

## CHAPTER TWO

### REVIEW OF RELATED LITERATURE

#### Demographics

In the United States, 26,983 thousand people participated in the Food Stamp Program each month in 1993.<sup>11</sup> Out of these participants, 535 thousand people were located in the state of Virginia. In 1992, the US government spent \$20,906 million in food stamp dollars; \$406 million of which was allocated to Virginia. By 1994, Virginia distributed \$448,189 million to food stamp clients.

In the 1989 Census, there were 126,897 (7.7%) families and 611,596 (10.2%) individuals living in poverty in Virginia.<sup>3</sup> Households must have gross incomes below 130% of the federal poverty line or net incomes below 100% of poverty to be eligible to receive food stamps.<sup>12</sup> This is equivalent to a gross income of \$16,050 per year for a family of four.<sup>13</sup> In addition to the income requirements, households can have only \$2,000 in countable resources to receive food stamps. However, if at least one person in the household is 60 years of age or older, the household's countable resources may be up to \$3,000.<sup>14</sup>

Food stamp households are expected to spend approximately 30% of their resources on food.<sup>14</sup> Therefore, the amount of food stamp benefits a household can receive is calculated by multiplying .3 times the net monthly income. The result is subtracted from the maximum allotment for the household size to determine the amount of food stamps that can be allotted. In 1994, the average monthly benefit per person was \$69, which provides approximately \$0.77 per meal for each person.<sup>15</sup>

In a review written by Coe<sup>16</sup>, it was revealed that not all eligible households participate in the food stamp program. In 1979, 45.4% of a study population eligible for food stamps were actually receiving them. Several reasons that an eligible household might not participate in a public welfare program were identified including the following: informational problems, problems with program parameters, administrative problems, physical access problems, and attitudinal factors. One example of such attitudinal factors was described as not feeling as though assistance is really needed.

More than half of all benefits go to households whose incomes are half the federal poverty level or less. Eighty percent of all food stamp households have children, seven percent of recipients are elderly, and a large proportion of the households have female heads and young children. Forty percent of food stamp recipients leave the program within four months and 50% leave within six months.<sup>12</sup> On average, able-bodied adults without children stay on the program for the shortest amount of time. The USDA<sup>15</sup> has stated that providing monetary benefits is not enough. There is also a need for people to receive the information necessary to make informed, healthy food choices.

People with low incomes, including those receiving food stamps, are at increased risk of developing diet-related chronic diseases. Five of the ten leading causes of illness, death, and high health-care cost in the US have been linked to unbalanced and inadequate nutrition.<sup>3</sup> These diseases (heart disease, cancer, stroke, diabetes, and atherosclerosis) resulted in 32,720 (67%) deaths in Virginia in 1992. The cost per individual for the treatment of each of these diet-related diseases averages \$27,000 per year.

### Demographics: Summary

Monetary aid in the form of food stamps is not enough to ensure that the U.S. low-income population is receiving adequate nutrition.<sup>15</sup> Although millions of dollars of food stamp money is being distributed, there are still many eligible families that are not being reached.<sup>16</sup> In addition, among the families receiving food stamps, the risk of diet-related chronic diseases and illnesses is still high.<sup>3</sup> In order to reduce health-care dollars and promote the use of food stamp dollars for nutritionally sound diets, effective nutrition education efforts must be available for food stamp clients.

### Nutrition Education

The role of nutrition in public health was considered as early as the 1800s. The Office of Experiment Stations of the U.S. Department of Agriculture began nutrition investigations in 1894.<sup>17</sup> At this time, milk stations, parental instruction on child nutrition, and school lunch programs were initiated in New York and Boston. The first official nutritionist, called a "health instructor in foods," was employed in 1917 in Massachusetts. Throughout the twentieth century, public health nutrition services continued to develop and grow.

Of these services, the nutrition education interventions that have been provided to the public have reduced the incidence of diet-related diseases.<sup>2</sup> However, the best method to achieve this is still a controversial issue. An editorial written by Kent in 1988<sup>18</sup> stated that nutrition education should include some aspect of empowerment. In Kent's words, "...to be empowered is to increase your capacity to define, analyze, and act on your own problems." It has been suggested that an individual has a greater chance of continuing a changed behavior if the change occurred due to a personal analysis of the situation rather than an authority's demand. Therefore, including the goal of empowerment in a nutrition education intervention involves supporting people in making their own analyses so that they can decide for themselves what is good for them. In addition, empowerment could begin by basing the development or expansion of education programs on the perceived needs of the program's clients.

Nutrition education can be directed at many different levels such as the individual, an organization, the entire community, or the entire society.<sup>19</sup> Most of the nutrition education available to adults has targeted the individual or utilized certain organizations to promote nutrition awareness. Individual nutrition education has included one-on-one counseling, group classes, self-help materials, and computer-based feedback. Examples of organizations that have been utilized for the promotion of better nutrition practices are educational institutions, worksites, and grocery stores. The two federal nutrition education programs that have been

conducted on both of these levels are the Special Supplemental Food Program for Women, Infants, and Children (WIC) and the Expanded Food and Nutrition Education Program (EFNEP).

WIC is a supplemental feeding program with a nutrition education component. The effectiveness of WIC has been well documented in the literature. In 1993, it was shown that for every \$1.00 spent on WIC services, \$2.91 was saved in Medicaid costs for newborn care.<sup>20</sup> In addition, the incidence of low birth weight was 22% lower for white women receiving prenatal services through WIC compared to those who were not. Black women receiving WIC prenatal services had a 31% lower incidence of low birth weight and 57% lower incidence of very low birth weight. However, it is difficult to differentiate between the outcomes of WIC's supplemental feeding versus its educational components.

A few outcome studies have been done on WIC's educational services. Schwartz and colleagues<sup>21</sup> conducted a study in 1995 to determine if WIC participation improves breast-feeding practices. Data from the National Maternal and Infant Health Survey conducted by the National Center for Health Statistics was analyzed. Of the women eligible for the WIC program, three factors were considered: participation in WIC, the initiation of breast-feeding, and the duration of breast-feeding.

It was determined that WIC mothers who received breast-feeding advice were twice as likely to breast-feed than those who did not. However, WIC mothers who did not receive breast-feeding advice as a part of the program were less likely to breast-feed than mothers not enrolled in WIC. This was thought to possibly be due to WIC's provision of infant formula. Breast-feeding duration was unaffected by both the participation in WIC and the provision of breast-feeding advice. The authors<sup>21</sup> concluded that a more detailed and objective measurement of the breast-feeding information received by WIC participants is needed in order to better evaluate the educational outcome. However, from this study, WIC's breast-feeding educational component seems vital to breast-feeding promotion among WIC participants. Further studies on this and other educational components of WIC are needed.

