postulates that an individual's readiness to act is determined by a set of attitudes toward health in general and toward the specific condition and treatment regimen (Becker et al., 1972). The other model, which is called the Health Locus of Control (Wallston et al., 1976), focuses on an evaluation of the degree to which individuals perceive that events that happen to them are dependent on their behavior or are the result of chance or powers beyond their control or understanding. Both models have been associated with behavior changes that were expected as the result of intervention programs.

Research has shown that attitudes may be determinants of behavior. We have learned nutrition attitudes influence food behavior and certain health attitudes may predict health behavior. It must be recognized that health behavior is complex. A study commissioned by the Food and Drug Administration (1972) to evaluate health practices and opinions concluded that most people lack a generalized systematic set of health beliefs. The study found that health practices are not necessarily related to beliefs that seem logically related. After resurveying 300 young

adults, who had been studied 16 years earlier as children, Mechanic (1979) learned that patterns of health and illness behavior have low levels of continuity. However, Breslow and Enstrom (1980) found their subjects were stable over a 9-1/2 year period.

The interrelationships between nutrition practices and health are well established. When diets are deficient in nutrients, a variety of conditions may result, such as anemia, scurvy, protein-calorie malnutrition and others. Nutrition is also used as adjunctive therapy in the treatment of many medical conditions. For example, in Diabetes Mellitus, end stage renal disease, and hepatic failure, diet therapy is primary in the treatment plan. When studying the relationship between a subjective assessment of health and health habits, Belloc and Breslow (1972) learned that as individuals practiced one or more health habits, the general feeling of health increased. Dietary habits including frequency of eating, consumption of breakfast and weight in relation to standards were studied along with sleeping habits, physical activity, smoking and alcohol consumption. Later studies (Breslow and Enstrom, 1980 and Wiley and Camacho, 1980) of the same population showed that health habits were also related to morbidity and mortality.

Thus, it has been shown that health practices including some food behaviors may influence a general feeling of well-being. Also in nutrition research, it has been shown

that attitudes influence dietary intake. Studies have not, however, been done to determine whether health attitudes and practices relate to nutrition attitudes and practices. Are there interrelationships between health attitudes and practices and nutrition attitudes and practices which it would be helpful for the nutrition educator to understand?

Using a random sample of members of a prepaid health plan in Portland, Oregon, this study will determine if relationships exist between attitudes toward and the practice of nutrition and certain health attitudes and practices. The process will include: (1) identifying one attitude toward nutrition, "nutrition is important"; (2) identifying the attitudes toward health, specifically health locus of control and general well-being; (3) describing the population's food practices; (4) describing the population's health practices and (5) determining the population's general demographic characteristics.

II. REVIEW OF LITERATURE

ATTITUDES

General Characteristics

Much of the literature on attitude research uses terms such as belief, opinion, feelings, preferences, motivations, intention, and value to imply that they are interchangeable with attitude. It is important to understand these terms and appreciate the distinctions between them before a discussion of specific research can be understood.

The classic definition of attitudes put forth by Allport (1935, p. 8) is:

"An attitude is a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individuals' response to all objects and situations with which it is related".

Other definitions which are slight variations have been stated.

"An attitude is an implicit response which is both anticipatory and motivating in reference to patterns of overt responses, which is evoked by a variety of stimulus patterns as a result of previous learning or of gradients of generalization and discrimination which is itself cue- and drive-producing and which is considered socially significant in the individual's society". (Doob, 1967, p. 43)

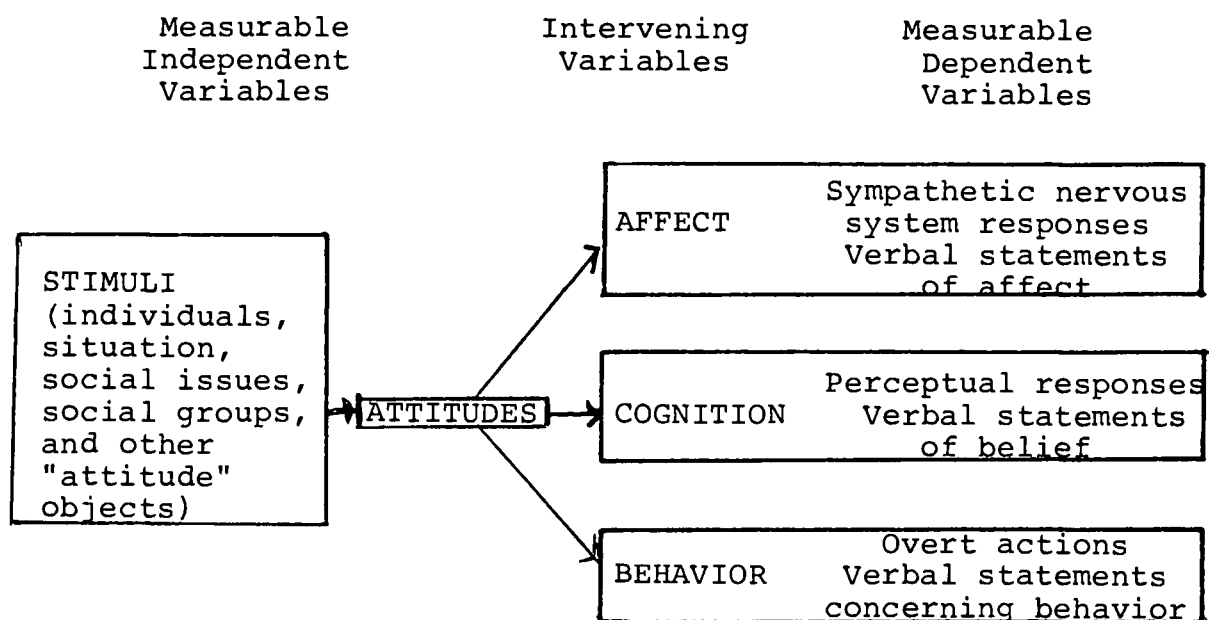
"An attitude is a relatively enduring organization of beliefs around an object or situation predisposing one to respond in some preferential manner". (Rokeach, 1968, p. 110)

"An attitude is the predisposition of the individual to evaluate some symbol or object or aspect of his world in a favorable or unfavorable manner". (Katz, 1960, p. 168)

All definitions suggest that attitudes are multifaceted. Triandis (1971) has described the three components of attitudes as cognitive, affective and behavioral. All components are closely related and influence each other, yet are distinct elements that make up the larger process referred to as attitude. Figure 1 represents schematically the triad concept of attitude.

The cognitive component represents a person's information about an object. That is a "...mental and neural state of readiness..." (Allport, 1935, p. 8), or "...organization of beliefs..." (Rokeach, 1968, p. 110) or "...reference to patterns of overt responses..." (Doob, 1968, p. 43) or "...predisposition of the individual to evaluate..." (Katz, 1960, p. 165). The cognitive component of attitude is based on observation and information the individual has made of his world. It is this process that lays the foundation for the formation of attitudes. Beliefs and perceptions are expressions of the cognitive element of attitudes. Usually one is able to distinguish between rightness-wrongness, probable-improbable when evaluating beliefs and perceptions. Statements such as "I do not think

Figure 1 A Schematic Conception of Attitudes



(From Triandis, Attitude & Attitude Change, 1971, p. 3)

white bread is as nutritious as whole wheat" or "It is important that all persons eat a diet low in cholesterol" are examples of beliefs. There has been a reasonable amount of research exploring food misconceptions or food fads which is actually a study of beliefs.

The affective component of attitude refers to a person's feelings of liking or disliking an object. It is the emotion which charges the idea. It has been stated as "...exerting a directive or dynamic influence.." (Allport, 1935, p. 8) or "...in some preferential manner.." (Rokeach, 1968, p. 110), or "...gradients of generalization and discrimination.." (Doob, 1968, p. 43) or "...in a favorable or unfavorable manner.." (Katz, 1960, p. 168). This component has been described as the "essence" of attitude which is usually described as favorableness or unfavorableness toward some object. Feelings cannot be judged correct or incorrect because they represent an individual's evaluation. Statements such as, "I feel fasting cleanses my body" would be an example of an affective attitude. The study of food preferences is an evaluation of the affective component of attitudes.

Finally, the behavioral component concerns the person's tendency to act. It implies action or response as a result of the evaluation and feeling. The third component of attitude has been referred to as intention or motivation and can be predictive of behavior. By the time individuals have formed an intention, they have processed information

about an object, evaluated their feelings and are now ready to respond when stimulated. Attitude research which attempts to predict or measure behavior changes should be focused at the behavioral component of attitudes.

Values are also used interchangeably with attitude and yet refer to a more general and enduring evaluation. Rokeach has differentiated between values and attitudes in the following way.

"Attitude is an organization of several beliefs focused on a specific object or situation, predisposing one to respond in some preferential manner. Values, on the other hand, have to do with modes of conduct and end-states of existence--enduring belief. Attitude represents several beliefs focused on a single specific object or situation, a value is a single belief that transcendently guides action and judgements across specific objects and situations and beyond immediate goals to more ultimate goals".
(Rokeach, in Handy, 1970, p. 203)

Schematically this is represented in Figure 2.

As one reviews the literature reporting research on attitudes and their relationship to knowledge and behavior, it is important to distinguish what attitudes as actually being studied. Figure 3 is a schematic presentation of the relationships. It is important to consider that the relationship is not unidirectional but complex feedback does occur.

Nutrition Research

In studying attitude research in nutrition, one is faced with a multitude of studies which report relationships

Figure 2 Hierarchy of Terms

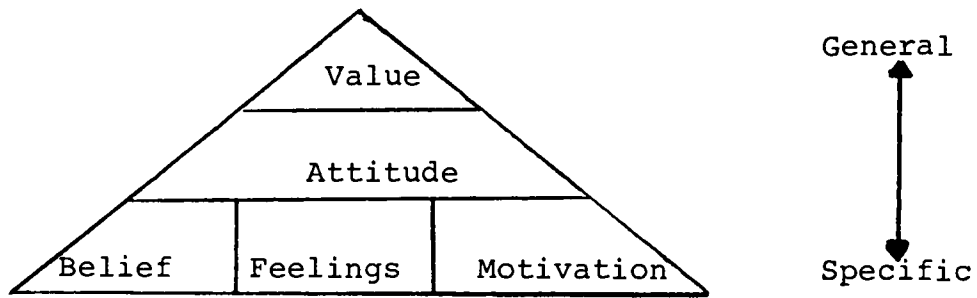
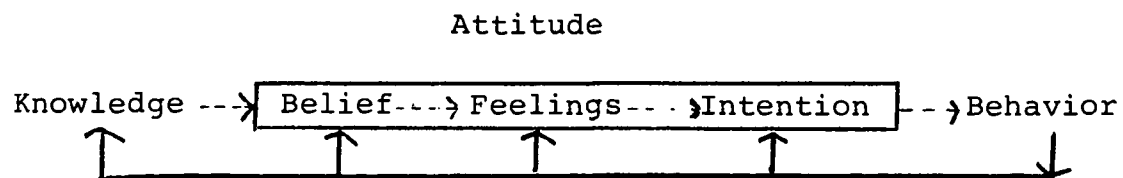


Figure 3 Schematic Presentation Relating
Knowledge, Attitude and Behavior



of "attitudes" and other indices. While each of these studies is important and adds to an understanding of attitude, there is little about the studies which can be compared to achieve a broader perspective of nutrition-related attitudes. Distinctions between cognitive, affective and behavioral aspects of attitudes have not been made, yet subjective evaluations are reported and compared by various techniques. The following are examples of studies on nutrition attitudes reported in the literature.

1. Attitudes and motivational factors in food choices were evaluated in young women (Lohse, 1968, Zimmerman and Munro, 1972, Cosper and Wakefield, 1975 and Ikeda, 1975).
2. Nutritional opinions and practices relating to food fads were assessed (Jalso, Burns and Rivers, 1965, Wilson and Lamb, 1968, and Anderson and Standal, 1975).
3. Attitudes of elementary teachers toward school feeding programs and teaching nutrition were measured (Peterson and Kies, 1972).
4. Attitudes of high school home economics teachers in relation to their effectiveness as change agents were determined (Skinner, 1978).
5. The importance of nutrition to high school students has been assessed by

Schwartz (1975), Spitze (1976) and Picardi and Porter (1976).

6. Mother's attitudes were studied to determine how environmental variables such as culture, family and sources of information influenced prenatal diets (Schwartz and Barr, 1977).
7. Attitudes of health professionals about the importance of diet and the role of the dietitian have been evaluated (Schwartz, 1976 , Vickstrom and Fox, 1976, Dugdale, Chandler and Baghurst, 1979, Krause and Fox, 1977 and Lohr and Carruth, 1979).
8. The attitude 'flexibility' was suggested to be more predictive of nutrition-related behavior than nutrition knowledge when measured with a scale developed for Expanded Food and Nutrition Education Program aides (Carruth, Mangel and Anderson, 1977).
9. Relationships of nutrition attitude and knowledge and food patterns of young women athletes were found to be positively correlated (Werblow, Fox and Henneman, 1978).
10. In a study of 116 women it was noted that self-concept was related to quality of diet (Schafer, 1979).

11. Attitude changes as the result of a university community nutrition course were measured with semantic differential scales by Carruth and Musgrave (1979).
12. The impact of dietitian's attitudes about vegetarianism on nutrition counseling has been examined (Strobl and Groll, 1981).

The study of food habits has been approached from numerous perspectives. Volumes of literature from many disciplines have been written in an attempt to describe, quantify and understand the complex behavior known as food habits (Wilson, 1973 and Wilson, 1979). Many studies referring to food habits are actually attitude studies because they explore an evaluative process the individual uses to make choices.

Models for understanding food behavior have been proposed. In an attempt to understand food faddism, Schafer and Yetley (1975) proposed that an individual's food behavior is the result of mutual influences of environment, personal and biologic factors. In the model, food behavior is mediated by a patterning process. The patterning process occurs as an integration of external factors, such as friends, family, media and education, and internal factors, such as attitudes, values and needs. The results are food behavior patterns that are practiced and maintained by selective perception within the individual's

frame of reference. Krongl and Lau (1978), perplexed by results of a national nutrition survey in Canada, realize food habits are influenced by more than information.

The behavior model they developed focused on food motives which can be acquired or learned. The nine motives were categorized into 4 system levels: physiologic (satiety, tolerance, taste); cultural (familiarity, prestige, taste, satiety); society (convenience, prestige, familiarity, price); and personal (health belief and health knowledge). The main purpose of the model was to identify food choice motives as variables within a process of food choices and to categorize them. An understanding of food motives may eventually lead to a more realistic standard of food needs based not only on organic needs but also cultural and emotional heritage.

Not only have factors influencing food choices been studied, but attempts have been made to determine what meanings are applied to foods (Fewster et al., 1973 and Schutz et al., 1975). Fewster et al. (1973) recognized that foods have many meanings of which nutritional value is only one. In a study to measure food meanings, respondents rated a total of seven foods and food groups in a series of scales consisting of polar adjectives or phrases. These adjectives and phrases were selected to represent 12 major categories of meanings associated with foods and food habits. Factor analysis of the data produced four major factors to account for 41% of the variance. The

factors were evaluative (or preference), communication (thinking or learning about food), nutrition and health apprehension. Schutz et al. (1975) criticized Fewster et al. (1973) because the respondents did not create the categories. The foods and their uses were classified by someone observing behavior. Schutz et al. (1975) attempted to extend the research on food use classification systems by allowing respondents to generate their own classification system. To accomplish this 200 people in 4 cities were surveyed using a questionnaire with a matrix of 56 foods and 48 uses. Factor analysis for each city and the total sample resulted in five factors or categories of food use. Factor 1, high calorie treats, included wine, pie, cake and dip. These foods were considered appropriate for guests and special holidays but not appropriate to lose weight or when one is not feeling well. Factor 2, specialty meal items, including chitterling, liver and chili. These foods were perceived notably inappropriate for a wide variety of situations. Factor 3, common meal items included chicken, roast beef and steak. They were viewed as nutritious and considered appropriate for all age groups. Finally the fourth factor, refreshing health foods, included foods such as Jello[®], cottage cheese, orange juice and milk. These were considered easy to digest and nutritious and could be served cold or in the summer.

Only in the research of Eppright et al. (1970), Schwartz (1975) Sims (1976, 1978) and Grotkowski and Sims

(1978) has the attitude "nutrition is important" been studied. Concerned with improving the nutrition of young children, Eppright et al. (1970) studied associations among mothers' scores on nutrition knowledge and attitude tests and socioeconomic factors in relation to food and nutrient intake of their pre-school children. One of the attitudes, "nutrition is important", included in the factors, was found to be highly related to nutrition knowledge and total food intake. Schwartz (1975) adapted the attitude segment "nutrition is important" to her study of high school graduates. She was interested to learn how much information graduates retained and used in their daily life four years after graduation. Schwartz used the knowledge and attitude scales of Eppright et al., (1970) along with a three-day food frequency form and questions about sources of nutrition information in her study. She found significant correlation coefficients between nutritional knowledge and attitudes and between nutritional attitudes and practices, however, the correlation between nutritional knowledge and practices was not significant. This study began to refine the relationship of knowledge, attitudes and practices in nutrition research.

In a survey of mothers of preschool children, Sims (1976) found that the attitude "nutrition is important" is positively correlated with the level of nutrition knowledge. To learn if attitudes are important in the translation of nutrition knowledge into actual food behavior,

mothers of 163 preschool children were interviewed regarding nutrition knowledge, attitudes (including "nutrition is important"), and demographic information. Dietary behavior was not a variable in this study. Statistical correlations were significant between nutrition knowledge, "nutrition is important" attitude, socioeconomic status and education.

Interested to see if the results of Eppright et al. (1970), Schwartz (1975) and Sims (1976) could be applied to other groups, Grotkowski and Sims (1978) studied 64 elderly persons to evaluate nutritional quality of diets, nutrition attitudes and knowledge and demographic characteristics of the group. Using statistical techniques interrelationships between these factors were again found. Higher socioeconomic status and greater nutrition knowledge were positively correlated with "nutrition is important" attitude. Socioeconomic status and nutrition knowledge were associated with higher dietary intakes as well.

These four studies strengthen each other. Using the parameter "nutrition is important" and obtaining comparable results with high school graduates, mothers of pre-school children and the elderly implies that an association does exist between knowledge, attitudes and practices which may be predictive of higher quality diets.

In another study Sims (1978) made an attempt to refine the relationships of attitudes, knowledge and behavior in the learning progression in nutrition. In the previous studies cited above, the variables had been compared in a

bivariate manner, that is, knowledge with attitudes, attitudes with behavior, knowledge with behavior. In this survey of lactating women, Sims (1978) proposed two models to study the variables as a triad.

1. Attitudes are intervening variables between knowledge and behavior.
2. Knowledge acts to intervene between attitudes and behavior.

