Chapter 2: Review of Literature

Members of low-income households are particularly likely to consume inadequate diets and practice unhealthy food behaviors. Insufficient funds to purchase healthy foods, low-literacy, unemployment, substandard housing, and lack of food preparation skills and equipment may detrimentally impact nutrition practices. While food assistance programs may increase the food purchasing power of low-income families, recipients may still not make healthy and nutritious food choices. Several nutrition education programs have been implemented to help meet the needs of the low-income population. However, current education delivery methods may limit the reach of such programs. As a result, the effectiveness, feasibility and potential appeal of alternative means of delivering nutrition education need to be developed. This review of literature explores the dietary habits and adequacy of the low-income population, the impact of the nation's largest food assistance program, mediating factors that may influence behavior change, characteristics of effective nutrition education programs, and the effectiveness and current instruction methods of the Cooperative Extension's nutrition education programs. Concluding this section is a review of research available concerning potential alternative methods of nutrition education.

Dietary Habits and Adequacy of the Low-income Population

Several monitoring systems have examined the dietary habits of low-income persons. The Healthy Eating Index, developed by the USDA, has been used to measure how well American diets conform to current dietary recommendations. This index combines ten quantifiable components of a healthy diet into an unidimensional measure of nutritional quality. These components consist of: cholesterol, sodium, total fat and saturated fat intakes; dietary variety; and the degree to which an individual’s diet conforms to the Food Guide Pyramid’s listed servings (see Appendix B) for each of the five major food groups. Each of the ten dietary components has a scoring range of zero to ten, with the overall index scoring from zero to 100. A score of zero corresponds to a total lack of consumption of a food in a particular group and a score of 10 is assigned when intake is at the recommended level.

In 1989 and 1990, individuals from low-income households, individuals with less education, and those within the 15-39 years of age category were more likely to have below average scores on the Healthy Eating Index. Those with incomes above 200% of poverty scored significantly higher than those with lower incomes and even higher scores were associated with incomes greater than 300% of poverty. Individuals with a post-college education tended to score seven points higher on the Index than those without a high school diploma.

The Third Report on Nutrition Monitoring in the United States, based on data collected by the National Nutrition Monitoring and Related Research Program, also identified several areas where low-income individuals are at risk. The prevalence of overweight in 1988-91 was highest in females with incomes below 131% of poverty, ranging from 45% for whites to 50% for Mexican Americans and 51% for African Americans. For African Americans, the prevalence of overweight was substantially higher in females than in males. In 1988-91,
African American and white females with incomes below poverty level also had higher age-adjusted prevalence of hypertension than did females with higher incomes in these two groups.  

The Third Report on Nutrition Monitoring in the United States also found disparities in dietary nutrient intakes across income levels. Adults with low-incomes reported eating certain foods containing higher levels of total fat (e.g., whole milk) and cholesterol (e.g., whole milk and eggs) than adults with higher incomes. However, fewer adults with low-incomes reported using fats and oils. The percentage of low-income adults who met the recommendation of less than 30% of kilocalories was slightly lower than that of higher income adults. Low-income adults were also found to have lower intakes of vitamin A, vitamin C, vitamin B₆, folate, calcium, iron, and zinc than adults of higher income groups, although the mean intakes of the low-income groups were not more likely to be below the RDA. 

A recent study conducted by Popkins et al. compared the dietary trends among African Americans and whites of varying economic status. Based upon today's dietary guidelines from the National Academy of Science, whites with high incomes were found to consume the poorest diets in 1965 while low-income African Americans consumed the healthiest diets. In 1989-1991, this difference among groups had narrowed. However, this convergence was due to a substantially greater dietary improvement among higher income groups than lower income groups. Dietary guidelines have also changed between 1965 and 1989, particularly with the introduction of the Dietary Goals for the United States in 1977 that suggested limitations on the amounts of fat, sugar and cholesterol consumed in the diet. It has been suggested that the findings of Popkins et al. may reflect the greater compliance of higher income persons with dietary recommendations at a given time. Even more disconcerting is that there was an increase in the consumption of high-fat cheeses and high-fat grain-based mixes and a decrease in the number of servings of grains and legumes among lower income African Americans. However, low-income African Americans had markedly increased their consumption of ready-to-eat high fiber cereals and citrus fruits while decreasing their consumption of other fruits and vegetables that were not dark-green or deep yellow. 

Other reports have noted that low-income populations consume fewer fruits and vegetables than higher-income groups. Data from the Continuing Survey of Food Intakes by Individuals (CSFII) indicated that the lowest percentage of adults, 20 years of age and older, using dark-green and deep-yellow vegetables, lettuce, and other vegetables were in the <131% of poverty category. Likewise, a higher percentage of adults 20 years of age and older reported consuming fruit with each increment in income category. Overall, adults 20 years and older reported consuming only an average of 1.3 servings per day. Reicks et al. found low-income mothers to perceive fresh produce as expensive. These mothers claimed they had to sacrifice other foods to buy fruits and vegetables and limited their choice according to price and storage space. Using central location intercept interviews, Trieman et al. found 87% of WIC participants to “almost never” or “only on some days” eat vegetables for a snack. The top three barriers to performing this behavior were not liking vegetables, lack of availability, and
preference for other foods. Trying new ways of preparing fruits and vegetables was rated as occurring “only on some days” or “never” for 86% of the respondents. Barriers to this behavior included not knowing how to prepare them, fear that others would not like it, time and effort, and wanting to “stick with what I like.” Other barriers to fruit and vegetable consumption included lack of availability, spoilage waste, running out, and not knowing if they taste good.\textsuperscript{37}

A review of recent survey data of low-income households showed that over one-third of the food expenditures of low-income families went towards the purchase of meat.\textsuperscript{38} African Americans were found to devote the greatest amount of their food expenditures to meat. Focus group discussions conducted with food stamp participants across the nation have also found this emphasis on meat across all ethnic groups. African American focus group participants, in particular, associated purchasing and serving meat with affluence, meal satisfaction, tradition and feeding the family the “right way.” This emphasis on meat may be problematic due to the high fat content of some meat products, especially if it limits dietary variety. The purchase of expensive meat products could also easily monopolize a large portion of the food budget, perhaps at the expense of other food items.

Analysis of entry 24-hr recalls of 150 Virginia EFNEP participants indicated that mean total fat intakes exceeded recommended levels (>30% kcals), with African Americans (mean ± SD = 36.5 ± 0.7) consuming significantly higher amounts of total fat than whites (mean ± SD = 33.6 ± 1.1).\textsuperscript{39} The intake of dietary fiber was below recommended levels for 98% of white and 100% of African American participants. Likewise, calcium intakes were substantially below the recommended levels for 89% of white and 89% of African American participants. The mean number of servings consumed from the six food groups of the Food Guide Pyramid were below the minimum number of recommended servings for the Vegetable, Fruit, and Dairy Groups for 75% of the study participants. An adequate number of servings were consumed from the Meat and Breads Groups, with no differences between race groups in the number of servings consumed from any of the food groups. More than one-third of each race group consumed greater than 10 servings a day from the Fats/Sweets Group.