EFNEP is the only non-supplemental nutrition education program for low-income families that is funded by the federal government. EFNEP was started in 1968 to help reduce malnutrition and hunger throughout the nation.<sup>2</sup> EFNEP's goal was to provide low-income families with the knowledge and skills necessary for a nutritionally adequate diet. In 1979, a federal evaluation of EFNEP revealed that a dramatic response to malnutrition had occurred in the early 1970s due to the EFNEP nutrition education efforts. No provision for food supplementation had been provided. In contrast with other efforts at the time, EFNEP provided person-to-person intensive education efforts for an extended period of time. Indigenous paraprofessionals have provided these services and have been thought to relate well to clients due to their similar backgrounds.

A study done by Bremner and colleagues in 1994<sup>22</sup> was conducted in New York State in order to compare how accurately the EFNEP paraprofessionals versus EFNEP professionals perceived the beliefs and practices of their clients. This study was conducted in two parts, an instrument development and final survey. Two quantitative measuring instruments were

developed using ethnographic research methods. The EFNEP clients participated in personal interviews and the EFNEP employees completed self-administered questionnaires. The final questionnaires were filled out by 173 EFNEP paraprofessionals and 43 EFNEP professionals. Fifty-one EFNEP clients throughout six New York sites were also interviewed.

The results showed that the paraprofessionals in this study did not share many demographic characteristics with the EFNEP clients. The paraprofessionals were similar in age and place of residence when compared to the professionals. In 6 out of 7 of the reasons for health, EFNEP staff perceptions were significantly different from client responses ( $p < .05$ ). However, in 5 out of 7 of these reasons, slightly more paraprofessionals than professionals were able to predict client responses ( $p < .05$ ). When considering the meaning of eating right, 61% of paraprofessionals and 42% of professionals believed that clients would give definitions based on monetary terms, i.e. having enough money, compared to the 7% of clients who actually did. Similar patterns were seen when considering descriptions of a good meal, financial control, self-perception of intelligence, and lack of food resources.

The authors<sup>22</sup> concluded that both EFNEP paraprofessionals and professionals in this study held inaccurate perceptions of their clients' beliefs and practices. Supporting this conclusion, the "underclass" concept was cited which states that a segment of economically disadvantaged people have a distinctive set of values, attitudes, beliefs, norms, and behaviors. The self-reporting nature of this study was limiting in addition to the fact that the personal interviews and questionnaires were assumed to be comparable. However, the gap that was reported between the staff views of clientele traits is an important consideration in the development and implementation of future programs for limited resource clients.

Regardless of the role that indigenous EFNEP paraprofessionals play, the overall effectiveness of EFNEP has been well documented in the literature. Contento et al.<sup>19</sup> reported five studies that illustrated positive results of the EFNEP program. The consensus of these studies was that the diets of EFNEP graduates had improved and that nutrition knowledge had increased. In 1979, a federally mandated evaluation of EFNEP revealed a dramatic decrease in malnutrition due to the program.<sup>2</sup> However, imbalances in consumption were not altered and more recent documentation of the long term effects of the EFNEP program is needed.

Recently, alternatives to the face-to-face educational methods have been explored by nutrition educators. The use of videotaped materials is one example. Meade et al.<sup>23</sup> conducted a study to compare the effects of printed versus videotaped materials on colon cancer patients with limited literacy skills. Booklets containing colon cancer information were prepared at a 5-6 grade reading level. Videotapes were also made containing the same information. The investigators recruited 1100 subjects from a primary care clinic meeting predetermined criteria. A colon cancer knowledge test was given to all subjects before and after the intervention.

There were no significant differences in the pretest scores among the two intervention groups. Both the booklet and videotape groups improved significantly in their colon cancer knowledge after the intervention, however, there was no difference in gain of knowledge between groups ( $p < .05$ ). The authors<sup>23</sup> concluded that both educational methods were effective, but

only short-term knowledge was evaluated. In addition, the preferences of the subjects was not assessed.

As another alternative educational method, Johnston and colleagues<sup>24</sup> conducted a study to determine the effectiveness of a lecture-style instruction versus a self-directed dietary education. One hundred and forty-seven men and women at risk for developing coronary heart disease were recruited from a US Air Force medical clinic. Participants were divided into two groups; one receiving a 1 hour lecture given by a registered nurse and the other receiving a 12 week self-directed diet education packet. Blood cholesterol levels were measured in both groups at the beginning and end of the 12 week period.

Total cholesterol (TC) levels in the lecture group decreased an average of 11.2% ( $p < .05$ ). The self-directed group resulted in a 17.6% decrease in TC and a 12.6% decrease in TC/HDL-C ratio ( $p < .05$ ). There was a significant difference between the decreases of TC between the two groups ( $p < .05$ ). The authors<sup>24</sup> concluded that both educational methods resulted in improved cholesterol levels, but that the self-directed program may have been slightly better. It was recommended that follow-up studies assess the long-term results of both methods.

### Nutrition Education: Summary

Nutrition education interventions available to the public have reduced the incidence of diet-related diseases.<sup>2</sup> The most recognized federal nutrition education programs for low-income audiences are WIC and EFNEP. The overall effectiveness of both have been well documented in the literature.<sup>19,21</sup> However, as in any long standing health education effort, these programs must be continually assessed and improved. For example, it has been indicated that EFNEP staff may not hold accurate perceptions of their clients' beliefs and practices.<sup>22</sup> In addition to gaining insight on these issues, alternatives to the conventional one-on-one and small group educational methods should be explored. Videotaped material and self-directed programs are examples of alternatives that have been shown to be effective.<sup>23,24</sup> However, preferences of the audience for certain educational methods should be identified.

### Behavior Change Models

There are many models that apply to explaining, predicting, and influencing the behaviors of an individual or group of individuals with respect to health promotion. No single theory or concept dominates the health education efforts to date.<sup>25,26</sup> However, the most dominant theories are the Theory of Reasoned Action, the Health Belief Model, and the Social Cognitive Theory (Social Learning Theory).<sup>25</sup> An understanding of the commonalties and differences between all of the available theories, a recognition of which are most helpful in a particular field, and a knowledge of the theories currently being used have helped researchers to select the most appropriate philosophies to follow. In addition to those mentioned previously, other frameworks that have been used in nutrition education efforts have been the Locus of Control Theory, the concept of self-efficacy, and Prochaska's Stages of Change Model.

The Theory of Reasoned Action was developed to explain any behavior over which an individual has personal control.<sup>27</sup> This model assumes that the immediate determinant of behavior is one's behavioral intention. According to the Theory of Reasoned Action, a person's intention to perform a behavior is a function of his/her attitude toward the behavior and the environmental influence or subjective norms. Attitudes are determined by a belief that a given outcome will or will not occur and an evaluation of that outcome. Normative beliefs are determined by one's opinion of what others think and his/her motivation to conform to those notions. Considering this theory, information on a population's beliefs about specific behaviors can be useful in nutrition education efforts.