By the use of statistical techniques, the relationships of dietary habits, nutrition knowledge scores and nutrition attitudes were evaluated. The statistical technique of path analysis (Nie et al., 1975), a special type of multivariate analysis which deals with a closed system of variables which are assumed to be linearly related, was used to explore the alternate causal models. It is not a technique which attempts to prove causal relationships but is intended to aid in interpreting causal relationships established by the researcher. Using this statistical method, Sims was able to conclude that knowledge is the intervening variable between attitude and behavior. This study emphasizes the importance of the affective domain in the acquisition of knowledge and the practice of good nutrition.

Health Research

The emphasis in health research has been on exploring attitudes which may be predictive of behavior. The

significance of predicting behavior was to improve cost/benefits of health education programs. Three models have surfaced which seem to be useful to this end; Health Belief Model, locus of control and general well-being. The Health Belief Model approaches the social-psychological framework of the individual. These include the individual's perceptions of illness susceptibility and severity, and perception of benefits and barriers to behavior. Locus of control focuses on the individual's perception of reinforcement for a behavior and whether the provision of reinforcement is within his/her control or not. General well-being is a subjective assessment of physical, psychological and social health.

The definitions of health behavior by Kasl and Cobb (1966) have been widely accepted. Health behavior is "any activity undertaken by a person who believes himself to be healthy for the purpose of preventing disease or detecting disease in an asymptomatic stage," p. 246. Conscious consumption of a balanced diet is a nutrition-related health behavior. Illness behavior is defined as "any activity undertaken by a person who feels ill for the purpose of defining the state of his health or of discovering a suitable remedy," p. 246. Attending a health spa or adhering to food fads may be a nutrition behavior related to this role. Sick-role behavior is any "activity undertaken by those who consider themselves ill for the purpose of getting well," p. 246. Following a therapeutic diet

would be consistent with sick-role behavior. There is a great deal of overlap of illness and sick-role behaviors. These are often reported synonymously.

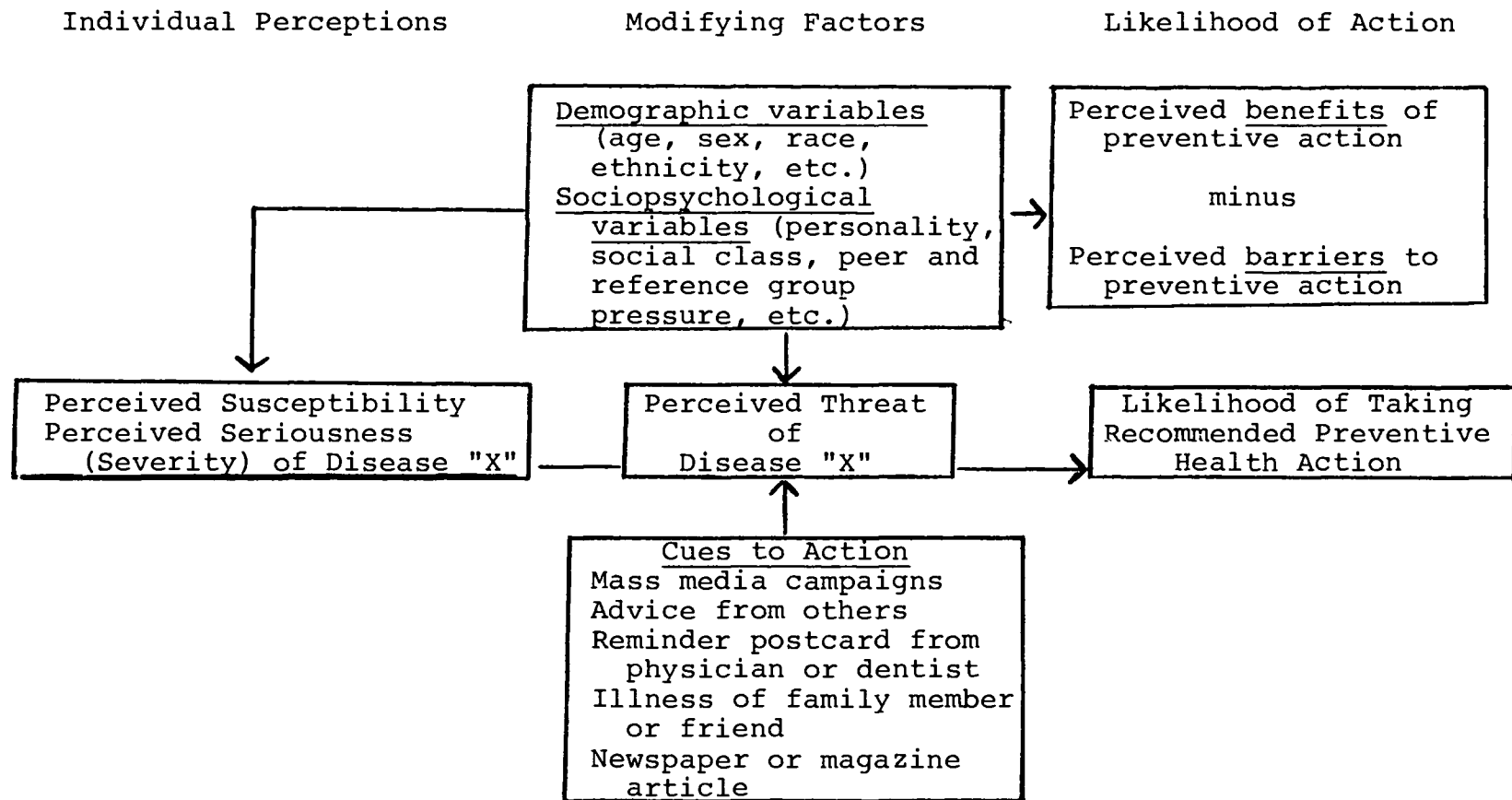
The Health Belief Model (in Becker, 1974) postulates that an individual's readiness to act is determined by a set of attitudes toward health in general and toward a specific condition and regimen. It is concerned with the subjective world of the acting individual, and proposes the following theoretical conditions and concepts:

1. Susceptibility - The individual must perceive susceptibility or resusceptibility to the condition.
2. Severity - An action will not occur unless the individual also believes becoming ill would bring serious organic and/or social repercussions.
3. Benefit - The individual must see a benefit in the prescribed behavior.
4. Stimulus - There must be an internal or external stimulus to act.

Figure 4 from Becker and Maiman (1975) graphically conceptualizes the model.

An example of this model to nutrition behavior would be the practice of taking vitamin supplements. The individual perceives a normal diet to be nutritionally

Figure 4 The "Health Belief Model" as predictor
of preventive health behavior



(Becker and Maiman, 1975, Medical Care 13:10)

inadequate. Upon learning about vitamin supplements, the person believes that the risk of malnutrition would be minimized if vitamin supplements were taken. If the cost of supplements is not perceived as a barrier the person may begin to use supplements. The stimulus in this case is both internal and external. The concern about being malnourished is internal. The external stimulus comes from learning about the supplements.

Several studies have been undertaken to evaluate the Health Belief Model as a predictor of compliant behavior (Kirscht et al., 1966, Becker and Maiman, 1975, Becker et al., 1977 and Glanz, 1979). Only two (Becker et al., 1977, and Glanz, 1979) describe dietary behavior specifically.

Becker et al. (1977) tested the ability of the Health Belief Model to predict and explain mothers' adherence to diets prescribed for their obese children. Significant correlations were obtained between each major dimension of the model and the outcome measured, the weight loss of the children. Dimensions measured included: (1) general health motivation (concern for the child's health), (2) perceived susceptibility (how easily the child becomes sick), (3) perceived severity, and (4) benefit (prevention of heart disease or adult obesity). Intervention was directed at heightening perceptions of susceptibility and severity through fear arousal messages, while dietary counseling and medical examinations were the treatment program.

(Becker et al., 1977) concluded that knowing the general health concerns of the mother coupled with her perception of her child's susceptibility and severity of disease a substantial prediction of weight loss in the child could be made.

In an attempt to evaluate the effect of dietitians' counseling on patient compliance with dietary regimens, the Health Belief Model was applied to health and diet-related attitudes such as belief in the benefit of the diet. Although only nine dietitians and twenty patients were studied for one month there appeared to be relationships between attitudes and compliance. Glanz (1979) cautions, however, that her data should be interpreted carefully due to limitations of the study.

While the Health Belief Model is interesting, Rosenstock (in Becker, 1974) pointed to methodological problems such as lack of standardized assessment tools that inhibit complete confidence in using the model to predict outcome behaviors.

In addition to the Health Belief Model, the locus of control is a theory based on the attitude about reinforcement as a predictor of behavior. The role of reinforcement is central to the locus of control. Reinforcement is crucial to the acquisition and performance of skills and knowledge. It is well recognized as a motivational force in behavior change. Rotter (1966) has developed a theory concerning the predictive role of reinforcement

expectancies. This refers to the degree to which an individual perceives reward as contingent on his behavior or independent of it. Rotter theorized that as subjects perceive a situation as one in which luck or some external force determined the reinforcement then they are less likely to expect future success. However, if the subjects perceive reinforcement as dependent upon skill or their own efforts, they are more likely to expect future success. After numerous studies, Rotter developed a reliable, valid instrument, the internal-external scale, to measure locus of control. The individual who perceives that an event is contingent upon his/her own behavior has what is termed internal control. Conversely, external control is characterized by the belief that luck, chance or fate determines the outcome of the action an individual takes. Studies provide strong support for the hypothesis that the individual who has a strong belief that he can control his own destiny is likely to (1) be more alert to those aspects of the environment which provide useful information for future behavior, (2) take steps to improve the environmental conditions, (3) place greater value on his/her skill or achievement and (4) be resistive to subtle attempts to influence him/her away from his/her beliefs. In a recent review, Strickland (1978) has discussed the role of internal-external locus of control in relation to health knowledge, precautionary health practices and reactions to physical and psychological disorders. She

concluded that a majority of the research on locus of control supports the theoretical assumption that those grouped as internals are more likely to assume responsibility for their health.

Based on the assumption that research related to health beliefs and behavior required an instrument that would be more specific to health than the original internal-external (I-E) scale, Wallston et al. (1976) adapted locus of control scale (Rotter, 1966) to be specific for health. Two validation studies reported in Wallston et al. (1976) showed that the health locus of control scale could be used in predicting health behavior. In one study the I-E scale was used to predict the behavior of patients collecting information about disease in a hypertension clinic. In a second study, health locus of control was found to correlate with success in and satisfaction with a weight control program. In general, Wallston et al. (1976) found that those classified as internals who value their health are more likely to collect information about disease and health maintenance.

Using health locus of control as an attitude variable, 36 clients of a commercial weight treatment program were studied to learn how locus of control might influence behavior (Muhlenkamp and Nelson, 1981). It was learned that the clients' scores on the I-E scale characterized them as internals. After an average of 6-1/2 weeks on the program an average of 19 pounds per person was lost.

Since the study group was small and self-selected, further study of this relationship was recommended.

Other than these two studies comparing weight reduction programs and health locus of control, no other studies were found in the literature to evaluate other dietary behaviors from the perspective of health locus of control.

The subjective assessment of health when correlated with objective assessments, i.e., medical exam and biochemical evaluation, is useful in gaining an overall perspective of an individual's health status. An understanding of how individuals view their health has been found useful in understanding how they utilize health services as well as how they perceive their overall satisfaction with life. Measures of general health perceptions differ from other measures of health status in that they do not focus on a specific dimension of health status. Instead, such measures ask respondents for an assessment or self-rating of their general health. This assessment reveals the general attitude that a person has toward his/her health. Two studies have been done to produce valid and reliable instruments for the measurement of general well-being.

Using data collected on 6931 non-institutionalized adults during the National Health and Nutrition Examination Survey (HANES) of April, 1971 through October, 1975, Wan and Livieratos (1978) demonstrated the validity and reliability of the General Index of Subjective Well-Being

previously constructed by the National Center for Health Statistics (Dupuy, 1974). They were interested in using an instrument which could be self-administered and would be sensitive to the relationship between various clinical measures and a sense of general well-being. The HANES included medical, dental, nutritional, demographic and psychological measures, one component of which was the General Index of Subjective Well-Being. The index includes 18 items and asks for a self-evaluation of the presence, severity and frequency of some clinical symptoms. The questions are to be answered in the context of how one has been feeling during a specified time period. Response options range from excellent to very poor. The analytic technique used in this study was a multivariate approach that identifies sociodemographic differentials in general well-being and then examines the relative importance of clinical measures in predicting general well-being.

Correlations were observed between (1) age, (2) the presence of clinical symptoms and (3) psychological indicators and general well-being. The older segment of the population did not evaluate their general health as high as younger segments. Throughout the population, as the presence of clinical symptoms increase the assessment of general well-being declined. Perceived health status was the most sensitive indicator of psychological health. Throughout the analysis the scores on the General Index of Subjective Well-Being maintained a consistent pattern. It was

concluded that the General Index of Subjective Well-Being may be regarded as a useful tool for portraying the general health self-assessment of a population.

In a study to assess the effects of variations in the cost of health services to the patient on the use of services, quality of care, patient satisfaction and health status, Brook et al. (1979) included a component of general health perceptions similar to those studies by Wan and Livieratos (1978). Reported in this study (Brook et al., 1979) are techniques used to measure the validity and reliability of general health perceptions as an indicator of health status. Like Wan and Livieratos (1978), the scores of the general health perception maintained a consistent pattern.

HEALTH-RELATED PRACTICES

What behaviors or habits are related to health and should be measured to be compared with attitudes? Health can be measured by mortality rates, categorized by disease incidence or disability. In each of these measures only one aspect of health is considered and the tendency is to focus on the lack of health rather than the presence of good health.

Belloc et al. (1971) conceived of health as a spectrum and developed three scales to assess physical, mental and social health. Applying these scales, Belloc and Breslow (1972) made an attempt to quantify the concept of health

in studies in Alameda County, California. The purpose of their studies was to determine practices that favored health and to estimate the effects of health habits and personal care habits on health. Seven thousand adults were selected at random from the general population of Alameda County to be surveyed by a mailed questionnaire. A physical health spectrum was developed on the basis of answers to questions about disability, chronic conditions, impairments, symptoms, and energy level. The population was grouped into seven categories based on perception of physical health. Belloc and Breslow then used this perception of physical health as a dependent variable and health habits as independent variables in an attempt to establish a relationship between the feeling of health and health habits. The health habits investigated were sleep, physical activity (activity focused on daily activity rather than conditioning exercises), alcoholic beverage consumption, smoking and eating habits. Eating habits were reflected by weight maintenance, frequency of eating and consumption of breakfast. Nutrient intake was not estimated. The results of the study showed that as individuals practiced one or more of the various health habits their feeling of health increased. They learned that the effect of practice of health habits was additive. Personal health practices including 7-8 hours of sleep, regular meals, weight in relation to desirable standards, no smoking, moderate drinking and physical activity were related to

physical health status. In every age group, those who practiced all habits felt in better health than those who followed none or few.

In follow up studies (Belloc, 1973, Breslow and Enstrom, 1980, and Wiley and Camacho, 1980), the same health practices were related to morbidity and mortality. Additive effects and positive correlations were found between the number of health practices and the individuals' perceptions of health as well as longevity. Belloc (1973) examined health practices in relation to mortality rates of the study population. He found, after adjusting for variation in age, that mortality was associated with health practices. As more health habits were included, the mortality rates declined. Further longitudinal analysis of the population revealed continuing trends. Breslow and Enstrom (1980) and Wiley and Camacho (1980) have followed their original populations for nine years to evaluate the effects of health practices on health status. The seven health practices included never smoking, regular physical activity, moderate or no use of alcohol, 7-8 hours of sleep daily, maintaining standard weight, eating breakfast and not eating between meals. When totalled to give a health practice score from 0-7, the number of health practices showed a striking inverse relationship with age-adjusted mortality rates. These results lend support to the hypothesis that good health practices are largely responsible for the observed (Belloc, 1973)

mortality relationship. The fact that seven health practices have been identified and associated with health status and mortality rates provides an instrument to use for measuring health practices in relationship to other indices such as attitudes.

SOCIO-DEMOGRAPHIC VARIABLES

RELATED TO ATTITUDES AND PRACTICES

Attitudes seem to be closely associated with age, educational level and socio-economic level. In a study to determine associations between food-faddists' beliefs and practices and demographic characteristics, Jalso et al. (1965) found increasing age to be inversely related to valid opinions about nutrition and nutrition practices, but educational level to be positively associated with nutrition practices and opinions. Sims (1976) found high positive correlations between nutrition knowledge and socio-economic status, level of education, occupation and the attitude, "nutrition is important". In their study of the elderly, Grotkowski and Sims (1978) also learned that education level, socio-economic level and former occupation were associated with nutrition knowledge and attitudes. Coburn and Pope (1974) have shown similarities in population characteristics when related to health behavior. Those who were young to middle-aged, relatively well educated, and had higher incomes practiced more precautionary health behaviors.

When studying relationships of demographic characteristics and the combination of beliefs in susceptibility and benefits of the Health Belief Model, Rosenstock (1974) reported that certain beliefs may be necessary for taking preventive or screening tests, but that they are not distributed evenly in the population. Precautionary behavior of the Health Belief Model has been associated with women who were relatively young (35-44 years), Caucasian, of higher income, married and relatively well educated. Becker et al. (1977) found when working with mothers of obese children that only two demographic characteristics were associated with compliance to the weight control program. The age of the child and the mother's marital status were substantially associated with weight loss. Becker theorized that the older children participated in the program by assuming responsibility for their diet while away from home and that the mother's marital status indicated the support environment for the child.

In the literature on locus of control no reports of associations between demographic characteristics and this measure were found.

DEVELOPING ASSESSMENT METHODS

Attitude Assessment

Cook and Selltiz (1964) identify five methods by which attitudes can be measured: (1) self reports of beliefs,

feelings and behaviors; (2) observations of overt behavior; (3) reaction to or interpretation of partially structured stimuli which involve the attitudinal object; (4) performance of tasks which involve the attitudinal object and (5) physiological reactions to the attitudinal object or representations of it.

Self-report procedures represent the most direct type of assessment and include all procedures by which a person can be asked to report on his/her own attitudes. Interviews, surveys, polls, questionnaires, logs and journals are examples of self-report methods.