Healthy food practices may be negatively impacted by a variety of factors in the low-income household. Lower income individuals have been shown to place more emphasis on price and familiarity (what is typically eaten or what was eaten during childhood) when selecting foods than higher income groups.\textsuperscript{40} Low-literacy, unemployment, inadequate housing, violence, stress, and lack of food preparation skills may also limit opportunities and the motivation to engage in healthy behaviors. Results from the 1992 \textit{National Adult Literacy Survey} indicated that adults with the lowest literacy skills were more likely to have fewer years of education, earn lower wages, and live in poverty.\textsuperscript{41} Individuals with limited literacy skills obtain less from health care instructions than skilled readers, even when the material has a fairly low readability level.\textsuperscript{42} Doark et al.\textsuperscript{42} reported that poor readers tend to take words more literally rather than interpret their meaning, miss the context and not make inferences from factual data, and skip over foreign words. As a result, individuals with limited literacy skills may have difficulty in critically
Several studies have attempted to identify potential barriers to healthy eating habits perceived by low-income individuals. Hartman et al.\textsuperscript{43} conducted twelve focus groups with three different groups of EFNEP participants: individuals with low-literacy skills, teenage mothers, and Hmong and Cambodian women (non-English speaking). Participants reported motivators to change their eating habits as being: weight loss, more healthful eating for their families, and concerns about cholesterol levels, high blood pressure and diabetes.\textsuperscript{43} Identified barriers to making changes in eating behavior included extra time and money necessary to purchase and prepare healthy foods, concern that family members wouldn't like or approve of new recipes or cooking methods, lack of interest or skills in cooking, and not knowing which foods are healthful.\textsuperscript{43}

One obvious barrier to healthy eating for low-income individuals may be a lack of resources to purchase foods. Frequently, the money available for food in low-income households is inadequate to provide the family with nutritious meals. In general, low-income homemakers spend a greater proportion of their total income on food than those with higher incomes. Approximately 9-13% of people in low-income households reported experiencing some degree of food insecurity, as compared with about 4% in the overall U.S. population.\textsuperscript{44} Several federally funded programs currently exist to assist low-income households by providing direct assistance in the form of food and other commodities.

**The Food Stamp Program (FSP)**

The FSP is the largest of the USDA’s food assistance programs. The program is administered federally by the USDA’s Food and Consumer Services and by state welfare agencies at the state and local levels.\textsuperscript{44} The FSP provides over 22 billion dollars in annual benefits to low-income households that meet eligibility requirements.\textsuperscript{11} Nearly 25 million people in nearly 10 million households nationwide received assistance from the program each month during 1995. Over half of the people who receive food stamp benefits are children, the majority of which live in single parent households.\textsuperscript{11}

To be eligible for food stamps, a household’s gross income can not be more than 30% above the federal poverty guideline and their net income can not be more than the federal poverty guideline.\textsuperscript{45} Households may not have more than 2,000 dollars (3,000 if at least one person is 65 years or older) in countable resources such as bank accounts.\textsuperscript{45} Certain resources such as home and lot are not counted, and the resource value of vehicles owned by household members is governed by special rules. The Welfare Reform Act of 1996 ended eligibility for many aliens and placed restrictions on benefit amounts for able-bodied adults.\textsuperscript{10} In 1994, whites were the largest group of food stamp recipients (41.1%), approximately 32.7% were African American, and 19.2% were Hispanic.\textsuperscript{10}

Monthly benefits are issued through coupons or Electronic Benefits Transfer (EBT) in which
A plastic card is used in a fashion similar to a credit card. These benefits are redeemable at approved retail stores. The amount of benefits issued each month to households is based upon the Thrifty Food Plan (TFP). The TFP is a low-cost model diet plan determined according to the recommendations of the National Academy of Sciences’ RDAs and upon the food choices of low-income households. The individual food stamp allotment is equal to the maximum allotment for the household size less 30% of the household's net income. The average benefit per person per month is $73.37. Households can use food stamps to buy any food or food product for human consumption, as well as seeds and plants for use in home gardens. The following items cannot be purchased with food stamps: alcohol, tobacco, lunch counter items, vitamins or medicines, pet foods, and non-food items (with the exception of seeds).

The mission of the FSP has undergone several changes since the first food stamp plan was implemented in 1939. While the first food stamp plan’s goal was to alleviate hunger, it primarily sought to stabilize agricultural prices by stimulating consumption of surplus farm commodities. In 1961, several food stamp projects were piloted under an executive order by President Kennedy. The FSP was expanded through the passage of Food Stamp Act in 1964, but participation in the program was optional and benefits varied widely across states. There was also a purchase requirement, participants had to put money into the program in order to receive benefits. The Food Stamp Act of 1977 made the program more accessible to low-income households by eliminating the purchase requirement. This reform redefined the FSP’s goal as “to permit low-income households to obtain a more nutritious diet by increasing their food purchasing power,” thereby diminishing the FSP’s role in supporting agricultural prices.

Access and participation in the FSP is an essential component in enabling low-income households to obtain a more nutritious diet. Almost six million new participants joined the program between January 1989 and 1992, compared with an increase of 1.9 million eligibles during this time period. In other words, overall participation rates (number of participants to number of those eligible for the program) increased substantially (from 59% in 1989 to 74% in 1992) since 1989 due to an increase in participation among the eligible population.

The mere use of food stamps, however, may not improve a household’s nutritional status. It is possible that households may reduce cash expenditures on food items proportional to the amount of the food stamp benefit received and, as a result, eliminate any net impact of the food stamp benefits on food purchases. While food stamps have been shown to reduce cash spending on foods to some extent, research has shown the food stamp benefit to increase food expenditures overall. Recent research determined that each additional dollar of food stamps produces a 20- to 45-cent increase in food expenditures. This increased food purchasing power may still not translate into improved nutritional status either. The household may use the extra money to make unbalanced food purchases or to purchase more pre-prepared or processed foods that may be higher in sodium, fat, cholesterol, and sugar.

Findings from recent focus group discussions conducted with FSP participants nationwide
have shown food stamp participants to generally be smart shoppers who often make shopping lists or work form "mental" lists, compare food prices using store advertisements, and shop at several stores to obtain the best prices for food items. Hispanic and white focus group participants reported shopping the most frequently. White females that were employed were particularly likely to not plan meals in advance and to shop several times per week. African American focus group participants reported doing major shopping once a month at major supermarkets. A review of recent survey data found that African American food stamp participants were better able to keep food expenditures at or below the TFP than their white counterparts. It may be that the more frequent shopping trips and lack of meal planning of white food stamp participants contribute to higher food expenditures and more impulse purchases. Many focus group participants reported being aware of current nutrition guidelines, but believed healthy eating was more expensive and were unsure how to use information on the food label. Some participants reported trying new more healthful recipes, but that children and family members often complained about recipe changes or new foods.