The Health Belief Model was initially developed in order to explain the public's lack of participation in health programs.<sup>28</sup> The model has since been extended to apply to behavioral responses to symptoms and diagnosed conditions. The key components of the Health Belief Model are based on an individual's threat of a health condition, his/her outcome expectations, and the person's efficacy expectations. The perceived threat is based on two components; the perceived susceptibility to an ill-health condition and the perceived seriousness of the condition. Outcome expectations are based on the perceived benefits of specified action and the perceived barriers to taking that action. The conviction to carry out a recommended action determines one's efficacy expectations. It is clear from the basis of the Health Belief Model that an individual or group's perceptions of health related topics are important considerations in the development of health and nutrition education programs.

The Social Cognitive Theory, previously known as the Social Learning Theory, explains human behavior in terms of the interactions of a person's behavior, personal factors (including cognitions), and environmental influences.<sup>29</sup> The interaction of these three categories is known as reciprocal determinism because a change in one has implications for the others. An example of a personal factor is an individual's ability to perform a known behavior or skill, distinguishing between learning and performing. Other personal factors include foreseeing outcomes of given behavior patterns, learning through observation, behavior self-regulation, and the ability to reflect and analyze experiences. The Social Cognitive Theory states that behavior is determined by an individual's expectancies and incentives.<sup>28</sup>

From the Social Cognitive Theory, the Locus of Control Theory was developed.<sup>30</sup> Locus of Control proposes that individuals view the achievement of goals, rewards, or behavior-outcomes as being either within or outside of their control. The following orientations have been identified: the internal locus of control, the external locus of control, and the external locus of control by chance. The internal locus of control is a belief that the attainment of a goal is the result of one's own actions. The external locus of control is a belief that the attainment of a goal is the result of other people or things more powerful than oneself. A belief that achieving a goal results from chance, fate, or luck is known as an external locus of control by chance.

A study done by Eden et al.<sup>30</sup> used the Locus of Control Theory to gain insight into individuals' perceptions of their willingness and ability to achieve nutrition behavior changes. The study was conducted in Israel, where 127 healthy men and women between the ages of 18 and 48 were randomly selected. A questionnaire was developed using the Multidimensional

Health Locus of Control scale in order to examine the internal and external factors controlling dietary and health habits. The questionnaire was first pilot tested in the United States to ensure workability. The questionnaires were analyzed using frequency distributions to determine general trends in the data. Factor analysis was performed on the locus of control items to establish distinct groups of responses. Hierarchical cluster analysis was done on the rated responses in order to obtain an arrangement of subjects according to their responses.

The results of the study were based on 105 questionnaires. The rest were omitted due to failure to meet acceptability requirements. The factor analysis resulted in 8 factors, rather than the 3 distinct factors defined by the Locus of Control Theory. These 8 factors, however, were not identified by the authors. The hierarchical cluster analysis revealed that there were five clusters according to similarity of responses. The first had no significant demographic features. The second consisted of mostly women who tended to disagree with externally oriented statements. The third cluster consisted of 50% Yemenites who agreed almost equally with internally and externally oriented statements. The fourth and fifth clusters were combined due to low subject numbers and were mostly men who disagreed with internally oriented statements.

The authors<sup>30</sup> concluded that the Locus of Control Theory was a useful tool in determining perceived control of nutrition behavior, but that it was too narrow as a construct. The results indicated a distinction between eating habit outcomes and the forces that control behavior. In other words, this study illustrated the possibility of separate beliefs on the factors controlling an outcome and factors controlling actual behaviors. The Locus of Control Theory fails to discriminate between outcome expectations and self-efficacy and therefore may not be the best choice for consideration by nutrition educators. Further studies utilizing this theory should be done in the United States before final conclusions can be drawn.

Rosenstock et al.<sup>31</sup> showed how the Health Belief Model, Social Cognitive Theory, Locus of Control, and self-efficacy interrelate. In a comparison of the Health Belief Model and the Social Cognitive Theory, it was concluded that the major difference was two contributions of the Social Cognitive Theory that were not included in the Health Belief Model. The first was the mention of several sources of information for obtaining expectations, for example observational learning. The second was the distinction between self-efficacy and outcome expectation. Rosenstock et al.<sup>31</sup> also noted the difference between Locus of Control and self-efficacy. Locus of control is a generalized concept about the self that may relate more to outcome expectations than to efficacy expectations. Self-efficacy, however, is thought to be situation-specific and determined by an individual's beliefs about his/her abilities in specific settings. It was suggested that Locus of Control and self-efficacy interrelate, requiring an internal locus of control and positive efficacy expectation for a specific behavior to be achieved. This concept supports the inconsistent findings of studies utilizing Locus of Control but disregarding self-efficacy.

Rosenstock and colleagues<sup>31</sup> concluded from the comparison of four health behavior concepts that it should not be assumed that a client expressing a desire to change has enough incentive to make that change, is sufficiently threatened, believes outcomes can be influenced by his/her behavior, and does not face barriers preventing change. In other words, it may be necessary to consider a multitude of theories when developing health education efforts. The authors expressed the belief that interventions should be targeted to the identified needs of the

population of interest, concentrating on health beliefs of the population and including self-efficacy.

In addition to understanding the qualities contributing to behavior change, it is also necessary to understand when behavior changes occur in order to improve health education efforts. Prochaska et al.<sup>6</sup> have defined various stages of behavior change and emphasized the importance of designing programs that are tailored to the appropriate stage of change. The stages of change in Prochaska's model are pre-contemplation, contemplation, preparation, action, and maintenance. Precontemplation is the stage at which there is no intention to change behavior. It is common for individuals in this stage to be unaware or under-aware of their problems. Contemplation is the stage at which people are aware that a problem exists, but have not yet made a commitment to change their behavior. Preparation has been defined as the stage at which individuals are intending to take action in the next month, but have unsuccessfully taken action in the past year. In the action stage, individuals modify their behavior, experiences, or environment in order to overcome their identified problem. When individuals work to prevent relapse and achieve a continuation of behavior change they have reached the maintenance stage of change. Prochaska et al.<sup>6</sup> recognized the spiral pattern to behavior change, with relapse and recycling through the stages occurring frequently. Segments of a population may differ in what stage of change for a particular behavior they predominantly represent. For example, it has been determined that the only 10 to 15% of addicted smokers are in the action stage, while 50 to 60% are in the precontemplation stage. More research is needed to determine the predominant stage of change when considering dietary changes, if different populations are in different dietary stages of change, and the specifics of how people progress from precontemplation to action.

Different processes of change have also been identified by Prochaska's Stages of Change Model. Such processes illustrate important relationships between an individual's stage of change and the processes he/she will use to progress to the next stage of change.<sup>32</sup> In other words, the processes of change define how behavior change can move from one stage to the next. When one has moved from precontemplation to the contemplation stage, the following processes of change have most likely been emphasized: consciousness raising, dramatic relief, and environmental reevaluation.<sup>6</sup> Consciousness raising is defined as having more information about one's problems. Dramatic relief involves expressing one's feelings about his/her problems and possible solutions. Being able to assess how a problem affects a person's physical environment is called environmental reevaluation. These processes of change are targeted through interventions using observations, confrontations, interpretations, psychodrama, role playing, and empathy training.