Several self-report techniques have been devised to measure attitudes (Fishbein and Ajzen, 1975). One of the most widely used and successful tools was developed by Likert (1932). A Likert scale consists of a series of statements to which the subject responds by selecting from five or more choices ranging from strongly agree to strongly disagree. It is a relatively easy scale to construct and has been shown to possess a high degree of unidimensionality (Oppenheim, 1966). An instrument of twenty or so items is usually used to assess one dimension of attitude. Likert scales are usually treated as integral scales in statistical analysis. A second commonly used tool is the Thurstone scale, which is a series of statements of equal appearing intervals that have previously been given a scale value by a group of judges (Thurstone, 1928). The respondents are asked to agree or disagree with each

statement. The responses are tabulated according to the previously established scale values. The major purpose of the Thurstone scale is to specify the location of each item on the evaluative dimension or rank by assigning a scale value to each item. The technique is particularly useful when one is attempting to measure attitude change over time. Another technique used in attitude assessment is the Guttman scale (Guttman, 1944). The format is similar to the Thurstone scale but scores are cumulative rather than ranked. Guttman scales are useful when examining small shifts of changes in attitudes. Hertzler and Owen (1976) review the use of Guttman scales in the study of food preference. A fourth technique of attitude measurement is the semantic differential. This was designed to measure individuals' reactions to semantic objects utilizing ratings of bipolar adjectives. Through the work of Osgood, Suci and Tannenbaum (1965) it was found three basic dimensions account for most of the variation in subject responses. The dimensions were evaluation, potency and activity. Evaluation involves paired adjectives such as good-bad; potency relates to power (strong-weak); and activity to pairs such as slow-fast.

Selection of attitude measuring techniques depends on the definition of the problem and the strategies to solve the problem. Regardless of what procedure or scale is selected, the useful attitude instrument must possess the properties of reliability, validity and unidimensionality

(Oppenheim, 1966, Sims, 1981 and Talmage and Rasher, 1981). Reliability is an indicator of the reproducibility of test results from a series of measurements for a given sample. Unidimensionality is the property that indicates a single attitude is being measured. Validity refers to the property that the test is measuring what it should be and that it may have a predictive nature. Validity and reliability are dependent upon the characteristics of the test subjects and the purpose of the assessment. Because an instrument is valid and reliable for one group, will not mean it will be equally valid or reliable for all groups.

A reliable instrument is one that is relatively free of measurement errors. Upon repeated use the instrument would yield similar scores should all other factors be the same (Talmage and Rasher, 1981). Sources of experimental error include the instrument, the method of administration, the technique of scoring, the mental and physical state of the individual taking the test and distractions in the environment. Reliability of an instrument can be measured by determining the stability of the instrument through repeated use or by internal consistency with the use of statistical methods such as Cronbach's alpha coefficient, split-half method or Kruder-Richardson formula (Bohrnstedt, in Summers, 1970).

Validity can be classified into three types: content validity, criterion-related validity and construct validity

(Oppenheim, 1966, Sims, 1981, Talmage and Rasher, 1981). Content validity is the degree to which the scale being used represents the concept about which generalizations are made. Content validity is frequently judged by a panel of content area specialists who can evaluate the relationship of the items to the overall objective. Criterion-related validity refers to the degree that the scale will measure one objective, that is the strength of the relationship between the independent and dependent variables. Criterion-related validity may be predictive or concurrent and is usually expressed as the correlation coefficient. Construct validity is established by determining the degree to which certain concepts account for the performance on the test. Factor analysis is one statistical tool used to establish construct validity.

Sullivan and Schwartz (1981) describe the steps used to develop instruments for assessing attitudes and knowledge about cardiovascular nutrition among adult lay persons. An independent panel of experts determined content validity. Construct validity was assessed by measuring significant differences in the mean attitude and knowledge score among four groups presumed to have differing information about cardiovascular nutrition. Dietitians, college nutrition majors, college education majors and adults from a community center composed the groups. Internal consistency to measure reliability was tested with Cronbach's alpha and Hoyt's r test.

Carruth and Anderson (1977) pointed out in their research, that there are at least two critical problems in assessing attitudes in nutrition education: the lack of available and suitable instruments to measure attitudes toward food and nutrition; and the complexity of interpretation associated with descriptive, non-parametric data. In most cases, the attitude instruments are developed to test the hypothesis of a specific research study. Sims (1981) has schematically reviewed 62 articles which appeared in the nutrition literature during the 1970's. All publications reportedly measured constructs identified as attitudes, beliefs, or opinions. Of these publications, 11 were review articles and therefore excluded from further review.

For the published empirical work studying nutrition-related attitudes, use of survey methodology was the most popular; more than 90 percent of the studies reported employing this rather than experimental or intervention designs. Most studies used Likert-type scales as the method of measurement. Carruth and Musgrave (1979) used the semantic differential once. Some of the authors stated that they used a method of measurement which asked the respondent to tell whether each item was true or false, correct or incorrect, right or wrong, in spite of the fact that they reportedly were measuring an affective dimension for which a judgement of correctness or incorrectness cannot be made. Nearly 30 percent of the studies did not report

the type of measurement used in the collection of data.

Even though the assessment of attitudes and related concepts was indicated as a primary focus of the research study, few of the studies reported any validity and reliability assessment of the data. For 72 percent of the studies no validity check was identified. For most of the other studies, content validity was indicated. Reliability assessments were reported in only 17 percent of the published works. The type of reliability determinations reported included Kuder-Richardson, Chronbach alpha and test/retest reliability.

Sims (1981) review concurs with the assessment of Carruth and Musgrave (1979) that in nutrition-related attitude research attention must be directed to developing instruments and methods that will support the research.

Dietary Assessment

The literature describing the evaluation of diets is broad and voluminous. Dietary assessment is a component of nutritional status evaluation along with anthropometric and biochemical data. Dietary assessment is usually the subjective component of nutritional status since it requires gathering information about foods eaten from the subjects and determining nutritional composition of foods from tables. Dietary study methods may include past dietary history, present food habits, the typical intake and the

determination of nutritive adequacy according to some standard, such as the Basic Four Food Groups or the Recommended Dietary Allowances (National Academy of Sciences, 1980). Dietary evaluations may focus on the individual, on groups within a population, or on the country as a whole. The appropriateness of the method of dietary evaluation will depend on characteristics of the target individual or population (age, education, diet variety) as well as proposed objectives and limitations of the study (time, money, personnel). The validity of the study will depend not only on the selection of appropriate dietary methodology, but also on the size and selection of the sample, quality of the questionnaire, accuracy of the data collected and statistical tests employed. Three extensive reviews of dietary evaluation methodology (Pekkarinen, 1970, Marr, 1971 and Young, 1978) have detailed advantages and limitations of various methods including dietary recall, food records (one-to-seven-day), household inventory, and food frequency. Research focusing on food record methods will be reviewed since this method was the one chosen for this study.

There are several variations of food record methods. Amounts of food actually eaten may be weighed or determined by household measure or may be estimated by the subject. The length of time the record is kept can vary from 24 hours to seven days or more. It is generally agreed that the most accurate way of learning about food consumption is by

weighing all food consumed for a given period of time. Unfortunately, the limitations inhibit its use. Precise weighing requires close supervision which is time consuming for the investigator and the participant. This method is best used in a controlled metabolic unit. When an estimate of portions in household measures is used, a loss of precision occurs but a higher degree of subject cooperation is achieved (Young et al., 1953, Marr, 1971). Use of food models and household measuring tools has been shown to facilitate a more accurate estimation of consumed amounts (Pekkarinen, 1970). The accuracy of food records may be questioned because of the inability of subjects to estimate portion sizes or their willingness to keep records (Young et al., 1953). Eads and Meredith (1948) and Eppright et al. (1952) preferred the food record and considered this a satisfactory method with regard to accuracy and consumption description. When studying individual as opposed to group means involved in epidemiological studies, the food recall and food record methods appeared to have a higher correlation than when compared with the diet history (Young et al., 1952). The dietary record is currently recognized as a means to obtain quantitative estimates of individual consumption as well as groups (Christakis, 1973).

There is some question as to the number of days that a food record should be kept. Chalmers et al. (1952) believed that to characterize the dietary intake of a group one day's record can be satisfactory. However, Eads

and Meredith (1948) and Balogh et al. (1971) have shown that a single day's intake may not be representative of the subject's usual diet. Because there are also disadvantages of prolonged record keeping in terms of cost, loss of interest and accuracy, three days has been suggested as "the minimum length of time for obtaining a satisfactory picture of the food intake of an individual" (Tinsley 1947). After comparing previous research data, Marr (1971) suggested that dietary information for three days yields as much information as data for seven.

Even with ready availability of computers, data banks and appropriate programs, calculations used to derive the nutrient content of a diet on the basis of a food record are relatively tedious and time consuming and hence costly. To avoid the disadvantages involved in collecting and analyzing voluminous data used to assess nutritional status, shorter means have been explored.

Pennington (1976) has devised two tools to provide a means of dietary nutritional assessment that can be easily used in a clinical setting or in the field. The first, a miniature food list, designated "mini-list", was developed for the purpose of determining coexistence of nutrients in foods and for the purpose of evaluating the nutrient content of diets. The mini-list contains 49 nutrient values for 202 foods. The foods are representative of those most commonly consumed in the United States. Provisions have been made for food substitutions, so that food items not

on the "mini-list" are substituted by similar items (i.e., pears and cherries are substituted by apples). An average serving size for each food item on the list was developed. Pennington (1976) has demonstrated that errors in nutrient evaluation incurred when using the "mini-lists" with the use of food substitutions and the use of established portions were much smaller than the errors due to normal nutrient variations in foods. The second nutritional tool is a group of index nutrients. Based on the co-occurrence of essential nutrients in foods which are commonly eaten by the American public, seven nutrients (Vitamin B₆, magnesium, pantothenic acid, folacin, Vitamin A, iron, calcium) were designated index nutrients. To identify the index nutrients, Pennington (1976) explored the feasibility of using one nutrient to predict the presence of several other essential nutrients in the diet. Nutrients selected were those which (1) alone could insure adequacy of one or more essential nutrients; (2) in combination with one or more index nutrients, could insure adequacy; (3) or were essential and could not be insured by any other nutrient or combination of nutrients. Using correlation coefficients for the 45 nutrients of the "mini-list", and studying published literature pertaining to dietary studies and evaluating "authentic" diet records, the seven index nutrients were identified.

The seven index nutrients insure the adequacy of amino acids, total protein, phosphorus, calcium, potassium,

thiamin, riboflavin, niacin, Vitamin B₁₂, zinc, copper, Vitamin C and probably insure adequacy of linoleic acid and other trace minerals such as manganese and chromium.

To apply the Dietary Nutrient Guide (Pennington, 1976) the mini-list foods have been given points based on their nutrient content of the seven index nutrients. Table 1 summarizes the scoring system.

To ensure dietary adequacy for adults the daily total for each of the seven index nutrients should be 10 points with a composite score of 70 for the day.

Using Pennington's guide to evaluate 2 day's menus from the Thrifty Food Plan, Lane and Vermeersch (1979) found their analysis was comparable to results of King et al. (1978) using Basic Four menu plans. Shapiro (1979) has also recommended Pennington's methods as a means to analyze nutrient quality of diets while using a short cut approach but maintaining overall accuracy.

Survey Methods

The issues of whom to study, where to conduct the study, what type of questions to use, and how to administer a questionnaire are resolved according to the purposes of the particular study and the financial, personnel and time constraints under which it must operate (Selltitz et al., 1976). Usually questionnaires are administered by interviews either in person or over the telephone or are self-administered when mailed directly to the respondent.

Table 1 Dietary Nutrient Guide Scoring System

Percent of Suggested Daily Intake for Adults	Points Assigned
98 or more	10
88-97.9	9
78-87.9	8
68-77.9	7
58-67.9	6
48-57.9	5
38-47.9	4
28-37.9	3
18-27.9	2
8-17.9	1
4- 7.9	1/2
2- 3.9	1/4

Pennington, Dietary Nutrient Guide, 1976, p. 52.

Face-to-face interviews have been considered the most satisfactory survey method because, in spite of the personnel required, the response rates were higher. However, a special committee of the American Statistical Association has noted that completion rates of personal interviews in general population samples now average 60-65 percent compared to 80 to 85 percent previously attributed to this method (Dillman, 1978, p. 3).

Siemiatycki (1979) studied the various survey strategies to compare cost and data quality. Strategies which began with mail or telephone contact, followed by either a telephone or mail contact provided response rates as high as the home interview strategy for one-half the cost. The telephone response rate (87-90%) was higher than the mail response rate (79-85%). The validity of responses and willingness to answer sensitive questions were greatest in the mail survey.

A major limitation of validity for studies using mailed questionnaires is non-response bias. An assessment of response bias was made (Barton et al., 1980) comparing respondents and non-respondents with regard to age, education, state of residence, employment status and field of employment. The study populations consisted of 240,709 registered nurses who were identified from files provided by State Boards of Nursing and the American Nurses Association. Demographic characteristics of each individual were known prior to the survey. It was found that response

and non-response groups were quite similar. Response rates were slightly higher among younger nurses but the differences overall were not statistically significant.

Feeling that the failure of telephone and mail surveys resulted from poor design and administration, Dillman (1978) has recommended what he calls "The Total Design Method" (TDM), which consists of two parts. The first is to identify each aspect of the survey process which may affect either quality or quantity of the response. The second is to organize the survey efforts so that the design intentions are carried out in detail. Dillman believes there are three things that must be done to maximize survey response: (1) minimize costs for responding, (2) maximize rewards for responding and (3) establish trust that those rewards will be delivered. Dillman (1978) outlines in a step by step fashion techniques to maximize responses from procedures for writing questions and cover letters to design and format of the questionnaire itself to implementing the survey. He recommends that a midweek mailing date be selected to avoid weekend buildup, yet ensure arrival before the weekend. A four-wave mailing is felt to achieve maximum response. The first mailing is a complete questionnaire, cover letter and a stamped return envelope. The second mailing is a post card one week later. The third and fourth contacts are three weeks and seven weeks respectively from the initial mailing. Again a cover letter, complete questionnaire and a stamped

return envelope are included. Using the Total Design Method, Dillman estimates response rates for mailed surveys to be 74 percent.

III. PROCEDURES

To evaluate the interrelationships between attitudes toward and practices of health and nutrition, a survey was designed using a self-administered questionnaire that would be mailed to the study population.

Data Source

The study population was selected from subscribers to Kaiser Foundation Health Plan of Oregon. This is a prepaid health plan headquartered in Portland, Oregon. It was felt that a response from this population might be greater than from the general population since accurate records of the members' addresses are maintained. Also this investigator was employed by the organization at the time of the research. The organization offered technical and financial support to the project.

A population of 600 individuals was selected from the 230,000 health plan members using random selection processes. The criteria for inclusion in the population were that the individuals be 18 years or older, that only one individual per family be included and that participants of this study should not be participating in any other study of the health plan. An attempt was made to gather equal numbers of men and women but no attempt was made to age segregate the population.

Survey Instrument

The final questionnaire (Appendix A) included a total of 63 questions which were gathered from the literature to reflect the specific objectives of this study. Questions for which validity and reliability were established were chosen to use in this instrument.

Health Attitudes: To assess health attitudes, two indicators were selected. The General Index of Subjective Well-Being, validated by Wan and Livieratos (1978), was used to reflect a subjective assessment of overall health. Eleven statements evaluating physical, social and psychological well-being were used from the Index. To each question the respondents were asked to rate their present degree of health from four choices offered. Statements 1 through 11a on the questionnaire represent the general wellness index.

Health Locus of Control: The Health Locus of Control Scale consisted of ten statements validated by Wallston et al. (1976). Statements 12 a-j on the questionnaire are the health locus of control. Respondents were asked to indicate if they agreed or disagreed, or did not know in a Likert scale to each of the ten statements. Four statements were stated so that an agree answer would indicate internal locus of control. The remaining six were directed so that an agree answer would represent external locus of control.

Nutrition Attitudes: Nutrition attitudes were evaluated using fifteen statements from the research of Eppright et al. (1970), Schwartz (1975), Sims (1976, 1978) and Grotkowski and Sims (1978) and Katz and Goodwin (1976) which focused on the attitude "nutrition is important". Refer to statements 12 k-y on the questionnaire for nutrition attitude segment. To develop this segment, 23 statements were gathered or adapted from the literature. A panel of Food and Nutrition faculty, graduate students and selected nutritionists employed in various agencies reviewed the statements for content validity. They ranked their suitability as indicators of the attitude "nutrition is important". The decision to select the final fifteen was based on the repeated use in the literature and the results of the panel's evaluation. Seven statements used repeatedly beginning with Eppright et al. (1970) then with Schwartz (1975), Sims (1976, 1978) and Grotkowski and Sims (1978), five statements from Katz and Goodwin (1976) and three statements adapted from the health locus of control (Wallston, 1976) composed the index. Respondents were asked to answer a Likert scale of agree, disagree or do not know for each of the 15 statements.

Health Practices: The health practices studied by Belloc and Breslow (1972) and later by Wiley and Camacho (1980) and Breslow and Enstrom (1980) were used as indicators of health habits. The habits included daily physical

activity, smoking, alcohol consumption, hours of sleep, body weight and weight change, consumption of breakfast and between meal snacks. Visits to physicians and dentists were added as an internal check of general wellness. Questions 15-23, 26, and 27 on the questionnaire represent the health practices segment.

Nutrition Practices: To assess nutrition practices participants were asked to complete a 24-hour food record and answer two statements which defined their purpose for choosing foods and indicate consumption of vitamin supplements and the amount of liquids consumed in a day. Questions 13, 14, 24, 25, and 28 completed the nutrition practices segment.

Demographic Characteristics: The final section of the questionnaire was to determine demographics of the population. Information was gathered including the respondents' sex, age, marital status, employment status, education and income. This section of the questionnaire is found in questions 29-35.

All statements on the questionnaire were reviewed by the Survey Research Center at Oregon State University and at the Kaiser Foundation Hospitals Health Services Research Center. The questions were checked for bias and clarity and revised to improve these qualities. The questions were then formatted for ease of handling by the respondent and

for coding for computer analysis. All statements were close-ended except the 24-hour food record.

The booklet format recommended by Dillman (1978) was used for the final form of the questionnaire. The cover included the logo of Kaiser Foundation Health Plan. The last page of the questionnaire was an open-ended opportunity for the respondents to express themselves.

A description of the methodology and a copy of the instruments used in this research were submitted to the Human Subjects Committees of Oregon State University and Kaiser Foundation Hospital Health Services Research Center for review and approval prior to the test. Additional approval of the Vice President of Kaiser Foundation Hospitals, Oregon Region Manager was also obtained before the questionnaires and letters were printed and mailed. It was not anticipated that any stress or harmful side effects would be experienced by the subjects. Questionnaires were administered in a manner that maintained the anonymity of the subjects, thereby protecting their privacy. Results were tabulated and reported respecting the confidentiality of the respondents. Results of the survey were not included in the medical records of the Kaiser Health Plan member.

Prior to mailing, each questionnaire was labeled by hand with the final four digits of the health plan identification digit. This was used to identify returned questionnaires. The names of the individuals remained anonymous.

Evaluation of Reliability and Validity

Reliability of the segments of this instrument was implied through test/retest procedure. All indexes had been used repeatedly with results reported in the literature.

Validity of all indexes except nutrition attitudes was also reported in the literature.