Recognizing the importance of nutrition education in conjunction with food assistance in ensuring access to nutritious healthful diets for all Americans, the USDA is currently looking at new ways to teach food stamp participants to make healthy food choices and to use their food stamp benefits more efficiently. Administrative funds are available through the Food and Consumer Service division of the USDA to provide nutrition education to food stamp recipients. Several states, including Virginia, have already established Food Stamp Nutrition Education Plans (FSNEP) to provide nutrition education to food stamp recipients, with many of these programs being administered by state Cooperative Extension. One of the food stamp administrative guidelines is that nutrition education under this program will not duplicate EFNEP. While EFNEP and the FSNEP work collaboratively, they are administered independently and their efforts focus on different groups in order to avoid duplication of efforts. FSNEPs are currently operating in thirty-seven states. In Virginia, FSNEP has been titled the Smart Choices Nutrition Education Program (SCNEP).

Characteristics of Successful Nutrition Education Programs

Nutrition education has been defined as “any set of learning experiences designed to facilitate the voluntary adoption of eating and other nutrition related behaviors conducive to health and well-being”. Any nutrition education program or initiative should be able to demonstrate its ability to facilitate these nutrition-related behaviors as well as demonstrate the program’s cost effectiveness. This is especially true for federally subsidized programs where allocated funds often depend upon regular reviews of program outcomes. The effectiveness of nutrition programs has been, at times, reliant upon measured changes in nutrition knowledge. However, research has demonstrated that knowledge of good nutrition practices does not always translate into the implementation of such practices. This indicates that the implementation of healthy nutrition behaviors is dependent upon more than nutrition knowledge, that certain barriers and
motivators may be mediating the actual implementation of such behaviors. As a result, nutrition education programs need to identify and address these factors in order to maximize program effectiveness.

A review of 217 nutrition education intervention studies by Contento et al.\textsuperscript{29} identified several components of successful nutrition education programs. Communications and educational strategies for enhancing awareness and motivation were two components associated with program success. Contento et al.\textsuperscript{29} also found that programs that identified specific motivators and reinforcers with personal meaning for the target population were more effective. Providing feedback in relation to recommendations was found to increase motivation in older children, adults, pregnant women and older adults. Active participation was important for all age groups, including participation in setting goals, food-related activities, etc. Social marketing was found to increase awareness of the consequences of certain dietary practices and to improve knowledge about behaviors that reduce risk. A change in actual behavior was seen using social marketing techniques if the behavior was highly targeted and the messages about the program were highly focused. Behavior change strategies (such as self-assessment, learning effective behaviors for healthful eating, personal goal setting, learning the cognitive, affective and behavioral skills needed to achieve goals, incentives, reinforcements, and supportive changes in food environment) were another component of successful nutrition education programs. In the studies reviewed by Contento et al.,\textsuperscript{29} behavior change was more likely with interventions that systematically targeted the psychosocial factors that are antecedents of behavior such as personal factors, behavioral capabilities and environmental factors.

**The Social Learning Theory as a Theoretical Base for Successful Nutrition Education Intervention**

The Social Learning Theory, founded by Rotter, has been used as a theoretical base for examining the effects of the interaction between individual and contextual factors on food behavior.\textsuperscript{50} The Social Learning Theory contends that three variables assist in the prediction of behavior. These three variables are expectancy beliefs or locus of control, reinforcement values (RVs), and situational factors. While reinforcement is often recognized as playing a crucial role in the acquisition of behavior, whether or not an individual perceives an event as a reward or reinforcement may be contingent upon his/her own behavior versus the degree to which they feel control over the reward event.\textsuperscript{51} Rotter believed that the effect of a reinforcement following some behavior on the part of an individual “is not a single stamping-in process but depends on whether or not the person perceives a causal relationship between his or her own behavior and the reward”.\textsuperscript{51}
Locus of Control

Rotter suggested that one's locus of control reflected an individual’s expectancies concerning the influence his/her behavior held over reinforcement outcomes. An internal locus of control was defined as “generalized individual belief in one's own dominance over situational factors in the control of reinforcements”. In other words, “internals” believe that reinforcement is the result of their own actions or characteristics. External control, on the other hand, was defined by Rotter as the “perception of reinforcements as being contingent upon external influences and beyond personal control”. These external influences may include luck or chance, fate, or influence by powerful others. Rotter believed that “internals” are more likely to:

a) be more alert to those aspects of the environment which provide useful information for his future behavior; b) take steps to improve his environmental conditions; c) place greater value on skill or achievement reinforcements and be generally more concerned with his ability, particularly his failures; and be resistive to subtle attempts to influence him.

Some researchers have suggested that income may be associated with one's sense of control, that locus of control may reflect one's actual resources. Ross and Mirowsky suggested that individuals of higher income and education are more likely to feel in control of their lives than individuals of lower incomes and educational attainment. However, a recent study by Landau failed to find support for an interaction between socioeconomic status and locus of control. Such studies have examined the association between socioeconomic status and locus of control in regards to its affect on depression level. However, the potential relationship between socioeconomic status and feelings of control over eating behaviors or health has not been adequately studied. Smith and Owen, however, did find that social status and perceptions of external influences upon dietary choice were independently associated with food intake.

An Internal-External (I-E) scale, designed by Rotter, has been used in many studies to assess an individual's generalized expectancy beliefs. While one may refer to an individual as appearing to be internal or external, Rotter has cautioned that his scale is, in fact, a continuum upon which scores are placed. Any dividing point along this scale is, therefore, somewhat arbitrary and may change depending upon the distribution of the sample studied. Additional scales have also been created which attempt to measure locus of control, and interpretation of studies using different scales can be difficult.

In the nutrition arena, the locus of control concept has been primarily explored in obesity and weight loss studies. The results of such studies have been mixed. Some research studies have found internally oriented subjects to lose more weight in obesity treatment programs or make greater efforts initiating and completing such programs. Other studies have shown no significant relationship between weight loss and locus of control. These studies have
revealed, however, that individuals more internally or externally controlled may respond differently to weight loss programs. Behavior modification appears to be most effective for those who believe they can change their behavior and achieve goals. However, some research suggests that locus of control may predict the effectiveness of different health education approaches. Strickland reviewed research on locus of control expectancies and health behaviors and found that internally controlled individuals tended to exhibit desirable health behaviors more frequently when they participated in the decisions and structure was not imposed from the outside. Externally controlled participants, however, were more likely to respond in the desired manner if decisions were made by others and given to them to follow.

It is possible that the effectiveness of different instruction formats will vary depending upon the locus of control of the participant. Self-administered programs, distance learning, or those that require more initiative on the part of the participant may be more effective with internally controlled participants. It is also possible that those individuals that voluntarily sign up for a program may be more internally controlled whereas those who are required to participate (such as those required to participate in job readiness training) may be more externally controlled. This would agree with the characteristics of “internals” as defined by Rotter. Internals would be more likely to seek out programs to improve their diets and see meal planning and preparation as a challenge. The effectiveness of such nutrition education programs for "Externals" may be less predictable, depending instead upon the perceived influence of the environment or powerful others.