The process of change emphasized when progressing from contemplation to the preparation stage is called self-reevaluation and involves identifying one's feelings and thoughts about oneself with respect to a problem. Interventions targeting this process are as follows: value clarification, imagery, and corrective emotional experiences. Progressing from the preparation to action stage involves a self-liberation process when the individual chooses and commits to a behavior change. Decision-making therapy and commitment enhancing techniques have been identified as appropriate interventions targeting this process. Reinforcement management, helping relationships, counterconditioning, and stimulus control are processes of change that are emphasized when continuing from the action to the maintenance stage of change. Reinforcement management involves rewarding one's self or receiving rewards from others for



making changes. The helping relationships process involves being open about one's problems with a confidant. Using substitution behaviors in place of problem behaviors constitutes the counterconditioning process. Avoiding things that elicit problem behaviors is the stimulus control process. An integration of the processes and stages of change is necessary to develop appropriate behavior change interventions. However, an assessment of a person's stage of change should be the first step.

Prochaska et al.<sup>7</sup> investigated the generalization of the Stages of Change Model across 12 problem behaviors. The behaviors studied were smoking cessation, quitting cocaine, weight control, high-fat diets, adolescent delinquent behaviors, safer sex, condom use, sunscreen use, radon gas exposure, exercise acquisition, mammography screening, and physicians' preventive practices with smokers. These behaviors were viewed as being similar in that they all have important health consequences, require long-term changes, and are relevant to large numbers of people. Different procedures were used to recruit for each category of subjects. A questionnaire pertaining to the appropriate behavior change was given to each subject and used to assess the stage of change. A cross-sectional comparison of the results from each category was then performed.

The results showed a clear pattern across the 12 problem behaviors studied. There was a relationship between the "pros" and "cons" identified by the subjects and the determined stage of change for each behavior. The pros of changing a behavior were higher for subjects in the contemplation stage than the precontemplation stage ( $p = .0002$ ). However, these two stages showed no pattern when considering the cons of changing. Conversely, when comparing the contemplation and action stage, there was a pattern of differences in the cons of changing. Therefore, it was concluded that the crossover between the pros and cons of changing existed in the contemplation stage. The authors<sup>7</sup> suggested that increasing the pros of changing should be a goal of intervention programs.

Prochaska<sup>10</sup> investigated the hypothesis that a greater increase in the pros of a healthy behavior change compared to the decrease in the cons would be more likely to lead to progression from precontemplation to action. A study on 1,466 smokers was combined with the previously mentioned study on the stages of change across 12 problem behaviors. The amount of increases in the pros and decreases in the cons during changes from precontemplation to action was analyzed across both studies. The results of both studies provided strong support for the hypothesis. The author therefore labeled the increase in the pros of a health behavior the strong principle and the decrease in the cons of a health behavior the weak principle. However, no specific suggestions for focusing programs towards pros or cons of health behaviors were provided.

Greene and colleagues<sup>33</sup> conducted a study using the Stages of Change Model to develop an algorithm to define a person's stage of change for reducing dietary fat to 30% of energy or less. The study was divided into two phases using one sample to develop the instrument and another for validation. The instrument development questionnaire was randomly sent to 2,024 noninstitutionalized adults living in Rhode Island, 614 of which were returned. Responses to the questionnaires were classified into stage of change categories. Subjects avoiding high-fat food for more than 6 months were classified in the maintenance stage of change and for less than 6 months

in the action stage. Subjects not avoiding high-fat foods, but planning to start in the next 30 days were classified in the preparation stage. Contemplation stage subjects were those planning to start in the next 6 months. Subjects placed in the precontemplation stage were those not intending to start avoiding high-fat foods in the next 6 months. The items in the questionnaire that showed no significant differences in the proportion of people in any particular stage of change were then compiled to create a second questionnaire that was tested on a separate sample of subjects. This questionnaire was distributed to 192 students and staff members at a university and completed by 130 subjects. Fat intake of both samples was determined using a food frequency instrument.

Results showed that the two samples were significantly different in fat intake ( $p < .001$ ), Sample 1 being 35% energy from fat and Sample 2 being 32% energy from fat. A relationship was found between the decrease in the fat intake of the subjects and their identified progression between the precontemplation through maintenance stages of change. For example, both samples showed a correlation between high fat intake ( $> 30\%$ ) and classification in one of the preaction stages (93% in Sample 1 and 87% in Sample 2.) However, the questionnaire was found to be insensitive with respect to subjects consuming a low fat intake of less than 30% energy from fat. The authors<sup>33</sup> concluded that the newly developed algorithm was useful in classifying the stages of change of persons consuming greater than 30% of energy from fat. Therefore, it could be used in the future to identify the stage of change of subjects exceeding the recommended level of fat intake, which occurs in 86% of the US population. Education strategies could then be targeted to the appropriate stages of change.

#### Behavior Change Models: Summary

The behavior change models relevant to health behavior changes, specifically in the area of nutrition, contribute interrelating concepts that may be useful in program development. These concepts illustrate the importance of knowing the following about an individual or group of individuals: attitudes toward a behavior, environmental influences, perceived threats of a condition, outcome expectations, incentives, locus of control, self-efficacy, and stage of change. Past research has indicated that certain populations can be identified as more likely to be in preaction stages of change.<sup>6,33</sup> Interventions targeted to these populations should focus on increasing their “pros of changing” in order to progress through the stages of change.<sup>7,10</sup> In particular, to move from precontemplation to contemplation the following processes of change should be emphasized: providing more information about problems, encouraging the expression of feelings about those problems, identifying possible solutions, and allowing for an environmental reevaluation.<sup>32</sup> However, the initial step is to establish the stage of change prevalent among a targeted population.

#### Behavior Change Factors

The American Dietetic Association conducted a survey of American dietary habits in 1993 to determine the extent of Americans' understanding about nutrition and health.<sup>34</sup> One thousand telephone interviews were conducted in the US with adults aged 25 and older and representing all US demographic segments for gender, age, race, and geography. Results of this

survey showed that Americans have recognized the significance of good nutrition. The primary reason for concern given by 69% of the population was general health maintenance. Second to health maintenance was a concern stated by 32% of the population about maintaining or losing weight. Although nutrition was rated as at least moderately important by 82% of those surveyed, only 39% expressed they were personally doing all they could to achieve a good diet.

The ADA survey revealed that women rate nutrition higher in importance and take greater care in selecting foods than men. The same was shown to be true when comparing people aged 35 years and older with people younger than 35 years. Out of all of those surveyed, 50% reported extreme care with regard to fat intake. Saturated fat, vitamins and minerals, cholesterol, and sodium were reported as important considerations for 40-50% of respondents (in order from greatest to least.) However, approximately two thirds of those concerned about fat and cholesterol consumption monitored fat intake only in a general sense.