Data Collection

A three-wave mailing procedure was planned. The first and third contact packet included an introductory letter describing the project, conditions of participation and confidentiality, a questionnaire and a postage paid return envelope. The second contact, a post card, was mailed to thank all participants and remind that outstanding surveys should be returned. Guidelines from Dillman (1978) and Kaiser Foundation Hospital Research Center were used to develop the letters and post card. All mailings were conducted on Wednesdays to achieve maximum utilization of mail service. For the first mailing a complete survey package, including cover letter, questionnaire and postage paid return envelope, was mailed first class mail on May 5, 1981. One week later, May 12, 1981, a first class post card was mailed to all participants. Three weeks following the initial mailing, May 26, 1981, the final contact was made with all those who had not returned a questionnaire.

In this follow-up a duplicate questionnaire, a cover letter re-emphasizing the importance of returning the questionnaire and a postage paid envelope were included.

June 5, 1981 was the cut off date for inclusion in the study. No attempt was made to contact any of those who failed to respond by June 5 or those who returned blank or incomplete questionnaires.

Data Analysis

Returned questionnaires were opened and examined for completeness. Those questionnaires which had completed food records and at least partially completed in all other sections were included in the data analysis. If any one section was totally blank the questionnaire was classified incomplete and not included in the data analysis.

The 24-hour food records were analyzed by this researcher for nutrient content using the point system developed by Pennington (1976) and described previously. After each food on the record was scored, a total score for each nutrient was calculated and then a grand total for each record was computed. The grand total was called the nutrient score. Calculations were cross checked for accuracy.

All survey questionnaires were turned over to a research assistant at the Kaiser Foundation Hospitals Research Center who keypunched, entered and verified the data on the center's computer. The Statistical Package for the Social Sciences, (SPSS) 2nd ed. (Nie et al., 1975)

provided the computerized program for all the calculations in the data analysis.

The initial analysis of the data was a frequency distribution for the answers to each question by the total population. Each response to all questions was tabulated. Percentages were computed for each variable. For nutrition attitude statements calculations were based on answers to agree and disagree statements only. Answers of "don't know" were tabulated separately.

The second step in the data analysis was to develop summary measures to represent the research objectives: locus of control, general well-being, health practices, nutrition attitude and nutrient score. The summaries later became the variables for analysis of relationships.

For the General Index of Subjective Well-Being, one statement was discarded since the entire population answered it the same. It was felt little discrimination could be achieved from leaving it in. Of the remaining 10 statements in this section, an internal correlation coefficient was calculated to determine if one statement would accurately reflect all others. Since all statements were highly correlated to each other, one statement was selected to represent this attitude. The statement, "In general, would you say your health is excellent, good, fair or poor," was designated the representative variable of this index.

The Health Locus of Control was calculated by totalling the responses to the ten statements in this section. For

the four statements directed toward internal control the following points were assigned to the responses, plus one was assigned to agree, minus one to disagree and zero to don't know answers. For the six statements which were stated external locus of control a reverse scoring was used. A possible plus ten score would indicate health locus of control as highly internal, zero a neutral position and minus ten highly external control.

Of the fifteen statements in the nutrition attitude section, only four statements were selected for continued analysis since the answers were generally unanimous for the other eleven statements. Statements with less than 90 percent response to one answer were used. Pearson r correlation was calculated to learn the relationships of these four statements and to test for criterion-related validity. They were included as a group to represent nutrition attitudes.

Health practices were summarized in the following manner. Summary measures were calculated for smoking behavior to determine current, former and non-smokers. Alcohol consumption was summarized as either one or less drinks per day or two or more drinks per day. A physical activity score was derived from question 23. Each response of frequently or occasionally was given one point for each of the six close-ended options. By totaling the points a maximum score of 6 would represent an active individual. Scores ranged from 6-0. Indexes for hours of

sleep, consumption of breakfast and snacks and body weight were straight forward and were used directly in computing the health practice score. Finally, a health practices score was derived using the guidelines of Breslow and Enstrom (1980) and Wiley and Camacho (1980). One point was assigned to each of the following answers in the seven behaviors: never smoke, drink one or less drinks per day, sleep 7-8 hours per day, physical activity score of three or more, breakfast daily, no snacks and a stable weight for 5 years. A possible score of seven maximum and zero minimum was calculated from these criteria.

The grand total score from the nutrient analysis was taken to represent the nutrition practices.

For purposes of analysis, the demographic data were modified. Categories of data were collapsed to achieve meaningful numbers. Marital status was revised to married and not married. Employment status was modified to employed and not employed. Data regarding occupation was not used in the analysis. Education was combined to three categories, grade school or less, high school and college. Income was reduced from six categories to four by combining the lowest two together and the upper two together.

From the summary measures described above, sets of relationships were investigated. The S.P.S.S. Crosstabs routine permits the production of 2-way to n-way cross-tabulations of variables and computations of a variety of

nonparametric statistics based on the tables. Crosstabs produces a sequence of 2-way tables displaying the joint frequency distribution of two variables. The frequency counts can be expressed as a percentage of the row total, column total, table total or any combination. Statistics available to measure percent of associations based on distribution of frequency found include Chi-Square, Cramer's V, Kendall's tau B and C. The most appropriate method for this data was Chi Square since the data were nominal. Using the Crosstabs routine demographic characteristics were compared with health practices, general well-being and nutrition attitudes. Bivariate interrelationships of health locus of control, health practices, general well-being, nutrition attitudes and nutrient scores were tested using Crosstabs as well.

Another technique for examining the relationships between two or more variables is the breakdown routine of SPSS. This procedure requires that the dependent variable be at least ordinal. It compiles the means, standard deviations, and variances of a criterion or dependent variable. Breakdown computes one way ANOVA and tests for linearity. Demographic characteristics were compared with health locus of control and nutrient score using the breakdown routine.

To test for general relationships between variables (health locus of control, general well-being, nutrition attitude, health practice score, and nutrient score) a

bivariate correlation, Pearson correlation, was programmed. While the analysis provides less detail than Crosstabs and Breakdown, an overall summary was achieved.

The final step of data analysis was to test for multivariate relationships between the objectives. The SPSS multiple regression program was used to accomplish this task. Multiple regression requires that variables are measured on interval or ratio scales and that the relationships among variables are linear and additive. These restrictions are not absolute, however. Multiple regression is a general statistical technique through which one can analyze the relationship between a dependent variable and a set of independent variables. It may be viewed either as a descriptive tool by which the linear dependence of one variable on others is summarized or decomposed or as an inferential tool by which the relationships in the population are evaluated from examples of the sample data.

IV. RESULTS AND DISCUSSION

Response to Survey

Of the 600 surveys mailed, 452 or 75 percent were returned and 335 or 65 percent of these were included in the analysis and were referred to as respondents. The remaining 117 were not used for the following reasons: 35 were returned by the post office undeliverable; 29 were returned blank; 38 were incomplete and 15 were returned after the deadline.

This 75 percent response compares with the estimate of 74 percent given by Dillman (1978). Dillman estimates when the Total Design Method is used in detail a response of 77 percent can be expected and when it is used in part a response of 71 percent can be expected. For this survey the Total Design Method was used in part.

Compared with surveys reported in the literature the response to this survey was excellent. Brmer and Weatherholtz (1975) reported a response of 33 percent in a community survey. Schwartz (1975) had a response of 31.3 percent to her mailed survey. Grotkowski and Sims (1978) received 62 percent response in their survey of the elderly.

While no cut off deadline was indicated in the cover letters, participants returned their questionnaires quickly.

The majority of those returned came within two weeks of the first mailing. Many respondents added notes in their questionnaire booklets indicating enthusiasm about the survey and pleasure at being selected to participate.

Characteristics of Respondents

Table 2 presents the demographic characteristics of the respondents in comparison with the health plan population.

While the actual health plan population is nearly 2/3 men and 1/3 women, for this survey, an attempt was made to select equal numbers of men and women. Almost 59 percent of the respondents to the survey were women which reverses the proportion of men and women from the actual population. Distribution of the respondents was fairly even throughout the age groups and representative of the health plan. Marital status of survey respondents and the health plan population compare favorably. Respondents tended to have more education than the health plan population since 66 percent have achieved education beyond high school compared with 59 percent in the health plan population. While 13 percent of the health plan population have not graduated from high school only six percent of the survey population indicated they have not graduated from high school.

Survey respondents indicated they were employed full time or part time in 63 percent of the cases compared to

Table 2 Demographic Characteristics of Survey Respondents as
Compared to 1978 Health Plan Population

Demographic Characteristic	Survey Respondents Number Responding	Percent of Total	Percentage of Health Plan Population*
Sex of Respondents			
Male	136	41.1	63.4
Female	195	58.9	36.6
Age of Respondents in Years			
18-25	49	14.8	11.2 (Less than 24 yrs)
26-33	65	19.7	16.5 (25-29 years)
34-45	73	22.1	26.3 (30-39 years)
46-55	47	14.2	14.5 (40-49 years)
56-65	53	16.1	19.5 (50-64 years)
Over 65	53	16.1	12.2
Marital Status			
Married	247	75.1	71.2
Not Married	88	24.9	29.8
Educational Level Attained			
Grade School or Less	20	6.2	13.4
High School Graduate	90	27.4	27.4
Attended College	218	66.4	59.2
Employment Status			
Employed	208	63.0	79.5
Not Employed	127	37.0	21.5

*Kaiser Foundation Health Plan of Oregon, 1978.

Continued

Table 2 Continued

Demographic Characteristic	Survey Respondents		Percentage of Health Plan Population*
	Number Responding	Percent of Total	
Total Family Income Before Taxes in 1980			
<\$9,999	48	15.3	25.1
\$10,000-14,999	54	17.3	18.2
\$15,000-24,999	97	31.0	21.9 (\$15-19,000)
>\$25,000	114	36.4	34.8 (over \$20,000)

*Kaiser Foundation Health Plan of Oregon, 1978.

nearly 80 percent employment of the general population. Since most health plan members receive the insurance as a benefit of employment it would be expected that employment would be higher than 63 percent. No attempt was made to determine how many women were employed. When employment figures were computed the retired segment of the respondents were not omitted from the calculations. Both the inclusion of homemakers and retired persons in the calculations may have caused this low figure for employment.

Survey respondents tended to be higher income than the general health plan population. Sixty seven percent of the respondents reported their family income over \$15,000 per year compared with 57 percent of the health plan members. Fewer individuals in the income category of less than \$9,999 answered the survey than are represented in the health plan.

In summary, respondents to this survey represent the health plan population from which the sample was drawn with the noted exceptions in that respondents tended to have more women, higher education and higher income than the population at large.

Nutrition Attitude-"Nutrition is Important"

The "nutrition is important" attitude was selected for this study since it had been repeatedly studied. Overwhelmingly, this population felt that "nutrition is important". Over 90 percent of the respondents indicated answers which would support this attitude. (Table 3)

Table 3 Responses to Nutrition Attitude Segment of Questionnaire (12k-w)

		Number	Percentage	Don't Know
k. I believe poor health is the result of poor nutrition.	Agree	173	64.3	66
	Disagree	96	35.7	
l. When it comes to health, I believe that diet is very important.	Agree	306	97.5	21
	Disagree	8	2.5	
m. I eat what tastes good and not what is good for me.	Agree	71	22.5	19
	Disagree	245	77.5	
n. Even if I take vitamins, I feel I should be concerned about my diet.	Agree	301	94.4	16
	Disagree	18	5.6	
o. Nutrition is important and I should not be careless about it.	Agree	324	99.1	8
	Disagree	3	0.9	
p. As long as the doctor doesn't say anything about nutrition to me, I don't need to worry.	Agree	14	4.3	9
	Disagree	312	95.7	
q. I feel as long as I maintain my weight, I don't need to worry about what I eat.	Agree	30	9.1	6
	Disagree	299	90.9	
r. When I take responsibility for my diet, I am taking responsibility for my health as well.	Agree	312	97.5	15
	Disagree	8	2.5	
s. The food I eat affects my health.	Agree	310	98.7	21
	Disagree	4	1.3	

Continued

Table 3 Continued

		Number	Percentage	Don't Know
t. The food I eat has little to do with my appearance.	Agree	26	8.2	16
	Disagree	293	91.8	
u. The food I eat will affect my future health.	Agree	307	98.7	24
	Disagree	4	1.3	
v. I am willing to cut out foods that are not good for me.	Agree	231	84.6	62
	Disagree	42	15.4	
w. I try to learn to like healthy foods.	Agree	292	92.1	18
	Disagree	25	7.9	
y. I am concerned about eating nutritious foods throughout the day.	Agree	256	85.6	36
	Disagree	43	14.4	
z. I feel that if I drink milk, I don't have to worry about nutrition.	Agree	2	0.6	10
	Disagree	323	99.4	

Since discrimination was poor due to the almost unanimous responses, only four statements from this scale were used in continuing the analysis. These statements were: "I believe poor health is the result of poor nutrition."; "I eat what tastes good and not what is good for me."; "I am willing to cut out foods that are not good for me."; "I am concerned about eating nutritious foods throughout the day." With the exception of the statement "I believe poor health is the result of poor nutrition." the above statements reflect the behavioral aspects of attitude since they indicate what the person would do. The statement "I eat what tastes good and not what is good for me." is stated in the reverse of "nutrition is important." An answer of disagree would conform with the attitude, "nutrition is important".

When correlations between the attitudes were checked using Pearson r correlation (Table 4), the behavioral attitudes were significantly correlated. The attitude, "I believe poor health is the result of poor nutrition" was correlated only to "I am concerned about eating nutritious food throughout the day".

Each of the four nutrition attitude statements were cross correlated with the demographic characteristics of the respondents. (Table 5) Three correlations were significant. A correlation between age and the attitude "I am willing to cut out foods that are not good for me" was noted. In this case the older segment of the population

Table 4 Nutrition Attitude Correlation Matrix
(Pearson r)

Nutrient Attitudes Statement	r-Values (n=250)			
1. I believe poor health is the result of poor nutrition.				
2. I eat what tastes good and not what is good for me.	-0.05			
3. I am willing to cut out foods that are not good for me.	0.03	-0.30*		
4. I am concerned about eating nutritious foods throughout the day.	0.10*	-0.30*	0.29*	
	1	2	3	4

* = significance = <0.05 level

Table 5 Correlations Between Demographic Characteristics
and Four Nutrition Attitudes Statements

Demographic Characteristics	I believe health is the result of poor nutrition.			I am will- ing to cut out foods that are not good for me.			I eat what tastes good and not what is good for me.			I am concerned about eating nutritious foods through- out the day.		
	Agree	Dis.	X ²	Agree	Dis.	X ²	Agree	Dis.	X ²	Agree	Dis.	X ²
Sex of Respondents												
Male	63.6	34.4	0.03	86.3	83.0	.05	23.4	76.6	0.04	80.0	20.0	4.7*
Female	64.7	35.3		13.7	17.0		22.3	77.7		89.1	10.1	
Age of Respondents in Years												
18-25	54.5	45.5		74.4	25.6		21.3	78.7		85.0	15.0	
26-33	67.3	32.7		76.5	23.5	*	18.3	81.7		87.9	12.1	
34-45	70.2	29.8	5.5	78.9	21.1	16.7	35.8	64.2	9.0	77.9	22.1	4.6
46-55	52.8	47.2		86.5	13.5		19.6	80.4		85.0	15.0	
56-65	68.8	31.2		100.0	00.0		23.1	76.9		89.5	10.5	
over 65	68.3	31.7		94.1	5.9		15.4	84.6		90.0	10.0	
Marital Status												
Married	63.7	36.3	0.13	86.2	13.8	14.0	23.2	21.8	0.06	86.5	13.5	1.01
Not Married	66.2	33.8		80.0	20.0		76.8	78.2		81.7	18.3	
Educational Level Attained												
Grade School or Less	52.7	47.1	1.17	94.1	5.9	1.3	15.8	84.2	0.6	84.2	15.8	0.3
High School Graduate	63.2	36.8		84.3	15.7		24.1	75.9		87.0	13.0	
* College and Above	65.9	34.1		83.5	16.5		23.6	76.4		84.4	15.8	

Table 5 Continued

Demographic Characteristics	I believe health is the result of poor nutrition.			I am will- ing to cut out foods that are not good for me.			I eat what tastes good and not what is good for me.			I am concerned about eating nutritious foods through- out the day.		
	Agree	Dis.	X ²	Agree	Dis.	X ²	Agree	Dis.	X ²	Agree	Dis.	X ²
Employment Status												
Employed	63.5	36.5	0.2	83.4	16.6	0.56	25.8	74.2	2.6	82.0	18.0	4.6*
Unemployed	66.3	33.7		86.6	13.2		17.2	82.8		91.1	8.9	
Total Family Income Before Taxes in 1980												
<\$9,999	69.4	30.6		84.8	15.2		28.9	71.1		82.5	17.5	
\$10,000-14,999	60.5	39.5	2.6	82.6	17.4	0.3	22.6	77.4	1.8	90.6	9.4	1.7
\$15,000-24,999	59.0	41.0		86.3	13.7		24.7	75.3		83.1	16.9	
>\$25,000	69.1	30.0		85.3	14.7		19.3	80.7		84.5	15.5	

* = Significance at p = <0.05 level

agreed more often. Of the age group 56-65 year old, 100 percent agreed with this statement; the over 65 age group agreed 94 percent of the time, the 46-55 year group agreed 86 percent of the time, while those below 45 years of age agreed 74 to almost 79 percent of the time. It may be that the older segment of the population has health concerns which make dietary modification necessary so are willing to cut out foods to maintain health. The attitude "I am concerned about eating nutritious food throughout the day" correlated with sex and employment status. Women were more concerned than men about eating nutritious food throughout the day. This may relate to their traditional role as family food provider through shopping and cooking activities, while men more often eat what is provided. The unemployed were more concerned than the employed about eating nutritious foods. The unemployed may be women or retired. It may be that unemployment stresses finances and food choices are viewed with more concern.

The results of this survey differ somewhat from other studies reported in the literature. Jalso et al. (1965) found age to be inversely related to "valid" opinions about nutrition. While different instruments were used in these studies, the population studied here seemed to indicate greater concern for nutrition with advancing age. Sims (1976) and Grotkowski and Sims (1978) noted that nutrition attitudes were related to educational level, socioeconomic

level and occupation. These relationships were not found in this population.

The question of sensitivity of this scale as a measure of this attitude needs to be raised due to the nearly unanimous responses. Other researchers (Schwartz, 1975, Sims, 1976 and 1978 and Grotkowski and Sims, 1978) report positive attitudes using the same statements, however, the frequency of the responses to the questions was not reported. While the scale was reported valid for young women and the elderly it may be that when it is applied to a general population the scale may not be as reliable due to the addition of men and middle-aged women. As reported by Talmage and Rasher (1981) validity and reliability are dependent upon characteristics of the test subjects and the purposes of assessment. Since the scale was not pretested on a general population one can only speculate on the reason for the unanimous answers. The health plan population may have a particular bias toward nutrition which would skew the answers as has occurred in this survey. Many respondents wrote notes in their questionnaire booklets providing personal testimonials of their beliefs in the benefits of good nutrition and the importance of health.

With a response of 75 percent to the survey one would not expect that response bias would be the reason for the skewed results. If the response had been less, response bias might have been a logical explanation.