Reinforcement Values (RVs)

An individual's tendency to engage in a particular behavior may reflect the perceived worth or the behavior outcome or reward. The RV was defined by Rotter as “the degree of preference for any reinforcement to occur if the possibilities of their occurring were all equal”. A behavior-outcome, goal or reward may be, for example, having enough food to eat, maintaining a healthy weight, receiving compliments about food preparation skills, the sensuous pleasure of food, and better health. While locus of control and RVs are systematically independent of one another, the manner by which an individual seeks fulfillment of RVs can be dependent upon locus of control. For example, an internally controlled individual would be expected to take steps to become more knowledgeable about food and meal preparation in order to achieve better health and a balanced diet. While an externally controlled individual would depend more upon the advice and direction of powerful others to improve their health and diet.

Situational Factors

Rotter also believed that changes in one's situation (e.g. lifestyle) might also change the value of a reinforcement. Social context, the environment in which the behavior occurs, may also influence behavior outcomes. Regarding food behaviors, familial disapproval of new recipes or different foods may prevent an individual from trying alternative methods of food preparation.
Results from a national telephone survey of homemakers conducted by Houts and Warland, showed that 21% of the variation in reported nutritious food behaviors was explained by locus of control, RV, and social context variables. Internally controlled individuals scored significantly higher on a nutritious food behavior questionnaire than did externally controlled individuals. Individuals that identified nutrition as a RV scored the highest on the nutritious food behavior questionnaire, while those who reported that they did not like cooking or did it only because it had to be done achieved the lowest scores. Interestingly, not all individuals who identified positive RVs about cooking scored higher on the nutritious food behavior scale. Those that identified taste as a RV scored lower than individuals that reported disliking food preparation because of time, health, money or skill constraints, and those that simply disliked cooking. Social context was also shown to influence nutritious food behaviors. Those who reported living in households where household members agreed on food preferences scored higher on the nutritious food behavior scale than individuals living in disagreeing households. Houts and Warland suggested that the lower nutritious food behavior score for individuals living in disagreeing households may occur when the RV of wishing to restore harmony to the household is particularly strong.

A study conducted by Hertzler and Frary with EFNEP clients found that ratings for family atmosphere and living conditions were related to pre- and post iron intakes for homemakers with intakes of less than 50% of the RDA for iron. PAs reported that homemaker's often catered to the wishes of the adult male living companion rather than fully employing healthy food practices. Hertzler and Frary concluded that it might be necessary to determine the person in the household with the power to make food-related decisions when assessing family dynamics. The findings of this study may be partially explained by Rotter's Social Learning Theory. It may be that the homemakers were more externally oriented in regard to food choices and preparations and, therefore, felt that a powerful other (e.g., the male living companions) decided the family’s food choices. It may also be that the homemakers placed greater value in the potential reinforcement of praise or acceptance from the male living companions than in better long-term health or nutrition. Most likely, it is a combination of these variables that influenced behavior. Therefore, while the homemaker may gain knowledge of what foods are more nutritious, actual behavior change will not occur because of these other mediating variables.

Other studies have also indicated that such competing reinforcements may explain an individual's failure to adopt nutritious food behaviors. Several members of focus groups with food stamp participants have reported that their children's food likes and dislikes had a considerable impact upon their food purchases. Children were reported as expressing more affection, caring and satisfaction when foods they liked were available in the home. Focus group participants also noted that their children's requests often influenced them to purchase foods that were more expensive, higher in salt, sugar and fat but lower in nutrients. Female household members in all ethnic groups reported that their own tastes and preferences did not play as large a role in their food choices as those of other family members.
Nutrition Education Programs of the Cooperative Extension Targeting Low-Income Audiences.

The Smart Choices Nutrition Education Program (SCNEP)

SCNEP (see Appendix C) was initiated in FY 1996 by the Virginia Cooperative Extension to deliver nutrition education to food stamp recipients. PAs, supervised by Extension Family and Consumer Science Agents, are employed to provide direct nutrition education in approximately half of the 120 independent counties/cities in Virginia. Fifty-three SCNEP PAs currently operate out of 41 SCNEP centers. All SCNEP PAs receive a month of intensive training in foods and nutrition subject matter and in teaching methods that are appropriate for food stamp recipients. The SCNEP targets food stamp recipients who are either a) not eligible for EFNEP (e.g., older low-income adults with chronic disease risk) or b) in an area where there is no EFNEP program available. As a result, there are no duplication of efforts between the EFNEP and SCNEP programs. The implementation of the SCNEP and the development of additional means to reach clientele should substantially increase the number of food stamp recipients receiving effective nutrition education.

The Healthy Futures curriculum is the primary curriculum used in the SCNEP program, although the Eating Right is Basic, 3rd edition (ERIB-3), curriculum may be used in areas where there is no EFNEP. The Healthy Futures curriculum focuses on teaching the basics of health promotion and disease prevention. The ERIB-3 lesson series, developed by Michigan State Cooperative Extension, primarily covers The Dietary Guidelines for Americans, the Food Guide Pyramid, food labeling guidelines, meal planning and budgeting, promotion of breastfeeding, and infant feeding practices. Other materials used when appropriate include:

a) Smart Choices with Food Labeling
b) Healthy Eating For Life Program
c) Planning Makes the Difference
d) National Dairy Council materials

The Expanded Food and Nutrition Education Program (EFNEP)

EFNEP (see Appendix D) is a federally funded program of the Cooperative Extension Service, which was first piloted in Alabama in 1967 and then expanded nationwide in 1968. EFNEP is currently conducted through the Cooperative Extension System at land-grant universities in all 50 states, the District of Columbia, Puerto Rico, Guam, American Samoa, Micronesia, Northern Marianas and the Virgin Islands. It is administered by the USDA’s Extension Service. EFNEP seeks to help participants gain the knowledge, skills and adopt the
behaviors necessary to select, prepare and consume a nutritionally sound diet.\textsuperscript{19}

The program is delivered as a series of ten or more lessons designed to help clients acquire skills in food production, preparation, storage, safety and sanitation, and learn to better manage their food budgets and related resources such as food stamps.\textsuperscript{76} PAs, trained and supervised by Family and Consumer Science Agents, instruct homemakers through home visits or in small groups.\textsuperscript{20} The PAs are typically indigenous to the community in which they work in order to facilitate rapport building with the homemakers.\textsuperscript{20}

Nationwide in Fiscal Year 1994, EFNEP directly reached 198,931 homemakers and 737,000 family members were indirectly reached through the adult participant.\textsuperscript{77} Most participants were enrolled in other food and nutrition programs: 51\% of families were receiving WIC benefits, 61\% were receiving food stamps, only 13\% of those in EFNEP were not concurrently participating in a federal food assistance program.\textsuperscript{77} The EFNEP program were initiated in Virginia in 1968 and currently operate in 26 counties and cities. During the 1996 fiscal year, the Virginia EFNEP program reached 6,375 families.\textsuperscript{21} Seventy percent of the families were WIC recipients and 53\% were on food stamps.\textsuperscript{21} African Americans made up 46\% of the families reached, while whites, Hispanic, and Asian Americans made up 48\%, 4\% and 2\% respectively. Fourteen percent of households had no children, while 35\%, 29\% and 23\% had one, two, and 3 or more children respectively.\textsuperscript{21} Forty-five percent of households had incomes less than or equal to 50\% of poverty.\textsuperscript{21}

The ERIB-3 lesson series\textsuperscript{75} is the primary curricula used in the adult Virginia EFNEP program, although other materials may be used to supplement. The Dietary Guidelines, the Food Guide Pyramid, the new food labeling, meal planning and budgeting, promotion of breast-feeding, and infant feeding practices compose the majority of EFNEP teaching.