Although there has been an increase in the awareness of the importance of nutrition, no increase in the knowledge about nutrition has been seen. For example, although 50% of those surveyed expressed concern about fat, only 9% were aware of the dietary recommendation for percent of energy from fat. A common misconception that was reported was that healthy eating takes too much time and sacrifice, which may stem from a lack of knowledge on the subject. Another explanation of the gap between awareness and behavior change may be that taste overrides a healthy diet when selecting foods. Morreale and Schwartz<sup>34</sup> concluded that the public's increased awareness about nutrition can help nutrition education efforts greatly once further understanding on the gap between awareness and action has been achieved.

A study done by Smith et al.<sup>35</sup> investigated a possible relationship between dietary behavior change and socioeconomic status (SES). Also considered were beliefs that diet influences disease, confidence in the ability to maintain healthy eating, feeling of control over food consumption, nutrition knowledge, and stage of readiness for dietary change. Electoral rolls from the suburbs of an Australian city were used to randomly select 487 participants. Only suburbs with a high or low SES were chosen to ensure an equal representation from both groups. Subjects were divided into an intervention and control group, both of which received a baseline dietary assessment consisting of a food-frequency questionnaire and one hour interview. The intervention group was asked to set dietary behavior change goals and to monitor their progress during three 7-day periods over the 3 month intervention. Change in usual food intake, nutrition knowledge, diet-related beliefs, confidence about making changes, and dietary stage of change were also assessed.

The results showed that there were no significant differences in SES or gender between subjects who made two or more dietary changes and those who made less than two changes. However, subjects who made two or more dietary changes were determined to have significantly greater beliefs that diet plays a causative role in blood cholesterol, obesity, and heart disease; more initial nutrition knowledge; greater confidence in making dietary changes; and more motivation due to cholesterol measurements.

The authors<sup>35</sup> concluded that low SES did not result in a decreased ability to change dietary behavior. However, they did note that it was more difficult for the low SES group to

participate in the intervention. This study did not assess whether or not the lower participation rate was due to a greater lack of motivation. The authors<sup>35</sup> noted that the subjects of this study were not a true representation of the population due to having healthier dietary intakes, higher SES, and stronger beliefs in the need for a healthy diet. These factors may have skewed the results.

A study conducted by Contento and Murphy<sup>36</sup> compared adults who had made positive changes in their diets to those who had not in order to identify psycho-social influences on dietary change. The psycho-social factors analyzed were locus of control and self-efficacy, concepts taken from the Health Belief Model. Recruitment took place in two grocery stores in a middle-class suburb of New York, involving 117 predominantly white middle-class subjects. Subjects that reported a decrease in consumption of red meat and/or butter and one additional change suggested by the Dietary Guidelines were placed in the “self-change” group. Subjects that did not meet these requirements were placed in the “no-change” group. The two groups were given questionnaires that focused on confirming the group placement of each participant, identifying 12 psycho-social factors, and demographic information.

Results showed that 56% of the participants were self-changers and 44% were non-changers. A distinct pattern was found when comparing the 12 psycho-social factors and the existence of dietary change. The self-changers had a significantly greater perception of susceptibility to diet-related diseases, benefits of preventative action, and overall health concern when compared to the non-changers ( $p < .01$ ). In addition, the self-changers were affected more by the opinion of significant others, had greater self-efficacy scale ratings, and lower chance locus of control ratings than the non-changers ( $p < .01$ ). Out of the demographic variables considered, older participants and females were more likely to be changers than younger participants and males ( $p < .01$ ).

The authors<sup>36</sup> concluded from the findings of this study that perceived threat was a key factor in the issue of dietary change. It was emphasized that nutrition educators should develop strategies for individuals to be able to recognize their own personal health risks. However, the subjects of this study were mostly white middle-class adults and the results may not be applicable to other populations.

Lopez<sup>37</sup> conducted a similar study in which an instrument was developed to measure the psycho-social influences among low-income women affecting dietary behavior. Focus groups were conducted with low-income women attending health clinics in order to discover how they made food choices and talked about food. This information was needed in order to determine the topics and language appropriate for the development of the questionnaire. The three psycho-social scales used were comfort factors, familial and cultural influences, and environmental issues. Demographic information and a rating of nutritional risk were collected; however, knowledge of nutrition, health, appetite, and taste were excluded from the study.

The questionnaire was pilot tested on 55 women attending clinics at a community health center. The subjects were predominantly black, an average of 28 years of age, and all of low-income status. The results could not be generalized to the entire population due to the pilot nature of the study, however strong patterns were discovered. A majority of the subjects

reported that liking food too much or eating due to boredom were barriers to dietary changes. In addition, a majority reported that food choices were largely influenced by family preferences. When considering environmental influences, the greatest agreement was that seasonality and convenience in food preparation largely affected food choices. The participants in this study did not consider the availability of foods as a limiting factor. The authors<sup>37</sup> concluded that the questionnaire developed was only useful with women considering dietary change. It was noted that more research is needed using larger samples and including subjects less ready for change.

### Behavior Change Factors: Summary

Greater public awareness about the importance of nutrition has not led to significant changes in dietary behavior.<sup>34</sup> Research has, therefore, been conducted to determine what factors, other than knowledge, influence dietary behavior changes. Results from such investigations have shown that socio-economic status does not result in a decreased ability to change behavior.<sup>35</sup> However, individuals of low SES may have more difficulty participating in interventions and possibly less motivation to change. Contento and Murphy<sup>36</sup> identified perceived threat as a key factor in dietary change. Other factors that have been implicated are age and gender.<sup>34,36</sup> In addition, beliefs about the dietary role in disease, initial nutrition knowledge, confidence in making changes, and degree of motivation have been associated with dietary change.<sup>35</sup> Environmental influences, self-efficacy, and locus of control have also been shown to be factors.<sup>36</sup> Lopez<sup>37</sup> illustrated that family preference can also play a role. Research must now be conducted to identify more specific behavior change factors within subgroups of the population.

### Social Marketing

An article by Lefebvre and Flora<sup>38</sup> reported the view that classic health educational approaches may not be the most effective when attempting to reach whole communities or segments of society. Social marketing principles have been suggested to be useful tools for making health promotive changes in entire populations. Wallack<sup>5</sup> defines social marketing as "a social-change management strategy involving the design, implementation, and control of programs aimed at increasing the acceptability of a social idea or practice in one or more groups of target adapters." The basis for using social marketing to promote health behavior change is that the change will occur through persuasion and voluntary action.

Consumer orientation is an essential social marketing principle and involves addressing the client's needs and interests in the development and promotion of products and services.<sup>38</sup> In addition, it is necessary to facilitate the voluntary exchange of resources. When considering health education, client resources may include money, time, physical or cognitive effort, lifestyle and psychological factors, and/or social contacts. The resources that health educators may be offering are technical expertise, knowledge, ideas, products, and/or services. However, as Lefebvre and Flora<sup>38</sup> discussed, it is rare that intervention efforts are viewed in terms of an exchange process. In order to develop and improve nutrition education efforts, an approach must be taken that focuses on the preferences, values, beliefs, motivation, and knowledge of the target population.