The high correlation between the behavioral attitudes brings out an important methodological point. Carruth and Sims have published extensively on nutrition attitude assessment methodologies. They point to the need for meaningful instruments to improve the quality of attitude measurement and interpretation of results. Perhaps in collecting statements and developing scales, attention needs to be directed to the type of attitude being assessed and to what it is correlated. For example, cognitive attitudes should be compared with knowledge, affective attitudes correlated to feelings and preferences and behavioral attitudes should be related to dietary practices.

Perhaps the attitude scales were used inappropriately making meaningful answers difficult to give on the respondents' part. The respondents were forced to make an agree/disagree choice rather than a graded choice as in most Likert scales. Perhaps if a wider range of choice were offered answers would have been less unanimous. Also, if statements were scored and totaled giving a nutrition attitude score more usable results could have been derived.

Health Attitudes

General Index of Subjective Well-Being: Table 6 presents responses to the General Index of Subjective Well-Being. A review of the responses to the Index indicated the majority of the population rates their overall health as good to excellent. Their health is stable, the same as friends,

Table 6 Responses to General Index of Subjective Well-Being

		Number	Percent
1. In general, would you say your health is:	Excellent	81	24.3
	Good	210	63.1
	Fair	39	11.7
	Poor	3	0.9
2. Would you say your health is better now, about the same or not as good compared to your health five years ago?	Better	59	17.7
	About the Same	209	62.9
	Not as Good	66	19.8
3. Compared to friends and others your age, would you say your health is better, about the same or not as good?	Better	143	42.8
	About the Same	164	49.1
	Not as Good	27	8.1
4. In the past year, have you been bothered by any illness, bodily disorder, pains or fears about your health a lot, a little or not at all?	A Lot	32	9.6
	A Little	207	62.2
	Not at All	94	28.2
5. Have you had to change the kind of work or cut down hours because of illness or injury or not?	Yes	39	11.9
	No	209	88.1
6. Please indicate whether or not you currently have any trouble doing any of the following. (Check one box for each line)*	Feeding Yourself	Yes 4	1.2
		No 327	98.8
	Dressing	Yes 7	2.1
		No 323	97.9
	Moving Around	Yes 16	4.8
		No 317	95.2
	Getting Outdoors	Yes 9	2.7
		No 320	97.3

Table 6 Continued

		Number	Percent
7. How much regular activity do you get outside of work?	A Great Deal	57	17.1
	A Moderate Amount	198	59.5
	Very Little	75	22.5
	Not at All	3	0.9
8. How often have you been waking up fresh and rested?	Always	107	32.1
	Sometimes	209	62.8
	Never	17	5.1
9. Most days how much energy, pep and vitality do you feel?	A Lot	119	35.7
	Some	207	62.2
	None	7	2.1
10. In the past year how have you been getting along with family and co-workers?	Well	218	66.1
	OK	109	33.0
	Not at All	3	0.9
11. About how many voluntary groups or organizations, if any, do you belong to (including church)?	Number of Groups (write in the number, none, write in 0)	0-8	
11a. If you belong to any such groups, in the last year how active have you been?	Very Active, Attend Most Meetings	112	
	Fairly Active	93	

*This statement was omitted from further analysis due to skewed answers.

with minimal illness. They are active outside of work, get along well with others and feel rested when waking.

The subjective assessment of health may be related to access to medical care through the health plan or may be a function of the lifestyle of the participants.

Criterion-related validity was assessed for the index with the Pearson r correlation. The correlations among the answers were significant at $p = <0.05$ level. (Table 7)

When demographic characteristics of the respondents were correlated with their answers to the General Index of Subjective Well-Being (Table 8) four significant correlations were observed. Age, educational level, income and employment status correlated with General Index of Subjective Well-Being.

Almost 33 percent of the 18-25 year old group and 37 percent of the 26-33 year old group reported their health as excellent, whereas in the over 65 year old group only 3 percent reported their health as excellent.

General well-being correlated with educational level. The respondents who have received education beyond high school reported their health as excellent in 27 percent of the cases, while only 10 percent of the respondents receiving only grade school education indicated their health as excellent.

Those respondents who were employed reported their health as excellent in 31 percent of the cases while only 14 percent of the unemployed respondents felt that their

Table 7 General Index of Subjective
Well-Being Correlation Matrix
(Pearson r)

Index Statements	r-Values (N=330)									
1										
2	.37*									
3	.43*	.27*								
4	-.45*	-.28*	-.34*							
5	-.28*	-.17*	-.14*	.34*						
7	.25*	.15*	.32*	-.18*	-.13*					
8	.28*	.20*	.36*	-.33*	-.07	.22*				
9	.39*	.26*	.33*	-.27*	-.13*	.37*	.36*			
10	.24*	.11*	.19*	-.22*	-.10*	.19*	.21*	.22*		
11	.16*	.13*	.12*	-.14*	-.17*	.06	-.03	.06	.05	
	1	2	3	4	5	7	8	9	10	11

1. In general, would you say your health is:
2. Would you say your health is better now, about the same or not as good compared to your health five years ago?
3. Compared to friends and others your age, would you say your health is better, about the same or not as good?

Table 7 Continued

4. In the past year, have you been bothered by any illness, bodily disorder, pains or fears about your health a lot, a little or not at all?
5. Have you had to change the kind of work or cut down hours because of illness or injury or not?
7. How much regular activity do you get outside of work?
8. How often have you been waking up fresh and rested?
9. Most days how much energy, pep and vitality do you feel?
10. In the past year how have you been getting along with family and co-workers?
- 11a. If you belong to voluntary groups or organizations in the past year how active have you been?

* = Significance at $p = <0.05$ level

Table 8 Correlations Between Demographic
Characteristics and General Index of
Subjective Well-Being

Demographic Characteristics	General Index of Subjective Well-Being (Percent-Responses)				Chi Square
	Excellent	Good	Fair	Poor	
Sex of Respondents					
Male	25.0	60.3	13.2	1.5	3.4
Female	24.4	64.8	10.9	0.0	
Age of Respondents in Years					
18-25	32.7	55.1	12.2	0.0	35.0*
26-33	37.5	56.3	6.3	0.0	
34-45	23.3	67.1	9.6	0.0	
46-55	27.7	63.8	6.4	2.1	
56-65	20.9	65.1	11.6	2.3	
over 65	3.2	69.2	26.9	0.0	
Marital Status					
Married	24.4	66.1	11.0	0.4	4.6
Not Married	31.7	53.7	13.4	1.2	
Educational Level Attained					
Grade School or Less	10.0	60.0	30.0	0.0	14.8*
High School Graduate	21.3	64.0	12.4	2.2	
College and above	27.4	63.2	9.4	0.0	
Employment Status					
Employed	30.9	61.8	6.8	0.5	20.3*
Not Employed	14.0	65.3	19.8	0.8	
Total Family Income Before Taxes in 1980					
<\$9,999	12.5	58.3	27.1	2.1	24.4*
\$10,000-14,999	24.1	63.0	13.0	0.0	
\$15,000-24,999	19.8	69.8	9.4	1.0	
>\$25,000	34.5	58.4	7.1	0.0	

* = Significance at $p = <0.05$ level

health was excellent. It may be that their unemployment was related to poor health or perhaps reflects the older segment of the population who may also be retired.

Income level was found to correlate with general well-being. The respondents reporting a family income greater than \$25,000 indicated their health was excellent in 34 percent of the cases while only 12 percent of those reporting an income less than \$9,999 indicated their health to be excellent. This may be related to employment status as poor health would interfere with employment and income earning power. This relationship was not tested.

Brook et al. (1979) reported that associations between sociodemographic variables and general health rating were often inconsistent across populations, but some findings have been more consistently observed. Associations between age and general health ratings tended to be negative while greater income and higher educational level were generally positively related to general health perceptions. In their studies men appeared somewhat more likely to report favorable health than women.

Wan and Livieratos (1978) reported that general well-being correlated with sex, education and marital status. Men reported higher feelings of well-being than women. Positive correlations were noted between educational level and general well-being. Higher well-being was noted in those individuals who were currently married or never married compared to those who were no longer married.

When Belloc et al. (1971) examined the Alameda County population for selected demographic variables, including education, employment, marital status, age and sex, they found a marked linear relationship with age. In the older population there were more physical complaints. Men reported themselves slightly more healthy than women. Those with inadequate family incomes indicated they felt less healthy than those with marginal or adequate incomes. Educational level was directly related to health. Employed persons enjoyed better health than unemployed. The married reported better health than those who were separated.

In the population studied in this survey, it was the younger, better educated, employed and higher income groups who reported better health. This compared consistently with the reports cited above.

Health Locus of Control: Results of the Health Locus of Control Scale indicate that the population perception tends to be internal control with a mean score of +2.48. (Figure 5) Sixty-nine percent (218) of the respondents scored +1 to +10, nine percent (29) of the respondents gave neutral responses and 21 percent (67) responded external control with scores between -1 and -9.

When comparing Health Locus of Control scores to the demographic characteristics of the population again four significant correlations were noted. Age, marital status, educational level and employment status were correlated at $p = <0.05$ level. (Table 9)

Figure 5 Graphic Representation of Health

Locus of Control Scores (mean=2.48 points)

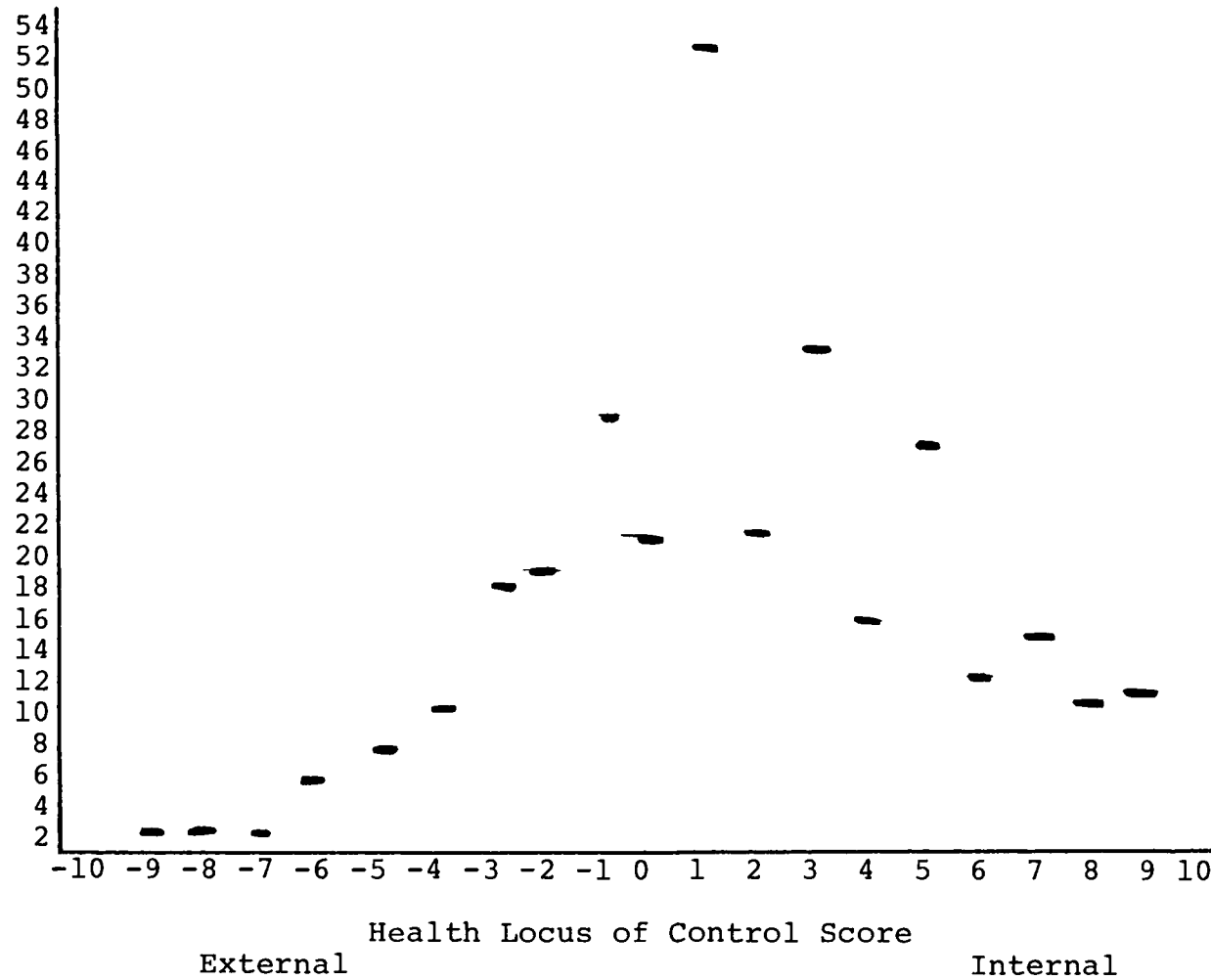


Table 9 Relationships Between Demographic
Characteristics and Health
Locus of Control Score

Demographic Characteristics	Health Locus of Control Score (Mean Scores)	F-Value
Sex of Respondents		
Male	2.57	0.109
Female	2.43	
Age of Respondents in Years		
18-25	2.95	2.398*
26-33	3.00	
34-45	2.85	
46-55	3.15	
56-65	1.57	
over 65	1.16	
Marital Status		
Married	2.21	5.187*
Not Married	3.37	
Educational Level Attained		
Grade School or Less	1.05	5.938*
High School Graduate	1.52	
College and Above	3.02	
Employment Status		
Employed	3.00	9.517*
Unemployed	1.61	
Total Family Income Before Taxes in 1980		
<\$9,999	2.11	1.47
\$10,000-14,999	2.79	
\$15,000-24,999	2.14	
>\$25,000	3.15	

* = Significance at $p = <0.05$ level

The older segment (56 to 65 years and over 65 years) of the population scored 1.57 and 1.16 respectively indicating slight internal control, while the younger groups scored an average of 3.0 ± 0.15 .

In contrast with general well-being, marital status was correlated to the health locus of control. In this case, the unmarried respondents had an average score of 3.37 while married respondents had an average score of 2.21. Both, then exhibited internal control, however the difference was statistically significant.

As with the General Index of Subjective Well-Being, health locus of control correlated with educational level and employment status. Respondents receiving education after high school scored 3.02 indicating internal control while high school graduates scored 1.51 and those with a grade school education have a score of 1.05. The employed had a score of 3.0 compared to 1.61 of the unemployed.

While no reports of demographic correlations to health locus of control were found in the literature, Strickland (1978) reported that individuals in poor health or afflicted with disabilities tend to be more external control than healthy individuals. Since fewer people in the older segment of the population of this survey reported their health as excellent, this may account for the lower health locus of control scores of the older groups.

Nutrition Practices

The nutrient score is representative of nutrition practices since it represents the nutrient intake of the diet. The range of scores using the Dietary Nutrient Guide (Pennington, 1976) is 0 to 70 points with 70 points recommended for adults to insure adequate intake of all nutrients. For the population of this survey the range of points was 6.2 to 69.3 points with the mean and median scores of 36.9 and 36.8. Figure 6 illustrates a slight trend to the upper range but the spread of points was fairly even.

There was a possible score of 10 points for each of the seven index nutrients. The mean and median scores were Vitamin B₆ 4.7 and 4.5; Magnesium 5.0 and 4.8; Vitamin A 5.4 and 4.9; Pantothenic Acid 3.9 and 4.0; Iron 6.0 and 6.0; Folic Acid 5.4 and 5.0 and Calcium 5.3 and 5.0.

The survey also collected information about other nutrition practices (Table 10). Seventy-one percent of the respondents felt they eat a "typical sensible American diet". Cost of food is the most important factor mediating food purchases for 43.5 percent of the respondents, while nutritional value of food was reported as the most important factor influencing food choice in only 21 percent of the cases. Equal numbers of respondents drink 8 glasses of liquids each day as those who do not. Fifty-four percent supplement their diets with multivitamin and mineral supplements.

Figure 6 Graphic Representation of Nutrient Analysis

Expressed as Nutrient Score (mean=36.9)

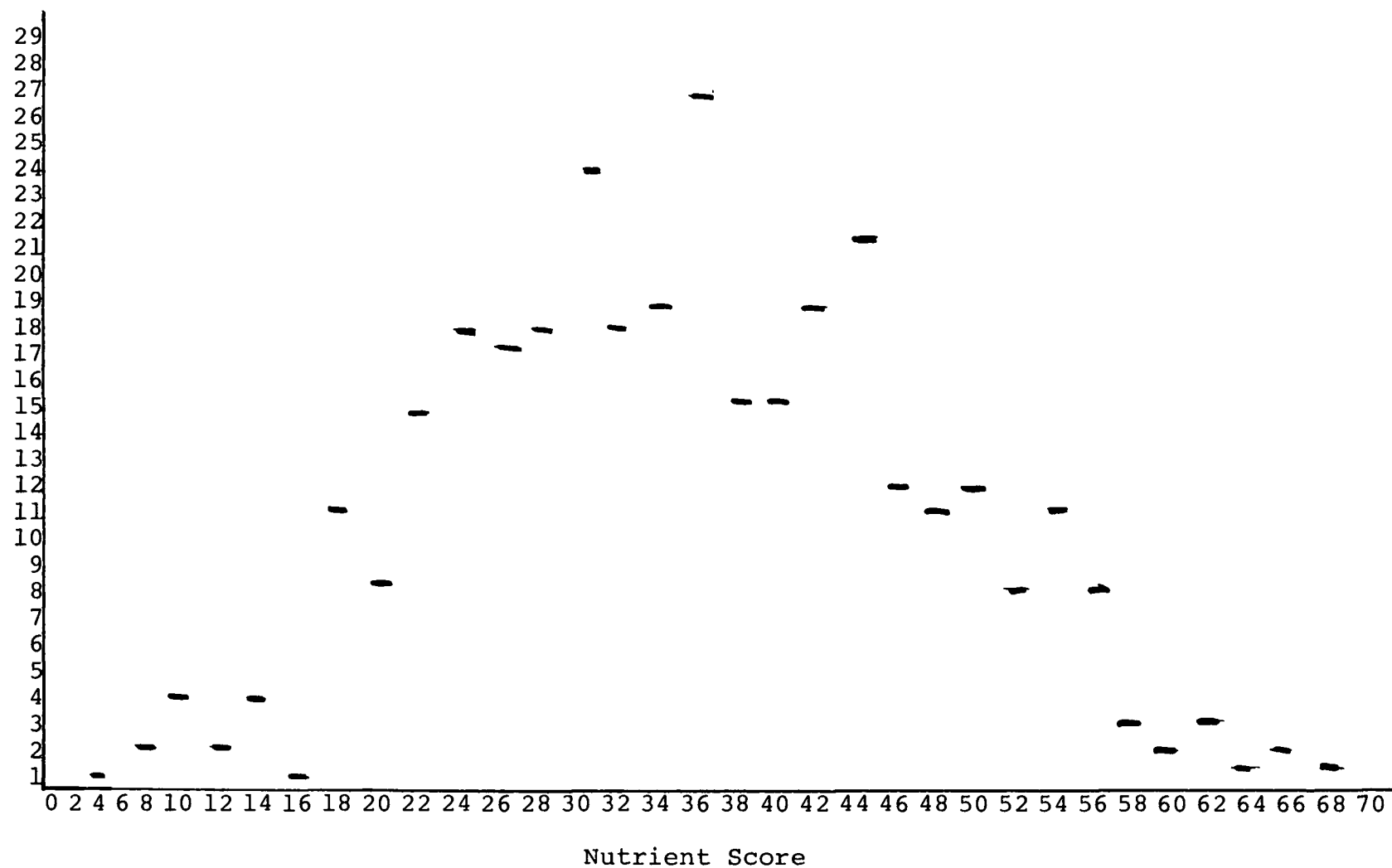


Table 10 Response to Nutrition Practices

Other Than Nutrient Score

Survey Question	Number of Responses		Selected Percentages of Total
In general, do you eat according to:			
Strict Organic, Natural		1	
Health Food or Organic with Others		33	
Typical Sensible American Diet		236	71%
Diet Recommended by MD or RD		20	
Vegetarian		4	
No Concern		22	
Factors most often affect food purchase:			
Cost		70	21%
What is Available		8	
Nutritional Value		71	21.3%
Taste		5.7	
What is Easy to Prepare		6.0	
What I Like		6.0	
Do Not Buy		10.5	
Cost and Other Factors		75	22.5%
Do you drink 8 liquids daily	Yes	168	50.8%
	No	163	49.2%
Do you take vitamin supplements	Yes	178	54.4%
	No	149	45.6%

Examination of the nutrient scores gives some cause for concern that the nutrient intake of this population may be inadequate. Only 75 out of 335 (22 percent) respondents scored above 46 points, which would correspond to two-thirds of the nutrient score Pennington considers adequate for adults, while one-third of population did not meet 50 percent of this score (Pennington, 1976). One day food records analyzed by the index nutrients was meant to provide an approximate assessment of the population's nutrient intake.