Families are eligible for the program if their income is 125\% or less of the poverty level, or if they are currently a participant in other government programs that use the poverty guidelines for eligibility.\textsuperscript{20} For example, participants of the FSP are automatically eligible to join the EFNEP program. In fact, many families are recruited via referrals from other agencies. Families may also be recruited through door-to-door visits.\textsuperscript{21} Additional families receiving food stamps are expected to be recruited in the future as the result of recent welfare reform. These changes in recruitment may result in changes in the characteristics of EFNEP’s target population. In fact, one review concluded that EFNEP clients today are better educated and more likely to be involved in other assistance programs.\textsuperscript{22} Armstrong et al.\textsuperscript{78} found that recruitment through WIC and Head Start programs rather than by traditional canvassing of neighborhoods significantly affected the sociodemographic characteristics of EFNEP enrollees and graduates. Homemakers in a county in Washington state that were recruited through WIC and Head Start were more likely to be white, 25-34 years old, better educated, have higher incomes, consume more foods from each food group, and were less likely to participate in the FSP than those homemakers recruited via canvassing of neighborhoods. These characteristics of Head Start and WIC
participants, however, cannot be generalized to other areas in the United States due to the limited scope of the study and non-representative selection of sites. It has been suggested that exclusive recruitment via these other agencies, while an easy way to reach low-income clientele, may limit EFNEP’s outreach to other needy families. 

EFNEP employs several communication, education and behavior change strategies in its education of low-income homemakers. Upon enrollment in EFNEP, several assessment tools are used to generate a Diagnostic Report (Appendix E) for the homemaker that describes their nutrient intake and food behaviors. Feedback is then given by the PA in relation to nutrition recommendations and personal and program objectives based on the homemaker’s dietary intake and food practice scores described in the Diagnostic Report. In addition, information from the Diagnostic Report is used to identify future EFNEP lessons that will best address the needs of the homemaker. Homemakers are also asked to identify lessons they are interested in receiving. This allows PAs to focus lessons on the needs and interests of the homemaker. Homemakers receive graduation certificates once they have successfully completed the program. “Successful completion” is defined as meaning that the homemaker has been available for lessons, has tried some of the ideas suggested in lessons, and has made a reasonable amount of progress as assessed by the Diagnostic Report and the PA’s observations in the home.

EFNEP’s use of “hands-on” activities, such as those practicing food preparation and shopping skills, are particularly important to the program. Such activities accompany the ERIB-3 curriculum and include preparing recipes, making a food budget, and taking a shopping trip. Behavioral change strategies utilized in the program include: a) the delivery of lessons focused towards the needs and concerns of the low-income population; b) the use of the PA which, through home visits, can identify environmental and personal barriers to change as well as provide social support for the homemaker; and c) the use of activities that encourage homemakers to develop a heightened awareness of their abilities and enhance self-esteem. The use of such an empowerment approach may strengthen the homemaker’s sense of personal control and perceived self-efficiency and thereby influence future health behaviors.

Evaluation of the Expanded Food and Nutrition Education Program (EFNEP)

Recognizing the need to evaluate program effectiveness based on changes in behavior, EFNEP currently collects three types of assessment data to document effectiveness. Frequently, this data is collected using the Family Record (Appendix F) which is divided into three parts designed to collect demographic information, information on food related practices, and dietary intake. Part A of the Family Record collects demographic information regarding participation in other food assistance programs, household size, locale and race. The Food Behavior Checklist (Part B of the Family Record) collects information pertaining to food practices, and a 24-hr recall (Part C) is used to document nutrient intake. Data collected using these three assessment tools is then entered into EFNEP’s Evaluating Reporting System (ERS) which generates the Diagnostic Report for each homemaker. The ERS contains a foods
During the past few years the EFNEP Behavior Checklist has undergone a series of changes as a result of expert committee recommendations, focus groups, and pilot testing. Focus groups and expert panels ensured proper definition of the target population and guided decisions pertaining to item type, length of the questionnaire, literacy level and the type of directions. A prototype of the questionnaire was pilot tested in 1993. Correlation coefficients were then used to identify items on the questionnaire, which could be eliminated. The final version of this checklist was released latter in 1993 and is currently a part of the EFNEP ERS. While the majority of state EFNEPs use this ERS version of the Behavior Checklist, some states have chosen to use a modified version. These modified versions of the checklist typically contain the fourteen questions (“core questions”) that are currently a part of the ERS Behavior Checklist, although the wording of the questions may be slightly altered to account for regional differences.

One study by Bowens et al. examined the validity and reliability of a Behavior Checklist designed to be used in EFNEP. However, the version of the checklist used in this study is not the same Behavior Checklist currently a part of the EFNEP ERS. Research employing certain measures of the reliability of the ERS Behavior Checklist, such as test-retest reliability and proxy reliability testing, is not currently available. Likewise, measures of construct validity are not available for the current version of the checklist. However, scores on the Behavior Checklist have been shown to improve following the EFNEP intervention. Questions on the checklist are grouped into four domains: Nutrition Practices, Resource Management, Food Safety, and Other Needs. The Diagnostic Report generated by the ERS indicates the amount of change in the different checklist domains as well as along each individual item. Factor analysis has not used to verify the use of the different domains as factors. Today, the format of the checklist continues to be modified and improved and a revised version of the Checklist is anticipated in conjunction with the update of the ERS (personal communication, Ruby Cox, May 1997).

The Pennsylvania State EFNEP uses its own version of the Behavior Checklist (Appendix G). While the Pennsylvania State Behavior Checklist addresses most of the “core questions,” it does not include the following questions:

1) In the past month, did you ever have to cut the size of your children's meals because there was not enough money to buy food?
2) When deciding what food to feed your family, how often do you think about healthy food choices?
3) How much do you agree with this statement? 'The food and nutrition needs of my family are being met'.

Instead, the Pennsylvania State Behavior Checklist includes the following questions that are
not currently a part of the National Checklist:

1) Do you and your children eat more than one kind of vegetable per day?
2) Do you make dishes from scratch?
3) Do you and your children eat more than one kind of fruit each day?