Additional components to social marketing are an audience analysis and the segmentation of the target population into useful subgroups. In concert with the consumer orientation philosophy, the population must be analyzed to identify its needs. The cost of addressing those needs must then be calculated so that a cost-beneficial program can be developed. Programs may be the most effective if directed to homogenous segments within a population. In addition, the communication channels that the target population perceives as being the most influential must be considered. Other considerations addressed by a social marketing approach include creating incentives for behavior change, gaining knowledge of where people are likely to receive public messages, and conducting formative research in program design. Lefebvre and Flora<sup>38</sup> remarked that, although the social marketing principles have much to offer the arena of public health change, certain limitations must be recognized. Social marketing campaigns must be continuous, for a brief marketing episode is not likely to result in substantial changes. In addition, social marketers must address the existence of socio-economic constraints, lack of supportive public policies, and a lack of consensus or coordination between health agencies and professionals.

Israel et al.<sup>39</sup> developed operational guidelines for social marketing projects in public health and nutrition. These guidelines state that "social marketing research is never an end in itself, but rather a continuous process of gathering feedback from the target audience in order to feed forward to ongoing campaign activities." In other words, a successful design of methods and materials depends upon insight into a group's knowledge, attitudes, and practices. Initially it is necessary to identify the target audience; their health and nutritional status; their knowledge, attitudes, and practices regarding health services; who informs their choices about health related behavior; and what behavior changes are attainable.

Wallack<sup>5</sup> suggested that the use of social marketing in public health promotion relies on three assumptions: that individual behaviors are primarily responsible for social and health problems, that behavior changes can occur on a large-scale, and that these changes can be maintained over time. It was emphasized that the social and economic contexts in which behavioral choices are made are considerations as important as individual behaviors. An editorial written by Heede and Pelican<sup>40</sup> stated the opinion that marketing is an inadequate and inappropriate model for nutrition education. The Theory of Communicative Action was discussed in order to assert that receivers of information should have the opportunity to question the information provided. In addition, it was commented that marketing campaigns do not encourage the intellectual development necessary for learning.

In response to the concerns expressed about using social marketing as a nutrition education tool, Lefebvre et al.<sup>41</sup> published an article reviewing these issues. It was stated that education is only one aspect to health promotion and that information alone is not enough to bring about large-scale behavior change. Social marketing is able to address many of the factors affecting behavior change that have been identified by various behavior change models; for example, belief that the behavior change will affect personal health, encouragement from others, and a feeling of self-efficacy. The authors<sup>41</sup> believed that education is only one factor in a multidimensional process resulting in behavior change. Social marketing has been proposed as a tool for health promotion and was not meant to take the place of health education.

Experiences from a variety of large-scale studies have shown that the principles and techniques of social marketing can enhance effective health education programs. In a study conducted by Huebner et al.,<sup>42</sup> the survey method of social marketing research was used to determine the educational priorities of a cardiac patient population. The survey analyzed the group's interest in the Dietary Guidelines, the group's perception about the difficulty of achieving each recommendation, and the preferred instructional method and educational content. Thirty cardiac patients at a teaching hospital were given questionnaires to fill out on their own. The questionnaires were collected three days later. The questionnaires were evaluated using frequency distributions to determine any trends in educational preferences.

Seventy-three percent of the subjects were familiar with the dietary guidelines. Most, however, had never received any form of nutrition instruction (no percentage was reported.) Of the patients familiar with the dietary guidelines, 86% reported following one or more ( $p < .01$ ). Results of rating the guidelines in order of interest showed that there was the least interest in meeting the guideline for carbohydrates. However, no guideline was identified as the most or least likely to be followed or the most difficult to comply with. The most popular educational topics were the physiology of heart disease and eating out. The most favorable method of learning was self-instruction booklets ( $p < .01$ ). The authors<sup>42</sup> concluded that the survey method taken from social marketing practices was an effective means of assessing educational priorities of a cardiac patient population.

White and Maloney<sup>43</sup> reported on a social marketing research study conducted by the Office of Disease Prevention and Health Promotion of the Public Health Service to discover how populations experiencing high disease rates perceived health and behavioral risk factors. The study focused on the behavioral risk factors of diet, exercise, and weight control. Focus group interviews, commonly used in marketing research, were employed to determine the perceptions of a high risk population. Twenty-four focus group interviews were conducted in nine major US cities. Approximately nine participants were present at each interview and met the following criteria: they were between the ages of 25 to 64, had 12 or fewer years of education, and had a family income between poverty and the median level. African American, White, and Hispanic populations were represented at eight focus group interviews.

The focus group findings showed that most of the participants considered being healthy as important, rating it among the top three life priorities out of 16 provided. They also had a general awareness of what was needed to be healthy. In addition, most seemed to be interested in "doing better," while only a few were content at their present state. The female and older participants seemed to express more of an interest than the male and younger participants. A notable finding was that most participants felt they had control over becoming sick, but that chronic diseases were associated with heredity and fate. In addition, many misconceptions about healthy diets were expressed. Participants had mostly sedentary lives and cited lack of time and money as barriers to exercise. The authors<sup>43</sup> concluded that the social marketing technique of focus group interviews was an effective assessment tool. The results of the study yielded clear advice for health messages such as the recommendation that presenting information on what to eat, rather than what to avoid, may be more appealing and effective.

Wechsler and Wernick<sup>44</sup> proposed a social marketing campaign to promote the use of low-fat milk in a low-income New York City neighborhood. Latino mothers of children between the ages of 2 and 12 years were the target population. Through an initial assessment, it was determined that local residents had many misconceptions about low-fat milk. Based on knowledge of these misconceptions, flyers, colorful posters, and magnets were printed in English and Spanish. The materials were distributed widely across the community. In addition, media publicity, taste tests on busy streets, discount coupons, and a low-fat milk label collection contest were employed. During a second phase of the campaign, local institutions serving only whole milk were encouraged to provide low-fat milk. The campaign was assessed as being extremely successful, although no quantitative measure of the success was reported.

The success of health promotion programs based on social marketing philosophies has been documented in the literature. Some of these programs are as follows: the National High Blood Pressure Education Program, the Stanford Three-Community Study, the Pawtucket Heart Health Program "Know Your Cholesterol" Campaign, and the Stanford Five-City Project Smokers' Challenge II.<sup>38</sup> It is important to recognize social marketing as a potential problem-solving process that may offer new and original ways to deal with health and social problems.<sup>41</sup> Social marketing is an attempt at helping entire populations learn in ways they can understand and relate to, with the hopes of achieving behavior change.

### Social Marketing: Summary

Social marketing has been shown to be a useful tool for making changes in entire populations.<sup>38</sup> Concepts of social marketing include consumer orientation, audience analysis, and segmentation of target populations. These concepts can be used as tools for health promotion and to enhance health educational efforts.<sup>41</sup> It has been documented in the literature that marketing survey methods and assessment tools like focus group interviews are effective for assessing health educational priorities and useful in campaign development.<sup>42,43</sup> To be effective, social marketing campaigns must be continuous and considerate of socio-economic constraints.<sup>38</sup> In addition, public policy and the degree of consensus among health agencies and professionals must be taken into account.