One-day food records have been reported to have errors relating to atypical means as well as under and over reporting of foods consumed. However, Chalmers (1952) concluded that one-day food records will give adequate information for group dietary assessment. Twenty-four hour food records and dietary recalls have been reported valid and reliable for groups by Gersovitz et al. (1978). Stunkard and Waxman (1981) found self reports of food intake to be remarkably accurate when comparing 24-hour recall to observed measured methods. Karvetti and Knuts (1981), however, found considerable and statistically significant differences between diet history, 24-hour and seven-day food recall methods when measuring diet changes in men one and two years after an acute myocardial infarction.

Pennington selected the particular index nutrients because they were frequently reported low in population

studies. The 1977-78 Nationwide Food Consumption Survey (United States Department of Agriculture, 1980) confirms that these index nutrients may still be low. They found that calcium intakes were less than the 1980 RDA. While men averaged at least 85 percent of the RDA, some groups of women averaged 64 to 77 percent of the RDA for this nutrient daily. Women's diets provided only 58 to 64 percent of the RDA for iron while men's diets appeared adequate. Magnesium was less than the RDA for both men and women providing a range of 65 to 89 percent. Vitamin B₆ was also found to be inadequate in the range of 60 to 65 percent. Vitamin A was supplied in amounts recommended while pantothenic acid and folacin were not analyzed.

Standards for the index nutrients were established to represent the 1974 Recommended Dietary Allowances. The standards remain adequate for the 1980 Recommended Dietary Allowances even though recommended levels of some nutrients have changed. In the 1980 RDA an increase in protein and Vitamin C has been advised. These nutrients were well satisfied by the index nutrients and it would be expected they are still adequate.

Pennington's "mini-lists" have been used in numerous studies (King et al., 1978, Lane and Vermeersch, 1979, Lewis and King, 1980 and Taber and Cook, 1980) to analyze nutrient intake. In these studies all nutrients were assessed not just the index nutrients. The researchers

were satisfied that the analysis accurately reflected their respective populations' nutrient intake.

Nutrient scores were tested statistically with other food habits, and also with demographic characteristics of the population for relationships and correlations.

(Table 11) No statistically significant relationships were noted between nutrient scores and the type of diet consumed, reason for food purchase, body weight, drinking liquids or eating between meals. The nutrient score was correlated with frequency of breakfast and use of vitamin supplements.

Respondents who ate breakfast daily had an average nutrition score of 39.6, 2.7 points above the mean, while those who never ate breakfast scored only 30.2 points. Vitamin supplements were not added into the nutrient score, however, those who stated they took supplements scored an average of 38.6 points, while those who did not use vitamin supplements scored only 35.1 points. This difference was significant at $p = <0.05$ level.

When compared with demographic characteristics of the population only income level and sex were correlated to the nutrient score. Income accounted for variable but statistically significant difference in nutrient scores. In the income level of less than \$9,999 per year the average nutrient score was 32.1 points. Respondents reporting an income between \$10,000 and 14,999 averaged 38.1 points. In the income level of \$15,000 to 24,999 the scores dropped to 35.2 points. In the income level over

Table 11 Relationships of Nutrient Scores
and Other Nutrition Practices

Nutrition Practices	Nutrient Scores	F-Value
Type of Diet Eaten		
Organic	15.6	
Health Food	39.2	
Typical American Diet	36.7	1.046
MD or RD	35.9	
Vegetarian	42.0	
Not Concerned	35.6	
Factors Which Affect Purchase of Food		
Cost	35.5	
Availability	35.2	
Nutritional Value	38.4	0.591
Taste	36.1	
Preparation	37.5	
Like	34.4	
Don't Buy	38.7	
Rate Body Weight		
Under	34.8	
Normal	37.5	0.679
Slightly Over	37.1	
Quite Over	34.8	
Drink 8 Glasses of Liquids?		
Yes	36.6	0.220
No	37.3	
Take Vitamins		
Yes*	38.6	6.677*
No	35.1	
Breakfast Consumption		
Daily	39.6	7.691*
3-6	35.7	
1-2*	34.1	
Never	30.2	
Between Meals		
Never	34.3	2.588
1-2	37.9	
3+	38.1	

* = Significance at $p = <0.05$ level

Table 11a Relationships of Nutrient Scores
With Demographic Characteristics

Demographic Characteristics	Nutrient Score	F-Value
Sex of Respondents		
Male	38.9	6.875*
Female*	35.3	
Age of Respondents		
18-25	35.1	0.818
26-33	38.2	
34-45	37.8	
46-55	38.2	
56-65	36.0	
over 65	35.2	
Marital Status		
Married	36.9	0.013
Not Married	36.7	
Educational Level Attained		
Grade School or Less	39.8	2.097
High School Graduate	34.7	
College and Above	37.3	
Employment Status		
Employed	37.0	0.110
Not Employed	36.6	
Total Family Income Before Taxes in 1980		
<\$9,999	32.1	4.601*
\$10,000-14,999*	38.1	
\$15,000-24,999	35.2	
>\$25,000	39.2	

* = Significance at $p = <0.05$ level

\$25,000 the nutrient score rose to 39.2 points. One would expect with increasing income that more money could be spent on food, however, other factors such as family size, cooking facilities, skills would influence nutrient intake and were not noted in this study. Men scored 38.9 points while women had scores that averaged 35.3 points. Since women reported more weight concern, one might suspect they might restrict their food intake, therefore limiting their score.

Health Practices

In Table 12 the responses to the questions concerning health practices are reported.

Smoking Habits: Only 28 percent of the respondents currently smoke any kind of tobacco product, while 40 percent of the respondents have never smoked in their lives. The remaining 32 percent of the respondents are former smokers. Details of how long they smoked or when they stopped were not calculated.

In a study of the relationship of smoking to the incidence of cancer (Hammond and Seidman, 1980) it was reported that almost 22 percent of the men and 65 percent of the women never smoked. Their data did not report former smokers. Breslow and Enstrom (1980) report that 35 percent of the men and 50 percent of the women in the Alameda County study had never smoked. In their study 27 percent of the men and 16 percent of the women were

Table 12 Health Practices of Respondents

Composite Health Habit Score

Number of Desirable Habits	Number of Respondents	Percentage
1-3	78	18.2
4	84	25.1
5	93	27.8
6	51	15.2
7	29	8.7

Smoking Habits

	Number of Respondents	Percentage of Total
Currently Smoke	91	28.0
Formerly Smoked	103	31.7
Never Smoked	131	40.3

Liquor Consumption

	Number of Respondents	Percentage
Non-Drinkers	92	27.5
Beer		
1 or less per week	195	58.2
More than 2	48	14.3
Wine		
1 or less per week	198	59.1
More than 2	45	13.4
Liquor		
1 or less per week	210	62.7
More than 2	33	9.8

Table 12 Continued

Physical Activity

		Frequently	Occasionally	Seldom	Never
Active Sports	#	36	79	80	92
	%	12.5	27.5	27.9	32.1
Swimming or Long Walk	#	80	123	71	26
	%	26.7	41.0	23.7	8.7
Working in Garden or Housework	#	218	68	21	7
	%	69.4	21.7	6.7	2.2
Doing Physical Exercise	#	57	109	89	39
	%	19.4	37.1	30.3	13.3
Taking Weekend Auto Trips	#	37	123	110	27
	%	12.5	41.4	37.0	9.1
Hunting or Fishing	#	36	56	64	141
	%	12.1	18.9	21.5	47.5

Physical Activity Score

	Number of Respondents	Percentage
0-1 activity	41	11.8
2	78	23.6
3	87	26.3
4	74	22.4
5	36	10.9
6	15	4.5

Rate Body Weight

	Number of Respondents	Percentage
Underweight	13	3.9
Above Normal	131	39.2
Slightly Over	145	43.4
Quite Over	45	13.5

Table 12 Continued
Body Weight Stability in 5 Years

	Number of Respondents	Percentage
Remained Same	187	56.5
Increased	89	26.9
Decreased	42	12.7
Other Answers	17	3.9

Eating Between Meals

	Number of Respondents	Percentage
Never	83	25.2
1-2 times per day	227	68.8
More than 3 times per day	25	6.0

Frequency of Breakfast

	Number of Respondents	Percentage
Daily	179	53.8
5-6 times per week	35	10.5
3-4 times per week	28	8.4
1-2 times per week	60	18.0
Never	31	9.3

Hours of Sleep Routinely Each Day

	Number of Respondents	Percentage of Total
Less than 6 hours	52	15.7
7-8 hours	264	79.5
More than 9 hours	16	4.8

were reported to be former smokers while 38 percent of the men and 33 percent of the women currently smoke. The health plan population surveyed for this study has a lower incidence of smoking than either of the studies cited. This may relate to the numbers of women in the survey group. It appears from the studies cited that fewer women smoke than men.

Alcohol Consumption: Of the respondents in the survey 27 percent report they are non-drinkers. Sixty percent of the respondents indicated they drank one or less drinks of alcoholic beverage per day, while the remaining 13 percent reported drinking more than two drinks of alcoholic beverage per day. This population can be characterized as light drinkers.

Breslow and Enstrom (1980) break their data into sex groups. There appears to be differences in the incidence of alcohol consumption in men and women. In their study, 16 percent of the men reported themselves to be non-drinkers while 29 percent of the women were reported as non-drinkers. Those consuming one to two drinks was nearly the same for men and women, while the data reporting those consuming more than two drinks showed 24 percent of the men and 16 percent of the women consumed over two drinks.

The health plan population reported a lower incidence of drinking than the Alameda County study.

Physical Activity: The survey population engaged in physical activity. The majority of the respondents

participated frequently or occasionally in some form of activity with almost 38 percent reporting participation in four to six activities frequently to occasionally. This is less than the activity level reported by Breslow and Enstrom (1980). The Alameda County population reported that 54 percent of the men and 46 percent of the women participated in activities.

Body Weight: When asked to rate their body weight, 39 percent of the survey population considered themselves to be about normal weight compared to only 25 percent of the Alameda County study. Almost 57 percent of the survey respondents felt that they were slightly to quite over weight as compared with the Alameda County study in which 59 percent of the men and 44 percent of the women considered themselves overweight.

Meal Frequency: The survey population appeared to eat regular meals with almost 54 percent reporting that they ate breakfast daily and an additional ten percent ate breakfast five to six times per week. This compares with the Alameda County study which reported about 57 percent of the population ate breakfast regularly. Snacking habits differed markedly between the two groups. In the survey population only 25 percent stated they did not eat between meals while nearly 69 percent reported eating between meals one to two times daily. This compares with the Alameda County group where about 70 percent of the subjects reported rarely eating between meals and 30 percent reported snacking almost every day.

Hours of Sleep: Almost 80 percent of the survey respondent reports sleeping seven to eight hours per day. Less than five percent sleep more than nine hours and almost 16 percent sleep less than six hours per day. These reports compare favorably with those given by Breslow and Enstrom (1980).

When health practices were compared to demographic characteristics (Table 13a-d) no consistent pattern of responses was noted, even though several correlations were significant. Smoking habits were the only habit which did not correlate with any demographic characteristic. Alcohol consumption correlated only to educational level. In this population those with grade school education reported drinking more liquor. While the group would still be considered light drinkers, as a whole more, in this group consumed two or more drinks per day.

Physical activity correlated with sex and age. Men reported being more active, with 44 percent of the men reporting 4 to 6 activities frequently to occasionally while 58 percent of the women reported only 2 to 3 activities frequently to occasionally. Age was significantly correlated with activity but not linearly correlated. In the 18 to 25 year old group and the 46 to 55 year old group each reported over 54 percent participation in 4 to 6 activities frequently to occasionally. The 34 to 45 age group, 56 to 65 year group and the over 65 group reported participating in 4 to 6 activities only 30 to 31 percent.

Table 13a Correlations Between Demographic Characteristics
and Health Practices-Smoking Habits and Alcohol Consumption

Demographic Characteristics	Health Practices in Percent of Responses									
	Never	Smoking Habits		Chi Square	Chi Square	Alcohol Consumption				Chi Square
		Former	Current			Liquor 0-1/d	2+	Beer 0-1	Wine 2+	
Sex of Respondents										
Male	33.8	35.8	30.6	5.01	3.34	86.5	13.5	56.7	43.3	15.81
Female	46.0	28.3	25.7			85.9	14.1	74.1	25.9	
Age of Respondent in Years										
18-25	55.3	23.4	21.3			89.7	10.3	86.2	13.8	
26-33	46.0	27.0	27.0			98.1	1.9	64.8	35.2	
34-45	36.1	30.6	33.3	15.35	44.6	86.0	14.0	58.0	42.0	49.2
46-55	34.0	27.7	38.3			73.0	27.0	67.6	32.4	
56-65	32.6	37.2	30.2			84.4	15.6	56.3	43.7	
over 65	41.6	43.8	14.6			80.6	19.4	72.2	27.8	
Marital Status										
Married	38.8	31.4	29.8	2.41	11.4	86.7	13.3	65.7	69.0	7.02
Not Married	47.4	30.8	21.8			84.5	15.5	34.3	31.0	
Educational Level Attained										
Grade School or Less	47.1	23.5	29.4			76.9	23.1	76.9	23.1	
High School Graduate	32.6	33.7	33.7	3.28	33.9*	82.5	17.5	74.6	25.4	22.09
College and Above	41.7	32.2	26.1			88.7	11.3	62.9	37.1	
Employment Status										
Employed	39.5	29.3	31.2	3.60	4.11	86.0	14.0	63.1	36.9	6.99
Not Employed	43.1	35.3	21.6			86.6	13.4	73.2	26.8	

Table 13a Continued

Demographic Characteristics	Health Practices in Percent of Responses								
	Smoking Habits			Alcohol Consumption					Chi Square
	Never	Former	Current	Chi Square	Chi Square	Liquor 0-1/d	2+	Beer Wine 0-1 2+	
Total Family Income Before Taxes in 1980									
<\$9,999	40.0	24.4	35.6			93.9	6.1	78.8	21.8
\$10,000-14,999	35.8	41.5	22.6	8.50	21.54	83.3	16.7	72.2	27.8
\$15,000-24,999	34.4	34.4	31.2			85.5	14.5	62.3	37.3
>\$25,000	48.2	26.3	25.4			83.1	16.9	62.9	37.1

* = Significance at $p = <0.05$ level

Table 13b Correlations Between Demographic Characteristics
and Health Practices-Physical Activity and Hours of Sleep

Demographic Characteristics	In Percent of Responses								Hours of Sleep			Chi Square
	0	1	Physical Activities/Day						<6	7-8	>9	
Sex of Respondents												
Male	1.5	17.2	18.7	18.7	28.4	11.9	3.7	19.35*	15.8	82.9	2.3	0.55
Female	0	8.3	26.9	31.1	18.1	10.4	5.2		15.9	80.4	3.7	
Age of Respondents												
18-25	0	6.3	14.6	25.0	35.4	10.4	8.3		8.3	85.4	6.3	
26-33	1.6	1.6	26.6	28.1	28.3	18.8	3.1		9.5	83.3	3.2	
34-45	0	15.1	26.0	28.8	19.2	9.6	1.4	48.03*	18.8	81.2	0.0	19.94
46-55	0	10.9	15.2	19.6	32.6	13.0	8.7		21.3	74.4	4.3	
56-65	2.3	14.0	34.9	18.6	14.0	9.3	7.0		19.0	78.6	2.4	
over 65	0	23.1	23.1	32.7	15.4	3.8	1.9		17.3	78.9	3.8	
Marital Status												
Married	0.8	13.1	25.3	23.7	27.9	10.2	4.1	5.45	15.7	80.6	3.7	1.25
Not Married	0	8.8	18.8	31.7	21.3	13.8	6.3		15.2	83.5	1.3	
Educational Level Attained												
Grade School or Less	0	20.0	30.0	25.0	15.0	5.0	5.0		15.8	78.9	5.3	
High School Graduate	0	13.5	22.5	25.8	20.2	13.5	4.5	5.07	19.3	78.4	2.3	2.70
College and Above	1.0	11.0	22.9	25.7	24.3	10.5	4.8		14.9	81.8	3.4	
Employment Status												
Employed	1.0	11.7	20.4	24.8	25.7	11.7	4.9	6.95	17.2	80.8	2.0	8.94*
Not Employed	0	12.5	29.2	27.5	16.7	10.0	4.2		13.6	81.2	5.2	

Table 13b Continued

Demographic Characteristics	In Percent of Responses							Chi Square	Hours of Sleep			Chi Square
	0	1	Physical Activities/Day				6		<6	7-8	>9	
Total Family Income Before Taxes in 1980												
<\$9,999	2.1	18.8	18.8	35.4	12.5	8.3	4.2		15.2	76.1	8.7	
\$10,000-14,999	1.0	10.4	21.9	26.0	25.0	10.4	5.4	15.18	17.6	76.5	5.9	15.49
\$15,000-24,999	1.0	10.4	21.9	26.0	25.0	10.4	5.4		12.6	86.3	1.1	
>\$25,000	0	11.4	22.8	24.6	23.7	12.3	5.3		18.6	79.6	1.8	