In addition, the wording of questions, as well as the method of scoring the checklist, is different between the Pennsylvania State Behavior Checklist and the current ERS Behavior Checklist. Like the ERS Behavior Checklist, research concerning the validity of the Pennsylvania State Checklist and their use of the question categories Resource Management, Nutrition Practices, and Food Safety/ Food Preparation as factors is not available at this time.

The Pennsylvania State Behavior Checklist also includes questions that assess locus of control, RVs/attitudes about cooking, and areas of interest to the homemaker. The questions addressing locus of control and RVs/attitudes about meal preparation are adapted from Rotter’s Social Learning Theory that identifies these as possible mediating variables that contribute to behavior change. Specific locus of control measures have been found to have stronger predictive strength than Rotter's original Internal-External locus of control scale which measured peoples’ generalized expectancy for control across situations. Several studies suggest that individuals may maintain different cognitive expectancies for specific aspects of behavior. The locus of control assessment portion of the Pennsylvania State Behavior Checklist was developed and tested by Houts and Warland. It is a five-item, unidimensional domain-specific instrument related to food and health. These questions are designed to assess expectancies, on a three point scale, about relationships between future health and current behavior, willingness to try foods recommended by healthcare professionals, ability to prevent illness, concern about what one eats, and the relationship between healthy eating and disease prevention. Houts found all five questions to load on one factor, with factor loadings ranging from 0.35 to 0.63. Scale reliability as assessed using Cronbach’s alpha was 0.6. The instrument is scaled in the direction of internal, with higher scores representing an internal orientation.

A possible relationship between age and locus of control has been explored in several studies. However, results have been mixed, possibly due to the use of different instruments. Scales used to assess locus of control in these studies range from unidimensional to multidimensional, with questions being either general or topic specific. The unidimensional locus of control instrument currently a part of the Pennsylvania State Behavior Checklist has shown elderly women to score more externally than other age groups.

Questions identifying positive and negative cooking RVs included on the Pennsylvania State were also derived from an earlier assessment measure designed by Houts and Warland. The first question asks how the individual feels about cooking, with possible responses of “I like it,” “I don’t like it,” and “I don’t mind it.” The second question attempts to ascertain why the individual feels this way about cooking and provides the choice of several positive and negative
RVs. Positive RVs include the enjoyment of food preparation, taste, and social approval. While negative RVs include dislike or neutral feelings about meal preparation.

The 24-hr dietary recall (Part C of the Family Record) has traditionally been used in EFNEP to assess dietary intake because of its ease of administration, low cost, and usefulness with low literacy groups. The use of 24-hr recalls to document food intake has been shown to be valid on the group level. Limitations associated with the use of the 24-hr recall include: unsatisfactory validity on the individual level, the underestimation of portion sizes, failure to account for plate waste, and possible reflection of foods consumed on a non-typical day. To reduce the effects of these limitations, the EFNEP PAs are instructed to try to collect recall data on a typical day (e.g. not on a sick day) when the participant has consumed his/her usual diet. They are also instructed to probe for information concerning portion sizes and method of food preparation. Food models and visual aides are used as described in Procedure for Collecting a 24-hr Recall (see Appendix H, I).

Effectiveness of EFNEP

Research has shown the EFNEP program to be effective in changing the dietary behaviors of its participants at graduation and maintenance of such behaviors over time. Amstutz and Dixon found significant and long term improvements in the food recall scores of 129 Maryland EFNEP graduates in comparison with 194 control participants. The program graduates had particularly increased their consumption of milk, fruits and vegetables, and breads and cereals. Program graduates who had initially consumed the most fats, sweets and alcohol were also found to significantly decrease their consumption of these items. Del Tredici et al. studied the eating habits of 355 California EFNEP participants and 328 controls. After 6 months of instruction in the EFNEP group, there was a significant increase in the food recall score for that group while the control group’s scores remained unchanged. Improvements in the EFNEP group were attributed to increased intakes from the Dairy, Meat, Fruit and Vegetable groups. In Georgia, 310 poverty level EFNEP participants reportedly increased consumption of milk, breads and cereals, and fruits and vegetables despite a 7% increase in food costs over the 6 month period when compared to controls. Brown and Pestle examined the long term effectiveness of the EFNEP program by studying the differences between dietary and food behavior practice scores of 225 homemakers at entry, exit and at one year post-exit follow-up. Food behavior practice and diet scores were significantly higher at graduation than at entry for participants receiving one-to-one instruction. No difference was found between scores at graduation and follow-up. However, no significant differences between entry, graduation, or follow-up food behavior practice or mean diet scores were found for participants receiving instruction in small groups.

In Virginia, Torisky et al. assessed the dietary improvement of 180 homemakers who had completed 6 to 18 months of instruction in the EFNEP program. Dietary improvement was measured via 24-hr recall at six and 36 months following program completion. Average diet scores were found to have increased significantly from entry to exit, and from entry to follow up.
There was a slight decline in scores from exit to follow-up. The most substantial improvements reported were in the average servings from the milk and fruit-vegetable groups.

Data collected from individual homemakers and entered into the ERS system is compiled annually to provide state reports of EFNEP’s impact. In Virginia, 49% of homemakers (n=3483) met program objectives and were graduated in 1995. Of the 3,185 graduated homemakers that completed entry and exit Family Behavior Checklists, 47% of homemakers made substantial improvements on various food related practices. Improvements were also seen in the number of servings consumed from all five food groups. Specific increases were as follows (reported as percent increase in servings): Meat, 5%; Breads, 16%; Vegetables, 48%; Milk, 50%; and Fruits, 80%. Positive changes, based on mean percentage of the RDA, also occurred for protein, iron, calcium, vitamin A, vitamin C, and vitamin B₆. Average fiber intake increased from 11.8 grams to 15.5 grams and total fat intake decreased from 35.2% to 33.2% of total calories.

EFNEP attrition rates can also provide valuable information regarding the program’s impact. However, few studies have actually looked at whether those who “dropout” of the program are different from individuals that graduate. This may be partially due to the fact that there is no federal mandate requiring the evaluation of data for individuals who terminate the program before graduation. Dropout rates have been shown to vary by state from 12% to 38%. Nationwide, 14% of homemakers left the EFNEP program before graduation during Fiscal Year 1993.

Traditional Methods of EFNEP Instruction

Face-to-face instruction was, initially, the sole teaching mode used in the EFNEP program. This method enables the PA to assess the specific learning needs of the homemaker, tailor information to address these needs, and best note the circumstances of the home environment. In 1979, a federal review of the program, cited face-to-face instruction as a critical impediment to the program due to its costliness. Today, homemakers are increasingly taught in groups. In Virginia, 68% of EFNEP participants were instructed in groups in 1996. Groups typically meet in housing-unit meeting rooms, community centers or in the homes of EFNEP participants. Reported benefits of the small group method include larger caseloads per PA, lower lesson costs per individual, and increased numbers of graduated homemakers. The social support associated with the group dynamic is noted as an additional advantage. However, transportation problems in rural areas, language barriers, arranging suitable meeting places, getting food recalls in a group setting, organizational problems, and the absence of adequate training of PAs in group facilitation skills have been problems associated with the group method. Some studies have shown group method instruction to be less effective than the traditional face-to-face method.