### Focus Groups: An Assessment Instrument

To gather data for use in planning a social marketing effort, a number of qualitative research techniques, such as focus group research, can be helpful.<sup>39</sup> Focus group interviews have often been used to assess the attitudes and behaviors of populations targeted for nutrition education interventions. Group interviews originated from the practice of psychotherapy. It has been theorized that the group interview process stimulates a more spontaneous response than an individual interview. Being in a group allows for a feeling of security that facilitates discussion of unconscious or suppressed themes that may be too threatening to bring up in an individual interview. Focus groups are advantageous for this reason and also use small samples from a population, requiring little expense. They are limited, however, in that they cannot be used to make quantitative measures or to make generalizations about an entire population.



The purpose of a focus group is to gather perceptions, feelings, opinions, and thoughts about a particular topic. As stated by Krueger,<sup>9</sup> focus groups result in candid portraits of people's perceptions. Although a consensus on the topic from an entire population cannot be reached, topics of interest to the target population, prominent issues, and key questions can be identified. People in the group may influence each other with their comments, resulting in a shift of opinions during the course of a discussion. However, this is useful to determine opinions held with absolute certainty versus those that are more easily changed. Although focus group research is subjective by nature, it has been shown to be a valid assessment tool in numerous studies.<sup>45</sup>

Crockett et al.<sup>46</sup> assessed the beliefs of older rural Americans about nutrition education using the focus group approach. Through this technique, information about influences on opinions of seniors, health behavior changes, eating behavior changes, interest in various nutrition education topics, and preferred educational channels and approaches were determined. Five focus group interviews were conducted throughout rural North Dakota. A stipend of \$10 to \$15 was offered as an incentive to participate. A total of 68 independent-living men and women, 60 years of age or older, were involved in the study. There was a broad representation of ethnic and economic groups. The group interviews followed a discussion guide containing eight main questions and subsequent probe questions. Audiotapes of each interview were transcribed and used for analysis. A condensed version of responses to each question was prepared and used to make summaries on each topic.

Results showed that the opinions of medical professionals and family members on health advice were highly valued by participants. They also felt that the elderly were making healthy behavior changes and were motivated by concerns for their health and a desire to feel good. However, no consensus was reached on the issue of whether senior citizens were interested in dietary changes. Suggestions provided for reaching the older population were the use of mass media, social gatherings, demonstrations, workshops, and one-on-one instruction. The authors<sup>46</sup> concluded that focus group interviews were a very helpful tool in developing nutrition education interventions.

Reed<sup>47</sup> utilized focus groups to identify desirable features of nutrition programs for low-income mothers of preschool children. The PRECEDE-PROCEED model and Social Cognitive Theory were used as a basis for this research. An assessment of the predisposing, enabling, and reinforcing factors was conducted, which focused on the predisposing factors of informational needs and attitudes. Preferred methods of information delivery and ways to reduce barriers were the enabling factors examined. Encouraging influences were analyzed as the reinforcing factor. Mothers of children attending three Head Start centers in Louisiana were asked to participate. The interviews were videotaped and later transcribed. Dominant themes were identified independently by the moderator and assistant and then cross-checked. Generalizations that failed to apply to all three focus groups were eliminated.

A total of 20 women participated in the focus group interviews. Approximately half were between the ages of 21 to 29. Eleven were African American, 12 were married, 14 were unemployed, and 10 had annual family incomes of less than \$10,000. Examples of some informational needs that were discovered were learning how to read food labels, learning about

correct serving sizes, and correcting certain food misconceptions. Information on health problems and diseases was determined to be a motivational factor for dietary change. Barriers to change were found to be receiving contradictory information, the lack of support from spouses, and the limited tastes of children. Suggestions were made to involve children in food preparation activities during nutrition education interventions. Reed<sup>47</sup> concluded that nutrition education efforts targeting low-income mothers should include predisposing factors such as age-appropriate food activities and family communication skills. This study illustrated the effectiveness of focus group research in nutrition education development.

An investigation conducted by Iszler and colleagues<sup>48</sup> assessed the general population's attitudes about cholesterol screening, experiences with dietary behavior changes, and reactions to several cholesterol reduction interventions. Four focus groups were conducted using the general public of North Dakota and Minnesota. The focus group participants were categorized according to age, gender, and the presence or absence of children in the home. The subjects were recruited via telephone invitations and were informed of a \$20 incentive for participation. Two investigators independently analyzed the interview transcripts and came to a consensus to create a summary of findings.

There were 7 to 8 participants at each focus group meeting. Most of the participants believed that cholesterol levels were determined by genetics and, therefore, not controllable. Older men and women seemed to have a stronger concept that making dietary changes would lower serum cholesterol. A majority of participants were concerned that they would have to give up all red meat. Barriers to dietary change cited by many women with young children were pressure from their children to buy certain foods and lack of spousal support. However, both men and women with children expressed that providing nutritious foods for their children was a strong motivator in eating healthy. Confidence in dietary advice provided by physicians was high among the men but low among the women. The most favored intervention was home-based learning through workbook mailings, along with weekly or biweekly visits with a health professional. Video tapes were also favored by most of the participants. The authors<sup>48</sup> concluded that the focus group interviews provided applicable background information in the development of programs targeting individuals, networks, and organizations.

Hartman<sup>49</sup> conducted 5 focus group discussions with EFNEP participants. The research facilitated the development of a low-fat nutrition education program for a low-literacy audience. Participants received a \$40 grocery store gift certificate for attending. There were 39 female and 2 male participants, most of whom were African American, that were recruited from three community centers in Minnesota. Transcripts were analyzed individually by two investigators and interpretations were discussed until a consensus was reached.

Results of this study showed that participants were most motivated to make dietary changes by health concerns, desire for weight loss, and desire to help their families. Time, money, family preferences, lack of cooking interest and skill, and insufficient knowledge were commonly mentioned barriers to change. A preference existed for hands-on activities and interactive experiences as avenues for learning. Most participants felt that lectures were an ineffective means of receiving nutrition information.

Hartman<sup>49</sup> concluded that low-income populations desire information that is understandable, practical, and suggestive rather than directive. It was recommended that future focus group research using low-income subjects deviate from the advised recruitment practices. Due to the difficulty in recruitment and attendance in this study, the use of pre-formed groups and familiar settings were suggested.

### Focus Groups: Summary

Focus group interviews can be used to assess attitudes, perceptions, feelings, and behaviors of a representative subset of a population.<sup>39</sup> Numerous studies have shown that focus groups can be a useful tool in the development and assessment of nutrition education interventions.<sup>45,46,47,48,49</sup> One such study found that nutrition education efforts targeting low-income mothers should address predisposing factors.<sup>47</sup> Another study found that health concerns, weight loss, and the desire to help one's family could all be motivational factors for dietary change.<sup>49</sup> In addition, it was determined that hands-on activities and interactive experiences were preferred methods of learning for those focus group participants. No comparable research was available on the beliefs, perceptions, and attitudes of food stamp recipients.