* = Significance at $p = <0.05$ level

Table 13c Correlations Between Demographic Characteristics
and Health Practices-Body Weight

Demographic Characteristics	Percent of Responses								Chi Square
	Under Weight	Rate Body Weight		Quite Over	Chi Squ	Same	Stability		
		Normal	Slightly Over				Inc 10#	Dec 10#	
Sex of Respondents									
Male	5.9	44.9	37.5	11.8	6.99	69.0	21.7	9.3	8.49
Female	2.1	36.1	46.9	14.9		52.7	31.7	15.6	
Age of Respondents									
18-25	16.7	45.8	29.2	8.3		55.6	33.2	11.1	
26-33	3.1	49.2	38.5	9.2		57.8	26.6	15.6	
34-45	1.4	35.6	39.7	23.2	43.44*	51.5	31.8	16.7	
46-55	0	31.9	57.4	10.6		63.8	25.8	10.6	
56-65	0	34.9	48.8	16.3		59.5	33.3	7.1	
over 65	1.9	39.6	47.2	11.3		70.6	15.7	13.7	
Marital Status									
Married	0.8	40.7	43.5	15.0	23.9*	58.7	27.7	13.6	0.26
Not Married	12.2	37.8	41.5	8.5		60.8	27.8	11.4	
Educational Level Attained									
Grade School or Less	0	45.0	40.0	15.0		60.0	48.3	63.2	
High School Graduate	3.3	33.3	44.4	18.9	6.15	25.0	33.3	25.9	2.70
College and Above	4.2	41.0	43.4	11.3		15.0	18.4	10.9	
Employment Status									
Employed	3.9	42.0	42.5	11.6	2.13	58.6	27.3	14.1	0.59
Not Employed	3.3	36.7	44.3	16.4		60.7	28.2	11.1	

Table 13c Continued

Demographic Characteristics	Under Weight	Percent of Responses				Same	Stability		Chi Square
		Rate	Body Weight	Quite	Chi		Inc	Dec	
		Normal	Slightly Over	Over	Squ		10#	10#	
Total Family Income Before Taxes in 1980									
<\$9,999	6.2	45.0	29.2	18.8		63.8	23.4	12.8	
\$10,000-14,999	3.7	38.9	40.7	16.7	10.54	54.0	28.0	18.0	6.70
\$15,000-24,999	3.1	36.1	46.4	14.4		54.3	35.1	10.6	
>\$25,000	1.8	44.2	46.0	9.4		65.7	39.7	13.6	

* = Significance at $p = <0.05$ level

Table 13d Correlations Between Demographic Characteristics
and Health Practices-Meal Frequency

Demographic Characteristics	Consumption of Breakfast				Chi Square	Never	Eat Between Meals		Chi Square
	Daily	3-6 times/ week	1-2 times/ week	Never			1-2 times/ day	>3 times/ day	
Sex of Respondents									
Male	55.6	19.3	17.8	7.4	1.20	37.3	56.7	6.0	17.34*
Female	52.6	18.0	18.6	10.8		17.1	76.7	6.2	
Age of Respondents									
18-25	38.8	16.3	36.7	8.2		10.2	77.6	12.2	
26-33	40.0	23.1	21.5	15.4		25.0	68.8	6.2	
34-45	43.1	23.6	20.8	12.5	47.20*	22.2	72.2	5.6	17.71*
46-55	59.6	19.1	19.1	2.2		35.6	62.2	2.2	
56-65	72.1	16.3	17.6	7.0		23.3	67.4	9.3	
over 65	80.8	9.2	3.8	5.8		37.7	60.4	1.9	
Marital Status									
Married	55.7	17.9	17.1	9.3	1.83	26.0	68.7	5.3	1.47
Not Married	47.6	20.7	22.0	9.8		22.5	68.8	8.7	
Educational Level									
Attained									
Grade School or Less	73.7	10.5	10.5	5.3		20.0	80.0	0.0	
High School Graduate	43.3	22.2	25.7	8.9	8.78	22.7	76.1	5.7	2.70
College and Above	55.4	17.8	16.4	10.3		26.4	66.5	7.1	
Employment Status									
Employed	46.2	20.2	21.6	2.0	14.60*	27.2	65.5	7.3	2.66
Not Employed	66.9	15.7	12.4	5.0		22.3	73.6	4.1	

Table 13d Continued

Demographic Characteristics	Daily	Consumption of Breakfast			Chi Square	Never	Eat Between Meals		Chi Square
		3-6 times/ week	1-2 times/ week	Never			1-2 times/ day	>3 times/ day	
Total Family Income Before Taxes in 1980									
<\$9,999	61.7	8.5	19.1	10.6		25.5	72.3	2.1	
\$10,000-14,999	64.8	18.5	13.0	3.7	11.52	22.6	66.0	11.4	11.48
\$15,000-24,999	50.5	23.7	17.5	8.2		19.6	71.9	8.3	
>\$25,000	47.4	19.3	20.2	13.3		30.7	67.5	8.1	

* = Significance at $p = <0.05$ level

One is tempted to speculate that the difference in the activity levels in the age groups reflects various lifestyle concerns. In the youngest group the general activity of youth is reflected. Generally, in this age group, the responsibilities of work and family do not restrict time for physical activity. In the middle years there are usually more demands on one's time and less time for activities. By the time one reaches the mid-forties it becomes evident that physical conditioning is needed to forestall the disabling diseases of old age. More effort is made to engage in activities for health's sake. As one approaches the later years the disabling effect of age begins to limit one's ability to engage in activities.

Health indicators of eating habits as established by Belloc and Breslow (1972) included consumption of breakfast, never snacking between meals and body weight in relation to standards. Eating habits in this study did not present consistent correlations. The stability of body weight as rated by the respondents did not correlate to any demographic characteristic. However, there were correlations between marital status and age and how respondents rated their present weight. The married reported themselves overweight more often than unmarried. The youngest and oldest groups more often reported themselves underweight, while the 35 to 65 year age groups most often indicated themselves to be overweight. The frequency

of eating was related to age. Almost 81 percent of the over 65 year old group reported eating breakfast daily and 37 percent never snack. Of the 18-25 year age group only 38 percent eat breakfast daily and 10 percent never snack. Women reported snacking more frequently than men. Almost 71 percent reported eating 1-2 times between meals while 37 percent of the men reported never snacking and 57 percent ate 1-2 times between meals.

In the Nationwide Food Consumption Survey (United States Department of Agriculture, 1981) it was reported that 86 percent of the people surveyed had breakfast on the day of the survey. Over 95 percent of the adults over 65 years old consumed breakfast. Of adults 23 to 34 years old only 74 percent ate breakfast. Snacking habits also varied with age. Over all, 61 percent of the respondents reported eating at least one snack per day. As a group 55 to 64 percent of the adults report snacking and 40 percent of the elderly reported snacking.

Sleeping habits correlated only to employment status. More employed people sleep less than 6 hours than unemployed people. 17 percent of the employed sleep less than 6 hours compared to almost 13 percent of the unemployed. Likewise, only two percent of the employed sleep more than nine hours while 5 percent of the unemployed sleep more than nine hours.

Correlations between health practices were not tested since Belloc and Breslow (1972) found that correlations

were inconsistent and often unrelated to overall health. Belloc and Breslow (1972) and later Breslow and Enstrom (1980) and Wiley and Camacho (1980) found that health practices were additive. Each factor contributed to the overall assessment of health as well as a decrease in morbidity and mortality. The survey population here appears to practice a number of "desirable" health habits reported by the researchers cited above. A composite health practice score is reported (Table 12) using the scoring system of Belloc and Breslow (1972) described previously. In general, in the group responding to this survey almost 52 percent reported practicing 5 to 7 of the "desirable" health practices daily. This compares with 65 percent of the Alameda County population (Breslow and Enstrom, 1980).

Interrelationships Between Attitudes and Practices

With characteristics of each index established, attention was directed to the objective of this research, which was to learn what interrelationships exist between attitudes toward and practice of health and nutrition. Correlations between attitudes and practices were tested in three ways. First, the General Index of Subjective Well-Being, health locus of control, nutrition attitudes, health practices and nutrition practices were tested using Pearson r correlations. Secondly, correlations were made by treating the scales categorically rather than

continuously as with the Pearson r correlations. The Health Locus of Control and nutrient score scales were modified into categories for this test. The Health Locus of Control Scale was divided into three categories: internal, neutral and external. Nutrition scores were categorized into percentiles of less than 20%, 30%, 40%, 50%, 60%, 70%, 80% and greater than 80%. Answers to the General Index of Subjective Well-Being, health practices and nutrition attitudes were treated as categories in this test. Chi square was applied to the tables created to test for significance. Finally, multiple regression analysis was used to test for multivariate relationships.

Product-Moment Correlation (Pearson r): When interrelationships were tested with Pearson r correlations several significant correlations were found. (Table 14) None of the correlations were high, however. Due to the differences in scales compared, the correlations are notable. Negative correlations were due to the direction of scales compared rather than inverse relationships.

The General Index of Subjective Well-Being was found to correlate with health locus of control, nutrition attitudes and health practices. The General Index of Subjective Well-Being did not correlate to the nutrient score.

Health locus of control correlated to the nutrition attitude "Poor health is the result of poor nutrition", health practices and the nutrient score. Correlations were significant at $p = <0.05$ level but they were low.

Table 14 Correlation Matrix of General Index of Subjective
Well-Being, Health Locus of Control, Nutrition Attitude,
Health Practices and Nutrient Scores (Pearson r)

Attitude/Practice Scales		r-Values (n=312)							
1	General Index of Subjective Well-Being								
2	Health Locus of Control	.27*							
3a	I believe poor health is the result of poor nutrition	.32*	.29*						
3b	I eat what tastes good and not what is good for me	-.14*	-.08	-.04					
3c	I am willing to cut out foods that are not good for me	.07	-.01	.03	-.32*				
3d	I am concerned about eating nutritious foods throughout the day	.06	-.08	.09	-.29*	.30*			
4	Health Practices	-.25*	.15*	-.58*	.23*	-.17*	-.20*		
5	Nutrient Scores	.01	.10*	.01	-.15*	-.14*	.05	.13*	
		1	2	3a	3b	3c	3d	4	5

* = Significance at $p = <0.05$ level

Health practices correlated with all other indices - all of the nutrition attitudes, nutrient score, health locus of control and General Index of Subjective Well-Being.

Nutrient score correlated with two of the nutrition attitudes. These attitudes were two of the behavioral attitudes. "I eat what tastes good and not what is good for me" and "I am willing to cut out foods that are not good for me." The correlations were weak but this may be due to the wide variation in nutrient scores compared with the narrow scale of the nutrition attitudes. The nutrient score also correlated with health locus of control and health practices.

Chi-Square Correlations: Results of this correlation were different from the results of the Pearson r correlations. While no new correlations were noted, several of the correlations noted with the Pearson r correlations did not occur when Chi square was applied. (Table 15)

The General Index of Subjective Well-Being correlated the same in both calculations. As with the Pearson r correlations, general well-being correlated with health locus of control, the nutrition attitudes, "Poor health is the result of poor nutrition" and "I eat what tastes good and not what is good for me.", and health practices.

Health locus of control correlated with General Index of Subjective Well-Being and nutrition attitude,

Table 15 Correlation Matrix of General Index of Subjective
Well-Being, Health Locus of Control, Nutrition Attitude,
Health Practices and Nutrient Scores (Chi Square)

Attitude/Practice Scales		Chi Square Values (n=314)							
1	General Index of Subjective Well-Being								
2	Health Locus of Control	23.37*							
3a	I believe poor health is the result of poor nutrition	15.43*	11.85*						
3b	I eat what tastes good and not what is good for me	9.85*	3.13	0.17					
3c	I am willing to cut out foods that are not good for me	1.77	1.77	0.10	24.60*				
3d	I am concerned about eating nutritious foods throughout the day	2.56	1.12	1.69	22.10*	19.79*			
4	Health Practices	13.77	11.98	8.43	18.7*	9.56*	17.5*		
5	Nutrient Scores	34.16	6.86	3.89	9.16	14.7*	6.57	2.01	
		1	2	3a	3b	3c	3d	4	5

* = Significance at $p = <0.05$ level

"Poor health is the result of poor nutrition" but the health locus of control did not correlate with health practices or nutrient score as in the Pearson correlation.

Health practices correlated with General Index of Subjective Well-Being and with the three behavior nutrition attitudes but not with the health locus of control or nutrient score.

Nutrient score correlated only with one nutrition attitude when the categorical approach was applied. This attitude was "I am willing to cut out food that are not good for me". Nutrient score did not correlate with health locus of control or health practices as was noted with the Pearson r correlations. As in the Pearson r the behavioral attitude remained significantly correlated.

Multiple Regression Analysis: In the first set of multiple regression analysis relationships between nutrition practices and nutrition attitudes, health locus of control and health practices were tested. General well-being was not part of these analyses since correlations had not been noted between these indices.

The nutrient score was used as the dependent variable in three regression analyses. First, the nutrient score was tested with the four nutrition attitudes. Next, a stepwise regression was initiated which tested first the nutrition attitudes then added health locus of control. Finally, the relationships between the health locus of control and health practices were tested against the nutrient score. (Table 16)

Table 16 Multiple Regression Analyses Results

Independent Variables	Beta	F-Value	Multiple R	R ²
Test 1: Nutrition Score Dependent				
I eat what tastes good, not what is good for me.	0.134	6.09*	0.134	0.018
I believe poor health is the result of poor nutrition.	0.016	0.09	0.135	0.018
Test 2: Nutrition Score Dependent				
I eat what tastes good, not what is good for me.	0.139	6.05*	0.134	0.018
Locus of Control Score	0.121	4.50*	0.175	0.030
I believe poor health is the result of poor nutrition.	0.037	0.44	0.179	0.032
I am willing to cut out foods that are not good for me.	0.008	0.020	0.180	0.032
Test 3: Nutrition Score Dependent				
Health Practices	0.110	3.81	0.124	0.015
Locus of Control Score	0.092	2.64	0.154	0.023
Test 4: Dependent Variable: General Well-Being				
Locus of Control Score	-0.235	16.44*	0.267	0.071
Health Practices	-0.219	18.95*	0.344	0.118
Test 5: Dependent Variable: Health Practices				
General Well-Being	-0.230	16.44*	0.253	0.064
Locus of Control Score	0.086	2.30	0.267	0.071

* = Significance at $p = <0.05$ level

When nutrition attitudes were regressed with the nutrient score only one of the attitudes appeared to have a significant relationship. The attitude "I eat what tastes good and not what is good for me" was demonstrated to be minimally correlated. The attitude "I am concerned about eating nutritious food throughout the day" could not even be computed and does not appear on the table. It is important to remember that a disagree answer to the statement "I eat what tastes good and not what is good for me" implies "nutrition is important". Since the relationship demonstrated in this statistical test was positive one can conclude that as respondents disagree with this statement their nutrient scores would increase.

The research of Eppright et al. (1970), Grotkowski and Sims (1978) and Sims (1978) has pointed to the correlations of "nutrition is important" with nutrient intake. Eppright et al. (1970) noted statistically significant correlations between attitudes and dietary content of the vitamins thiamin, riboflavin, niacin and ascorbic acid. Grotkowski and Sims (1978) found "nutrition is important" correlated with the percent of calories consumed as snacks in their elderly population. Sims (1978) learned that "nutrition is important" correlated with consumption of food in the protein group in lactating women.

When health locus of control was added to the regression, a minimal effect was noted. Only three percent

of the nutrient score can be accounted for by nutrition attitude and health locus of control.

When the relationship of the nutrient score was tested with the health locus of control and health practices, no relationship was found. While correlations exist, as established by Pearson r correlation, they are not of a magnitude to be predictive.

The results of the research undertaken here continue to support the relationship of attitude and nutrient intake. It was hoped that relationships would also be noted with health attitudes and practices, but the correlations were minimal so that definite relationships can not be implied.

Next the relationships between health attitudes and practices were tested with the multiple regression analysis. First the General Index of Subjective Well-Being was used as the dependent variable with the health locus of control and health practices as independent variables. Then the order was reversed and the health practices became the dependent variable with General Index of Subjective Well-Being and health locus of control as independent variables. (Table 16) In the first regression both health locus of control and health practices were strongly related to General Index of Subjective Well-Being. As postulated by Belloc and Breslow (1972) and later by Breslow and Enstrom (1981) and Wiley and Camacho (1981) General Well-Being is dependent upon health practices. When the order

was reversed, only relationship of the General Index of Subjective Well-Being and health practices was demonstrated. In this regression it was shown that General Well-Being is also predictive of health practices while the health locus of control was not significantly related to the health practices. It would seem that General Well-Being is both predictive and dependent upon health practices.

These relationships have been established in the literature. The results of the research here do not bring any new understanding to the attitude-behavior model. For nutrition educators the results of this study present some interesting ideas to explore.

1. There does appear to be some consistency between health and nutrition attitudes and health and nutrition practices. When approaching nutrition within the context of total health, understanding viewpoints and practices of an intended audience or client may improve the effectiveness of an education program. Wallston et al. (1976) points out that those who are internal control are more likely to respond to self-paced instruction, while those who are external may need more structured group or individualized instruction. A brief health locus of control questionnaire could be administered which may assist a practitioner in selecting effective strategies.

2. Further research needs to be done to develop nutrition attitude assessment tools. It was noted in this study that behavioral attitudes correlated highest to

nutrient intakes. Perhaps attention should be directed to distinguishing between cognitive, affective and behavioral attitudes in nutrition attitude methodology.

3. It would be interesting to reassess the data of this survey to compare groups of respondents. Nutrition attitudes and nutrient scores could be compared between those who felt well and those who felt fair or poor. The internal and the external locus of control groups could be compared. Comparisons could be made based on the number of health habits practiced. Respondents could be divided into groups by nutrient scores so that health attitudes and practices could be differentiated. The comparisons may provide additional insights into attitude practice relationships.

V. SUMMARY AND CONCLUSIONS

Interrelationships among attitudes toward and practice of nutrition and health were determined from results of 335 responses to a survey mailed to members of a prepaid health plan in Portland, Oregon, in the Spring of 1981. The population studied was characterized as married, employed, well educated and middle income. They felt well and in control of their health. Approximately 52 percent practiced several desirable health practices daily. About 90 percent had a positive attitude toward nutrition; however, only 22 percent had diets which scored at least 66 percent of the Dietary Nutrient Score considered adequate for adults while 33 percent had diets which did not meet 50 percent of this score.

It was found that correlations ($p = <0.05$ level) do exist among health and nutrition attitudes and practices when tested using Pearson r and Chi-Square. However, when multiple regression analysis is used, only minimal correlations between nutrient scores, nutrition attitude and health locus of control were noted. There were no correlations between nutrient scores, health practices and health locus of control or general well-being. Significant correlations were also noted between health practices, general well-being and health locus of control using

Pearson r and Chi-Square, however the relationships proved minimal using multiple regression analysis.