Mail-out lessons have also been evaluated as a means of targeting hard-to-reach clients. In Vermont, rural EFNEP homemakers that received seven direct mail lessons with telephone
follow-up and five intermittent face-to-face lessons (experimental instruction group) showed significantly greater gains in nutrition knowledge and food practice scores than a control group that received no instruction. \textsuperscript{103} These gains in nutrition knowledge and food practice scores were not significantly different from gains achieved by homemakers that received only traditional face-to-face instruction. However, there was a trend towards higher scores in the traditional face-to-face instruction group. The control, experimental and traditional groups did not show any significant dietary changes at the end of the study.

Cost efficiency, defined as the comparison of the delivery costs of the two methods per lesson, and cost effectiveness, as determined by comparing the average educational cost per average improvement on knowledge and food practices using effect size statistics, were also determined. \textsuperscript{103} The experimental instruction method was found to be 42\% less costly to deliver than the traditional face-to-face method on a per lesson per graduate basis. However, the experimental method was approximately 29.0\% less cost-effective in producing knowledge gains and 40\% less cost-effective in producing food practice changes than was the traditional face-to-face methods. As a result, it was concluded that while the use of mailed lessons with telephone follow-up and intermittent face-to-face lessons was more cost efficient it was less cost-effective than the traditional face-to-face instruction.

In Virginia, mail-out lessons are currently used by some EFNEP PAs to reach isolated or time constrained individuals. However, there is no official method or standard set of materials used for mail-out instruction. In conversations with PAs at training sessions held in southwest Virginia (Jo Combs, Carol Greear, Patricia Harden and Dorothy O'quinn) central Virginia (Wanda Evans and Brenda Seamster), and southeast Virginia (Leslie Staley, Janice Davis, Iris Miller and Mary Warren), PAs reported that mail-out lessons may include written transcripts of the flip-chart lesson, the mailing of hand-outs usually distributed during the lesson, other written material or instructions the PA deems appropriate, or a combination of the three. (August 1996). One disadvantage of the current mail-out lessons, however, is that they rely upon the literacy level of the homemaker. Approximately one out of five adult Americans read below the fifth grade level. \textsuperscript{42} Individuals with limited literacy skills are less likely to use print materials for information. \textsuperscript{42} As a result, the printed materials mailed to homemakers may not be the most effective means of delivering lessons to hard-to-reach clients.

Alternative Methods of Delivering Nutrition Information

Problems associated with attending group meetings or having a face-to-face home visit with a PA may seem so insurmountable to the homemaker that they drop out of the EFNEP program. Conditions previously cited as reasons for leaving the program early include: the birth of a baby, increased time constraints, problems with transportation, moving, and returning to work or school. \textsuperscript{19} In circumstances where there was only one adult in the household, the dropout rate associated with employment has been particularly high. \textsuperscript{19} It may, therefore, be necessary for
EFNEP to explore methods of delivering lessons that are more flexible concerning time and more accommodating of the homemaker’s locale. These factors associated with attrition may also pose problems for the new SCFSP and other programs in the nation that target nutrition education to those receiving federal assistance. Employment requirements and job readiness training may make these individuals particularly “hard-to-reach.”

Attrition rates are also likely to be lower if information is presented in the manner most acceptable to the homemaker and most suitable for his/her learning style. Focus groups conducted by Hartman et al. with low literacy and teenage EFNEP participants identified several preferred methods for receiving nutrition information. Some of the participants said they were interested in videos, but teenage participants added that they wanted interesting videos that addressed their needs and values. Some focus group members felt lectures were an ineffective means of communicating nutrition information. Several participants were interested in hands-on activities, group settings and pamphlets.

Audiocassette tapes have been used successfully in educational programs for geographically isolated or hard-to-reach individuals. A nutrition education program using audio cassettes to reinforce personal instruction was developed for EFNEP and its effectiveness evaluated in a study conducted by Travis et al. The development of the program was spurred by the need for the EFNEP program to reach more households than the PAs could reach by face-to-face contact. The audiocassettes were used in six weekly group meetings led by PAs. Each tape consisted of a 10-15 minute lesson and was then followed by a “live” discussion. Participants were able to take the cassettes and a tape player home to share with their friends and family. Existing EFNEP evaluation instruments were adapted to measure nutrition knowledge and food shopping behavior at the beginning and end of the six-week program. The authors concluded that there were several advantages associated with using the cassettes: 1) the ability to provide information via spoken communication which required neither good eyesight nor literacy; 2) protection of the message from distortion; 3) the ability to adjust, repeat, or stop the instruction according to the pace of the participants; 4) ability to adapt the language and examples of the lesson to match the cultures of the participants; 5) simplicity, durability and portability of the lesson; and 6) relatively low cost. Disadvantages associated with the program pertained to the time required to develop the cassette tapes.

Television watching is a common past-time in the United States. Several surveys have noted that the majority of Americans spend several hours a day watching television. As a result, videotaped and televised instruction may be an acceptable medium for nutrition education. It has been suggested, however, that passive television viewing does not necessarily stimulate critical thinking. Doark et al. identified three characteristics of videos that facilitate learning among low literacy clients rather than mere passive watching on the part of the viewer. The first characteristic, viewing time, emphasizes that most videos should have a run time no longer than eight minutes. Individuals with low literacy skills have been shown to have a short attention span and may lose interest with longer videos. Doark et al. recommend that videos that are
longer than eight minutes should be broken up into segments separated by live discussions. The second characteristic identified by Doark et al.\textsuperscript{42} is a focus on behavior change. Videos that present too much factual knowledge may seem boring or overwhelming to the viewer. The third characteristic of a video that facilitates learning is the incorporation of interaction with the viewer. Doark et al.\textsuperscript{42} noted that videos that provide some sort of interaction, such as worksheets that are completed with the video, better promote attention and long term learning.

Television and videotaped instruction, although primarily studied in university settings, has been shown to significantly improve nutrition knowledge.\textsuperscript{106-109} Christopher et al.\textsuperscript{109} found that post-test scores of college students in video instructed groups were at least as high as the scores of students in a conventional lecture group. Considering the influence the media has in influencing food choices and the “entertainment appeal” of television, the use of televised or videotaped programs to deliver nutrition education may be particularly effective.