### Reported Food Behaviors

Assessment methods of EFNEP and other nutrition education programs have included mainly 24-hour food recalls measuring intake of the number of servings from the food groups of the Food Guide Pyramid and selected nutrients.<sup>4</sup> Advantages to using 24-hour food recalls have been shown to be the ability to quantify data, the lack of an opportunity for subjects to modify their behaviors, the relatively short recall period, and the ability to probe for missing data.<sup>50</sup> Disadvantages to 24-hour food recalls that have been identified are the need for the subjects to have good memories, the possibility that a desire to please the interviewer could alter a recall, and the prospect that a short period of food intake may not represent an individual's usual intake. The analysis of 24-hour food recalls has been documented as a valid method for assessing the average nutrient intake, food intake, or food habits of groups for comparison with other groups.<sup>50</sup>

Specific food choices within food groups and information on what specific foods are being purchased by low-income individuals and families, specifically those using food stamps, has not been addressed. Cronin et al.<sup>51</sup> stated that relatively few studies have reported the usage of specific foods among segments of the population. It was also noted that more detailed information about food usage practices of individuals and groups would help in establishing realistic nutrition objectives.

Using the 1977 to 1978 Nationwide Food Consumption Survey (NFCS), Cronin and colleagues<sup>51</sup> reported the usage and average consumption frequencies of foods by specific segments of the US population. The NFCS data were collected from 15,000 households nationwide that included household food usage and individual dietary intake for a three day period. The information was collected once in each of the four seasons for a period of one year. Approximately 9% of the NFCS population were excluded from the analysis due to incomplete

3-day food records or other predetermined criteria. Subjects were separated according to race, age, sex, region, urbanization, and household income. Foods were categorized into 142 groups and subgroups. Cross tabulations were constructed with users and non-users of each food group for each demographic variable and season.

Findings were reported according to the five major food groups. Households with incomes greater than \$20,000 were reported to have a greater frequency of fruit and vegetable consumption. African Americans were shown to consume an average of 2.3 fruits and vegetables per day compared to 2.9 for the white population, with neither meeting the recommended five daily servings. Fruits were shown to be used less frequently than vegetables. Potatoes were shown to be the most widely used vegetable, consumed by 78% of all subjects. An average of 2.4 items from the breads and cereals group were consumed by all subjects per day. Male and non-white subjects tended to consume more breads and cereals than females and whites, respectively. Yeast breads were the most popular item from this food group. Whole-grain breads were used by 22% of all subjects. Dairy foods were consumed by 80% of the African American population, compared with 93% of the rest of the subjects. However, usage declined with increasing age. Whole milk was used more often than low-fat or skim. When considering the meat and meat substitute food group, beef was the most common red meat. African Americans were less likely to use beef and more likely to use poultry, however. From the limited extra food group, 85% of the population reported consuming fats, which was believed to be under-reported in the study. Consumption of alcohol and sweets were also thought to be under-reported.

It was concluded that when a specific food group was consumed by a large percentage of the population, there was little variation in consumption among different demographic groups. A multivariate analysis may better explain certain patterns that were observed. This type of information may be useful in developing more focused nutrition interventions.

A study conducted by Patterson and Block<sup>52</sup> examined the consumption of foods thought to be harmful or protective with respect to the development of cancer. As in the previous study, a national survey [the second National Health and Nutrition Examination Survey (NHANES II)] was analyzed. From NHANES II, the dietary intakes of 11,658 American adults were examined and separated by race, sex, and age. Each group was then divided by income level. Food groups were based on the Dietary Guidelines and the American Cancer Society recommendations.

The results showed that diets were closer to the guidelines for females than males, for African Americans than Whites, and for older than younger Americans. Vegetables were consumed more frequently than fruits; however, consumption of both was under the recommended amounts. Eighteen percent of the subjects consumed at least one serving of cruciferous vegetables, cabbage and greens being the most common. Twenty percent of the subjects consumed at least one serving of fibrous vegetables. Subjects classified as high income consumed more vegetables and fruits than those in the low income group. High fiber cereals or whole grain breads were consumed by 16% of all subjects. Red meat and fish/poultry were consumed by 55% and 33% of the subjects, respectively.

Patterson and Block<sup>52</sup> concluded that the results of this study confirmed the findings of other nation-wide studies, that Americans do not consume adequate amounts of fruits, vegetables, and whole grain cereals. In addition, these foods were consumed in larger proportions by subjects in the high-income category. More detailed information on what foods different groups of Americans do and do not eat could help in deciding which foods to promote to improve overall nutrition.

A similar study done by Morris et al.<sup>53</sup> described the consumption of foods assigned to specific food groups that can affect cancer risk among a sample of working adults. Self-administered surveys were completed by 2,857 workers from 16 different worksites. The survey included information on sex, race, age, education, occupation, and food frequencies. Food items were then classified into 15 food groups, previously established as having an association with diminished or enhanced cancer risk.

Results were not reported on differences among races due to the sample population being 94% white. Findings indicated that men consumed more vegetables, red meat, and luncheon meats than women ( $p < .01$ ). However, women were shown to consume more cruciferous and deep yellow vegetables, vegetables high in vitamin A, fruits in general, poultry and fish, and fats ( $p < .01$ ). In general, consumption of protective foods, except for those high in fiber, increased with age. The authors<sup>53</sup> concluded that differences among sex, age, education, and occupational type were associated with variation in consumption of foods that play a role in diminishing or enhancing cancer risk.

#### Food Behaviors: Summary

Considering the findings of the articles reviewed pertaining to the differences among certain subgroups of the US population in consumption of specific food categories, more research is needed to pinpoint exact dietary characteristics of each subgroup. Such information would be useful in establishing nutrition objectives and in targeting nutrition interventions appropriately.<sup>51</sup> It has been suggested that there is little variation among different demographic groups in the consumption of foods that are used by a large percentage of the population. However, much research is available in the literature that contradicts this. For example, Patterson and Block<sup>52</sup> documented that fruits, vegetables, and whole-grains are consumed less by low-income families. In addition, Morris et al.<sup>53</sup> illustrated differences in the consumption of foods associated with increases or decreases in cancer risk by the following categories: sex, age, education, and occupational type. However, none of the literature reviewed specifically assessed food stamp clients.

#### Conclusion

Members of low-income households are at risk for many diet-related conditions, chronic diseases, and high health care costs. However, few of the studies reviewed focused solely on low-income populations, specifically food stamp clients. Households receiving food stamps have been targeted for revised and new nutrition education interventions. The revision and development of such programs is dependent upon an accurate needs assessment of the

population. Furthermore, the behaviors, attitudes, and practices of those receiving food stamps must be determined. The stage of change of the targeted group and the specific food choices and practices also need to be assessed. Through these efforts, it will be possible to make useful program appraisals and recommendations.