This study using members of a prepaid health plan supports the existing literature. The nutrition attitude, "nutrition is important", was correlated to nutrient intake. Health attitudes, general well-being and health locus of control, were correlated to health practices. In this study correlations among general well-being, health locus of control, nutrition attitude, health practices and nutrition practices were noted, however, the correlations were not large enough to be predictive. Further study may be able to define and develop the relationships in greater detail than occurred in this study.

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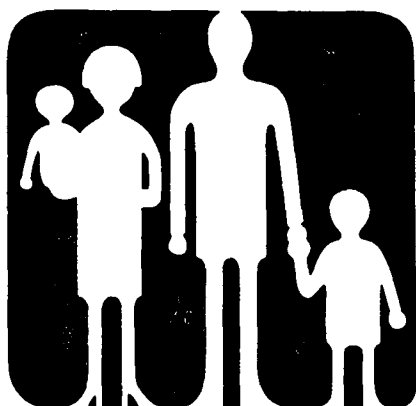
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APPENDIX

APPENDIX A

SURVEY QUESTIONNAIRE

***KAISER
FOUNDATION
HOSPITALS***

This research study is designed to learn what people think about health and diet as well as to learn what people do concerning health and diet. Your participation in this study will help us to learn more about these topics. The study has been developed in cooperation with the Graduate Program in Foods and Nutrition at Oregon State University.

Thank you for your help. Return in enclosed pre-addressed envelope. No additional postage is required.

Dataset 3647

1-4
5-14

First of all, we would like to know how you feel. Please answer each question as it applies to you by checking the appropriate box.

1. In general, would you say your health is:

EXCELLENT	<input type="checkbox"/> 1	15
GOOD	<input type="checkbox"/> 2	
FAIR	<input type="checkbox"/> 3	
POOR	<input type="checkbox"/> 4	

2. Would you say your health is better now, about the same or not as good compared to your health five years ago?

BETTER	<input type="checkbox"/> 1	16
ABOUT THE SAME	<input type="checkbox"/> 2	
NOT AS GOOD	<input type="checkbox"/> 3	

3. Compared to friends and others your age, would you say your health is better, about the same or not as good?

BETTER	<input type="checkbox"/> 1	17
ABOUT THE SAME	<input type="checkbox"/> 2	
NOT AS GOOD	<input type="checkbox"/> 3	

4. In the past year, have you been bothered by any illness, bodily disorder, pains or fears about your health a lot, a little or not at all?

A LOT	<input type="checkbox"/> 1	18
A LITTLE	<input type="checkbox"/> 2	
NOT AT ALL	<input type="checkbox"/> 3	

5. Have you had to change the kind of work or cut down hours because of illness or injury or not?

YES	<input type="checkbox"/> 1	19
NO	<input type="checkbox"/> 2	

6. Please indicate whether or not you currently have any trouble doing any of the following. (Check one box for each line)

	YES	NO	
FEEDING YOURSELF	<input type="checkbox"/> 1	<input type="checkbox"/> 2	20
DRESSING	<input type="checkbox"/> 1	<input type="checkbox"/> 2	21
MOVING AROUND	<input type="checkbox"/> 1	<input type="checkbox"/> 2	22
GETTING OUTDOORS	<input type="checkbox"/> 1	<input type="checkbox"/> 2	23

7. How much regular activity do you get outside of work?

A GREAT DEAL	<input type="checkbox"/> 1	24
A MODERATE AMOUNT	<input type="checkbox"/> 2	
VERY LITTLE	<input type="checkbox"/> 3	
NOT AT ALL	<input type="checkbox"/> 4	

8. How often have you been waking up fresh and rested?

ALWAYS	<input type="checkbox"/> 1	25
SOMETIMES	<input type="checkbox"/> 2	
NEVER	<input type="checkbox"/> 3	

9. Most days how much energy, pep and vitality do you feel? A LOT ☐1 26
SOME ☐2
NONE ☐3
10. In the past year how have you been getting along with family and co-workers? WELL ☐1 27
OK ☐2
NOT AT ALL ☐3
11. About how many voluntary groups or organizations, if any, do you belong to (including church)? NUMBER OF GROUPS _____ 28
(write in the number, if none, write in 0)
- 11a. If you belong to any such groups, in the last year how active have you been? VERY ACTIVE, ATTEND MOST MEETINGS ☐1 29
FAIRLY ACTIVE ☐2
12. Here are some statements about diet and health. There are no right or wrong answers. As you read each one, please indicate whether you agree or disagree with it by checking the appropriate box.
- | | <u>AGREE</u> | <u>DISAGREE</u> | <u>DON'T KNOW</u> | |
|------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------|----------------------------|----|
| a. If I take care of myself, I can avoid illness. | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | 30 |
| b. Whenever I get sick, it is because of something I've done or not done. | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | 31 |
| c. Good health is largely a matter of good fortune. | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | 32 |
| d. No matter what I do, if I am going to get sick I will get sick. | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | 33 |
| e. Most people do not realize the extent to which their illnesses are controlled by accidental happenings. | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | 34 |
| f. I can only do what my doctor tells me to do. | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | 35 |

Continue to answer these statements as you did on the previous page.
Remember to answer what you think and that there are no right or wrong answers.

	<u>AGREE</u>	<u>DISAGREE</u>	<u>DON'T KNOW</u>	
g. There are so many strange diseases around that you might pick one up.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	36
h. People who never get sick are just plain lucky.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	37
i. When I feel ill, I know it is because I have not been getting proper exercise or eating right.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	38
j. People's ill health results from their own carelessness.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	39
k. I believe poor health is the result of poor nutrition.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	40
l. When it comes to health, I believe that diet is very important.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	41
m. I eat what tastes good and not what is good for me.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	42
n. Even if I take vitamins, I feel I should be concerned about my diet.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	43
o. Nutrition is important and I should not be careless about it.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	44
p. As long as the doctor doesn't say anything about nutrition to me, I don't need to worry.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	45
q. I feel as long as I maintain my weight, I don't need to worry about what I eat.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	46
r. When I take responsibility for my diet, I am taking responsibility for my health as well.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	47

	<u>AGREE</u>	<u>DISAGREE</u>	<u>DON'T KNOW</u>	
s. The food I eat affects my health.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	48
t. The food I eat has little to do with my appearance.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	49
u. The food I eat will affect my future health.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	50
v. I am willing to cut out foods that are not good for me.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	51
w. I try to learn to like healthy foods.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	52
x. I am concerned about eating nutritious foods throughout the day.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	53
y. I feel that if I drink milk, I don't have to worry about nutrition.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	54

Another important purpose of this study is to learn what people actually do. Answer the following questions as they apply to you.

13. In general, do you try to eat according to:
- | | | |
|------------------------------------------------|----------------------------|----|
| A STRICTLY ORGANIC NATURAL HEALTH FOOD DIET | <input type="checkbox"/> 1 | 55 |
| A HEALTH FOOD OR ORGANIC DIET WITH OTHER FOODS | <input type="checkbox"/> 2 | |
| A TYPICAL SENSIBLE AMERICAN DIET | <input type="checkbox"/> 3 | |
| A DIET RECOMMENDED BY A PHYSICIAN OR DIETITIAN | <input type="checkbox"/> 4 | |
| A VEGETARIAN DIET | <input type="checkbox"/> 5 | |
| I DO NOT CONCERN MYSELF WITH WHAT I EAT | <input type="checkbox"/> 6 | |
14. Please indicate which of the following factors most often affects your purchase of particular food items. (check one)
- | | | |
|-----------------------------|----------------------------|----|
| COST | <input type="checkbox"/> 1 | 56 |
| WHAT IS AVAILABLE | <input type="checkbox"/> 2 | |
| NUTRITIONAL VALUE | <input type="checkbox"/> 3 | |
| TASTE | <input type="checkbox"/> 4 | |
| WHAT IS EASY TO PREPARE | <input type="checkbox"/> 5 | |
| WHAT I LIKE AT THE MOMENT | <input type="checkbox"/> 6 | |
| I DO NOT GENERALLY BUY FOOD | <input type="checkbox"/> 7 | |

15. How often have you visited a doctor in the past 5 years for a general health check up when you didn't have a problem, was it: (check one)
- MORE THAN ONCE A YEAR ☐1 57
ONCE A YEAR ☐2
LESS THAN ONCE A YEAR ☐3
I HAVE NOT BEEN TO A DOCTOR ☐4
16. How often have you visited a dentist in the past 5 years for a general check up when you did not have a tooth ache, was it: (check one)
- MORE THAN ONCE A YEAR ☐1 58
ONCE A YEAR ☐2
LESS THAN ONCE A YEAR ☐3
I HAVE NOT BEEN TO A DENTIST ☐4
17. In what year did you have your last tetanus booster vaccine?
- YEAR _____ 59-60
18. Have you ever smoked tobacco, or not?
- YES (GO ON TO QUESTIONS 18b-18d) ☐1 61
NO (SKIP TO QUESTION 19) ☐2
- 18b. For about how many years?
- YEAR _____ 62-63
- 18c. Please indicate the amount you usually smoke (or smokes each day for the types listed below:
- PACKS OF CIGARETTES PER DAY _____ 64-65
NUMBER OF CIGARS PER DAY _____ 66
NUMBER OF PIPES PER DAY _____ 67
- 18d. If you no longer smoke, please give the date you quit; your best estimate will do.
- HAVE NOT QUIT ☐
DATE _____ 68-71
19. Do you consume alcoholic beverages, or not?
- YES (GO TO 19A) ☐1 72
NO (SKIP TO QUESTION 20) ☐2
- 19a. Please indicate how many times per week you usually consume the following beverages. Also please give the number of drinks of each type you usually have at one sitting?
- | | <u>ONCE/WEEK</u> | <u>TWICE/WEEK</u> | <u>MORE THAN
TWICE/WEEK</u> | <u>DON'T USE</u> | <u>NUMBER
OF
DRINKS</u> | |
|--------|----------------------------|----------------------------|---------------------------------|----------------------------|---------------------------------|-------|
| BEER | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | _____ | 73-74 |
| WINE | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | _____ | 75-76 |
| LIQUOR | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | _____ | 77-78 |
20. How many hours of sleep do you routinely get each day? (check one)
- LESS THAN 6 HOURS ☐1 79
7 HOURS ☐2
8 HOURS ☐3
MORE THAN 9 HOURS ☐4

21. In the past five years has your weight remained the same, increased more than 10 pounds, decreased more than 10 pounds? (check one)
- | | | |
|-------------------------------|----------------------------|----|
| REMAINED THE SAME | <input type="checkbox"/> 1 | 80 |
| INCREASED MORE THAN 10 POUNDS | <input type="checkbox"/> 2 | |
| DECREASED MORE THAN 10 POUNDS | <input type="checkbox"/> 3 | |
22. How would you rate your body weight? Would you say you are:
- | | | |
|---------------------|----------------------------|----|
| UNDERWEIGHT | <input type="checkbox"/> 1 | 81 |
| ABOUT NORMAL WEIGHT | <input type="checkbox"/> 2 | |
| SLIGHTLY OVERWEIGHT | <input type="checkbox"/> 3 | |
| QUITE OVERWEIGHT | <input type="checkbox"/> 4 | |
23. Here is a list of active things that people do in their free time. For each activity please check whether or not you participate in that activity frequently, occasionally, seldom or never. (Check each line once.)
- | | <u>FREQUENTLY</u> | <u>OCCASIONALLY</u> | <u>SELDOM</u> | <u>NEVER</u> | |
|---------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----|
| ACTIVE SPORTS | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | 82 |
| SWIMMING OR LONG WALKS | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | 83 |
| WORKING IN GARDEN OR HOUSEWORK | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | 84 |
| DOING PHYSICAL EXERCISE | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | 85 |
| TAKING WEEKEND AUTOMOBILE TRIPS | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | 86 |
| HUNTING/FISHING | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | 87 |
| OTHER: (PLEASE SPECIFY) | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | 88 |
24. Do you drink eight (8) glasses of water or other liquid daily or not?
- | | | |
|-----|----------------------------|----|
| YES | <input type="checkbox"/> 1 | 89 |
| NO | <input type="checkbox"/> 2 | |
25. Do you take vitamin supplements or not?
- | | | |
|-----|----------------------------|----|
| YES | <input type="checkbox"/> 1 | 90 |
| NO | <input type="checkbox"/> 2 | 91 |
- If so, what kinds? _____
26. How often do you eat breakfast? Is it:
- | | | |
|----------------|----------------------------|----|
| DAILY | <input type="checkbox"/> 1 | 92 |
| 5-6 TIMES/WEEK | <input type="checkbox"/> 2 | |
| 3-4 TIMES/WEEK | <input type="checkbox"/> 3 | |
| 1-2 TIMES/WEEK | <input type="checkbox"/> 4 | |
| NEVER | <input type="checkbox"/> 5 | |
27. How often do you eat between meals? Is it:
- | | | |
|-----------------------|----------------------------|----|
| NEVER | <input type="checkbox"/> 1 | 93 |
| 1-2 TIMES/DAY | <input type="checkbox"/> 2 | |
| 3-4 TIMES/DAY | <input type="checkbox"/> 3 | |
| 4-5 TIMES/DAY | <input type="checkbox"/> 4 | |
| MORE THAN 5 TIMES/DAY | <input type="checkbox"/> 5 | |

28. Now will you please write down everything you ate and drank from the time you got up in the morning yesterday until the time you got up today. Be sure to write down everything you ate at home and away from home. Include all meals, snacks and drinks. Please be specific as you can be, include quantities and brand names when you can remember. Sometimes it is easiest if you think about when you woke up and then think through the day. Remember to include all meals and all snacks.

TIME EATEN	FOOD EATEN	DO NOT MARK IN THIS SPACE					

If you need additional space, use the back page.

94-95

96-97

98-99

100-101

102-103

104-105

106-107

Finally, we would like to ask a few questions about yourself to help interpret the results. Answer the following questions as they apply to you.

29. Are you: MARRIED ☐ 1 108
 SEPARATED ☐ 2
 DIVORCED ☐ 3
 WIDOWED ☐ 4
 SOME OTHER ARRANGEMENT ☐ 5
 NEVER BEEN MARRIED ☐ 6
30. Are you? EMPLOYED FULL TIME ☐ 1 109
 EMPLOYED PART TIME ☐ 2
 NOT EMPLOYED OUTSIDE THE HOME ☐ 3
 STUDENT ☐ 4
 RETIRED ☐ 5
31. What is your usual occupation when employed or before retirement?
 TITLE _____ 110
 KIND OF WORK _____ -
 COMPANY _____ 112
32. Please circle the highest level of education you have completed: NO FORMAL EDUCATION ☐ 1 113
 GRADE SCHOOL ☐ 2
 HIGH SCHOOL ☐ 3
 SOME COLLEGE OR TRADE SCHOOL ☐ 4
 COLLEGE GRADUATE ☐ 5
33. What was the total family income before taxes in 1980, just approximately? LESS THAN \$5,000 ☐ 1 114
 \$5,000-9,999 ☐ 2
 \$10,000-14,999 ☐ 3
 \$15,000-24,999 ☐ 4
 \$25,000-39,999 ☐ 5
 \$40,000 AND ABOVE ☐ 6
34. What is your sex? MALE ☐ 1 115
 FEMALE ☐ 2
35. What age category are you in: 18-25 ☐ 1 116
 26-33 ☐ 2
 34-45 ☐ 3
 46-55 ☐ 4
 56-65 ☐ 5
 OVER 65 ☐ 6

Thank you for taking time to fill out and return this questionnaire.

Is there anything else you would like us to know about how you think about health or diet? Are there any other concerns you may wish to express. If so, you may use this space.

HEALTH SERVICES RESEARCH CENTER

4610 SOUTHEAST BELMONT STREET, PORTLAND, OREGON 97215, TELEPHONE (503) 233-5631

May 5, 1981

Dear Health Plan Member:

Do you think about your health? Do you ever try to do things to change your health? Have you ever thought that nutrition might have a role in your health? Please take a few minutes to tell me about these things by completing and returning the enclosed questionnaire. You are one of a small number of people selected from the Kaiser Foundation Health Plan to participate in this study which has been designed as part of my Graduate Program in Food and Nutrition at Oregon State University and is being conducted in cooperation with the Kaiser Permanente Medical Care Program.

The questionnaire is easy to complete. You might find it easiest if you fill it out while you are first looking it over. Try to answer all questions. If you wish to add more information, use the back of the questionnaire.

You may be assured that your answers are confidential. Each questionnaire has an identification number for mailing purposes only. That is so the mailing list can be checked off when the questionnaire is returned. Your name will never be placed on the questionnaire and the results of the survey will not be included in your medical record. Answers will be reported anonymously or in statistical form only. Participation, of course, is voluntary. Whether or not you choose to participate in the study will not affect your status as a health plan member.

I do hope you will complete and return the questionnaire as a response from you is very important to help us find out more about nutrition and health. There is no way to substitute for the answers only you can provide. However, if you choose not to participate, please let us know by returning the questionnaire just as it is. If you have any questions regarding the questionnaire or the study, please call me at (503) 285-9321, Extension 4884, Monday through Friday.

Thank you for your help.

Sincerely,

Jan M. Daoust
Registered Dietitian

Last week a questionnaire seeking your opinion about nutrition and health was mailed to you. If you have already completed and returned it to me, please accept my sincere thanks. If not, I would appreciate your completing and sending it to me. Because the questionnaire has been sent to only a small, but representative sample of health plan members, it is extremely important that your responses be included in the study.

If by some chance you did not receive the questionnaire, or if it got misplaced, please call me at (503) 285-9321, Extension 4884, and I will mail you another immediately.

Sincerely,

Jan M. Daoust
Registered Dietitian

HEALTH SERVICES RESEARCH CENTER

4610 SOUTHEAST BELMONT STREET, PORTLAND, OREGON 97215, TELEPHONE (503) 233-5631

May 26 , 1981

Dear Health Plan Member:

About three weeks ago I wrote you seeking your participation in a study about health and nutrition attitudes and practices. I have not yet received a questionnaire from you. It is important for the results of this study to have you complete the forms and return them to me as soon as you can. You were one of a small number of people selected from the health plan to participate in this study and we cannot substitute for the answers only you can provide.

You may be assured that your answers are confidential. Each questionnaire has an identification number for mailing purposes only. This is so I can check off the mailing list when the questionnaire is returned. Your name will never be placed on the questionnaire. Whether or not you choose to participate in the study will not affect your status as a health plan member. The results of the survey will not be included in your medical record. This study is completely voluntary. I do hope you will complete and return the questionnaire. (However, if you choose not to participate, please let me know by returning the questionnaire just as it is.)

In the event that your questionnaire has been misplaced, a replacement is enclosed.

Your help is greatly appreciated.

Sincerely,

Jan M. Daoust
Registered Dietitian