Television and videotapes have recently been used as a means of patient education in a clinical setting.\textsuperscript{110-115} The majority of these studies have used short term knowledge gain as their primary outcome measure rather than behavior change. In addition, virtually all involved a one-time video instruction rather than a series of lessons over a period of time. Bethea et al.\textsuperscript{110} compared the effectiveness of videotaped instruction with conventional diabetic exchange list instruction. Patients consisted of mostly white females, had less than a high school education and incomes below $10,000. Pre and post instruction knowledge quizzes indicated significantly higher knowledge scores after instruction. Patients that were instructed about exchange lists by videotape did not have significantly different gains in knowledge scores than those instructed by the dietitian.\textsuperscript{111} Few studies have examined the retention of such knowledge gains in the long term.\textsuperscript{113}

Meade et al.\textsuperscript{115} reported that patients that received patient education via a booklet written at a 5-6\textsuperscript{th} grade reading level had similar knowledge gains to patients that watched a seven and one half minute video tape of similar content. Both education methods resulted in significantly higher knowledge gains when compared to controls. Therefore, Mead et al.\textsuperscript{115} concluded that printed materials when written at appropriate grade levels are as effective as videotapes in teaching low-literacy patients. While most studies have shown instruction via videos to be equal or more effective than other methods (face-to-face instruction, group instruction or written materials) in improving short-term knowledge gains, television or videos also have the potential to present powerful role models of particular behaviors,\textsuperscript{116} facilitate the visualization of concepts difficult to explain in words,\textsuperscript{109} and reduce the amount of time the instructor must spend with each individual.

A review of the use of television as an education tool by Neilson and Sheppard\textsuperscript{116} concluded that video instruction could be used in the process of skill building. While practice was cited as the most effective means of teaching manual skills, video instruction that included demonstrations of the skill was reported to facilitate knowledge acquisition and in turn lead to
skill development. It is, therefore, possible that videos that demonstrate basic food preparation and food safety practices may contribute to the learning of these skills. Neilson and Sheppard cautioned that the use of television and video systems are not a substitute for human interaction in patient education which is vital to the needs assessment and timing portions of the educational process. Doark et al. also noted that the educator must be involved in the teaching process and that videotapes cannot be used alone. Educators are needed to give patients a brief preview of the video and to promote interaction during the video especially if it is longer than eight minutes.

A major limitation concerning the use of television for dietary instruction is the lack of two-way communication between the instructor and the learner. In addition, the absence of emotional support may affect the motivation to learn. Klapper concluded, however that learners may learn effectively via television as long as they have some contact with the instructor. An effective means of communicating such messages must be appropriate to the point in the behavior change process at which the message is targeted. Other research has found that when an individual must decide whether or not to adopt a suggested behavior, an interpersonal network is usually more influential than media channels (e.g., printed materials and broadcast media). It is thereby necessary that instructors are used to reinforce video and television messages and facilitate the adoption of new attitudes and behavior (helping move individuals through the change process).

A study conducted by Byrd-Bredbenner et al. examined the effects of using video versus traditional lecture methods of delivering nutrition information on attitudes and food purchasing habits. Members of six different community or civic groups were instructed via two five minute color videos or a series of posters accompanying a five minute lecture on the same material. Question-and-answer periods followed both the video and lecture sessions and each session ended with a nutrition education activity. The researchers assessed the participants' nutrition attitudes, nutrition knowledge using pre and post-tests. A follow-up test assessed retained knowledge and changes in certain food behaviors as a result of attending the sessions.

Both lessons significantly improved the nutrition knowledge of participants and there was no difference in knowledge gains between the two groups. However, neither group had any affect on attitude or food behavior scores. The authors suggested that the lack of affect upon attitudes and behaviors might be the result of sessions focusing more on providing information than changing attitudes and behaviors. Interventions need to enable participants to get “hands-on” experience and practice skills. They concluded that use of informational videotapes accompanied by “live” discussion and activities may be an effective means of providing nutrition education.

In addition to the need for interaction with the instructor and videotapes that focus upon behavior change, other characteristics of videotaped lessons may influence their effectiveness. Doark et al. has reported that viewers at all literacy levels tend to lose interest after
approximately eight minutes of viewing a videotape. Humor, absorbing story lines and visual effects may be used to maintain interest in the video for a longer period of time. In addition, providing interaction with the videotape via a discussion or worksheet may better hold the viewer’s interest and facilitate learning. The acceptance of televised instruction by college students has been related to the sophistication of visual resources and the acceptance and enthusiasm of the supervising teacher. In addition, the inclusion of motivational material, the difficulty of the information presented and whether the video is culturally appropriate may all affect its effectiveness.

Fine et al. examined whether the differences in gains in nutrition knowledge were related to the individual’s ability to understand and motivational factors. A group of 264 low-income white women were classified into groups based on ability and motivational level. Subjects were randomly assigned to the Test group, Control, or baseline group. The test group received a lesson in basic nutrition consisting of a video and a booklet, both embellished with motivational material. Those classified as low ability received the material in a simplified format. The Control group received a video and booklet with no simplified or motivational material. The baseline group received no instruction. The Test and Control group both scored significantly higher on the post questionnaire than did the baseline group, but there was no difference between the Test and Control group. The authors concluded that while those individuals classified as more highly motivated scored higher on each questionnaire, the presentation of motivation or simplified materials had no significant effect on learning ability.

The results of previous studies indicate that videotapes are an effective means of improving nutrition knowledge, and knowledge of the consequences of poor dietary habits. Videotapes may allow for the visualization of concepts, the presentation of more information in the same amount of time, may be readily adapted to the culture of the participants, and allow for greater flexibility for learners and PAs. The study conducted by Byrd-Bredbenner et al., however, emphasizes the need for active participation and social support in a nutrition education program. Therefore, future nutrition education efforts that utilize videotapes should be combined with interactive activities.

The success of delivering nutrition education via videos and telephone discussions is, of course, dependent upon the homemaker's access to a videocassette recorder (VCR) and telephone. A survey, conducted by the Simmons Market Research Bureau, Inc. in 1990, showed that 43.8% of US households with incomes between 10,000 and 19,000 dollars owned at least one VCR. In households with incomes less than 10,000 dollars, 26.2% owned at least one VCR. No known studies have reported the prevalence of VCRs in low-income households in Virginia. In a preliminary survey, Virginia EFNEP PAs estimated that 54% of EFNEP home makers had VCRs (A.L. Hogbin, unpublished data, September 1996). The percentage of clients estimated to own a VCR varied from 10% to 100% depending upon the area (see Appendix J). Most clients were reported as either having a telephone in the home or were able to arrange to call PAs from another location.
Summary

Data from recent surveys suggest that low-income individuals may be at increased risk for several diet-related diseases. Increasing the food purchasing power of low-income persons, however, does not necessarily mean that these additional funds will be used to purchase healthy nutritious foods. Programs, such as EFNEP and SCNEP that target nutrition education to low-income households, may be limited in their reach due to current program delivery methods. Consequently, alternative methods of delivering lessons need to be developed and evaluated. Videotaped lessons have been successful in increasing the short-term knowledge gains of patients, however, the effectiveness of video lessons in facilitating behavior change has not been extensively studied. Research does indicate, however, that the use of video lessons should be combined with interaction with the PA in order for learning to take place. Certain characteristics of the participant, such as one’s locus of control, RVs and situational context, may also impact the effectiveness of delivering lessons via videotapes. In addition, qualities of the videotape, such as length, difficulty, and cultural appropriateness, may also affect learning and behavior change. Overall, current research indicates that an interactive curriculum employing video lessons could potentially be an alternative means of delivering nutrition education to low-income homemakers.