

Food and Nutrition for Life: Malnutrition and Older Americans

**Report by the Assistant Secretary for Aging
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A black man in his late 70s has four small cans of string beans and one pork chop--his food for the next two weeks.

An 80-year-old Chinese woman eats only half her meal at the senior center because she's made a pledge to feed a 90-year-old Asian couple who receive only a home-delivered lunch--her half-eaten lunch is their dinner.

An elderly white widow has to choose between buying winter boots and buying food--she bought the boots.

An 80-year-old Hispanic woman was found alone and eating dog food before her neighbor brought her to an emergency food pantry.

An 82-year-old black woman's grandson steals her money and her home-delivered meals.

Unfortunately, these and similar situations exist in communities throughout the country (1). Even with the currently funded federal, state, local and private nutrition programs, hunger and malnutrition continues to exist among older Americans.

What causes malnutrition among older people? Who is malnourished? How does malnutrition among the elderly affect society? What national programs are addressing malnutrition among older Americans? What are the challenges, limitations and gaps in nutrition and aging research? What are the recent legislative and policy responses to malnutrition in older people. Using information published over the last five years by

researchers, health professionals, social policy and aging experts, national organizations and program administrators, this issue paper will attempt to shed some light on these questions.

Malnutrition: Webster defines malnutrition as "faulty or inadequate nutrition; poor nourishment resulting from insufficient food, improper diet, etc." (2)

Simply put, malnutrition occurs when a person doesn't eat adequate calories, protein, vitamins or minerals. Maintaining adequate nutrition depends on two conditions: 1) consuming adequate calories and protein to give the body fuel and materials for tissue building, maintenance and repair, and 2) consuming a variety of foods to give the body the right amount of vitamins and minerals needed to assist in managing the body's machinery. If adequate calories, protein and other nutrients are eaten from a variety of foods, malnutrition does not occur in healthy people.

Malnutrition is usually thought of as too little nutrition, but often it's defined more globally to include excesses of calories and nutrients. The focus of this paper is on poor nutritional status and malnutrition related to general dietary inadequacies or deficiencies, i.e., inadequate food and nutrient intake alone, or inadequate food and nutrient intake in combination with or resulting from the effects of disabilities or illness. Malnutrition in older people is a complex condition caused by the culmination of multiple and often synergistic factors in their lives. Although overconsumption of calories, toxicity due to excessive consumption of a single nutrient, and single nutrient deficiencies due to medication, drug abuse or abnormal physiology are also forms of malnutrition, they are beyond the scope of this paper.

What causes malnutrition among older people?

Throughout life we constantly move along a continuum of wellness and illness. Older adults are a diverse group in all aspects of their lives, and the variations in their physical and physiological functions are greater than in any other age group (3). It's important to understand that the aging process itself is not usually a cause of malnutrition in healthy active elders. In fact, from long-term observation and study, researchers conclude that even with aging, healthy active older people and younger adults have similar nutritional requirements (4).

Every malnourished older person has his or her unique set of life decisions, circumstances and events that come together on the continuum of wellness and illness to cause malnutrition. Previously well-nourished elders can become malnourished when they experience physical trauma or stress, such as surgery, infection or injury. This stress can increase their metabolism and their protein, calorie and nutrient needs to such an extent that if their nutritional intake does not meet their increased needs, they may become malnourished. For others, malnutrition can occur due to inadequate nutritional intake caused by any number of factors and conditions (5,6).

Experts agree that the risk for malnutrition is high among specific groups of elders, especially those with inadequate income to purchase food, those who are isolated, and those who suffer from illnesses, disease and other conditions affecting independence (4,7-10). Any circumstance that interferes with consumption of adequate calories, protein and other nutrients from a variety of foods increases the likelihood of malnutrition. Therefore, because these specific groups of elders are more vulnerable to the multitude of life

circumstances and factors that cause inadequate nutritional intake, they are more likely to become malnourished.

Older persons who don't eat enough food to provide the energy and nutrients their mind/body needs to function will become malnourished. The reasons for older people eating too little food can be as simple as too little money or as complex as disease, too many medications and too dependent on others. A common cause of malnutrition in surgical patients has been starvation that occurs when patients are maintained in the hospital for several days or longer without solid food (11). Lipschitz has described the rapid onset of protein-energy malnutrition in older people during trauma such as surgery or illness. Unlike younger adults, older persons have reduced muscle and therefore reduced protein stores that can be depleted in as little as three days when they experience trauma and can't eat (12).

Inadequate nutritional intake affected the nutritional status of a group of underweight home-delivered meals clients who were in a small study and received either regular meal service (five meals per week), meals plus liquid supplements, or extra meals. These clients were pre-screened to ensure none had any known debilitating disease that causes wasting. The majority of those receiving the added calories and nutrients from liquid supplements or extra meals gained weight and lean body mass (muscle). Those receiving regular meal service lost weight and lean body mass (13). This study showed that inadequate nutritional intake has nutritional and physical health consequences, and that with enhanced home-delivered meal service, the impact of inadequate nutritional intake can be reversed.

Still, even when provided with adequate food older people may eat too little. Of 21 hospitalized patients, those over 65 years old ate food containing significantly less calories and nutrients over the course of their hospital stay than did the younger patients. Younger patients met 87 percent of their caloric needs with very little weight loss, while those over 65 met only 56 percent of their caloric needs with significant weight loss (14). A small study of home-care clients, the majority of whom were elderly, found almost all of them eating insufficient calories and protein needed for healing of their surgical wounds (15).

These examples help illustrate how changes in nutritional status seen in older people are often secondary to the multiple factors of disease, medication, trauma, living situation, and others (4,5,16-18).

Risk Factors

A number of specific and significant risk factors that are highly associated with poor nutrition, poor health and greater use of health services have been identified (19). Although they are labeled and categorized in many different ways, these multiple risk factors are the biological, psychological and social stressors which, in any combination, can negatively affect an elder's nutritional intake and eventually his or her nutritional and physical well-being (20-25). At the same time, certain diseases, conditions and medications can also affect metabolism, and when added to the "risk mix" may further hasten an older person's nutritional and physical decline on the continuum of wellness and illness.

The selected risk factors associated with inadequate nutritional intake that can cause or contribute to malnutrition and that will be discussed in this paper include (19,24,26,27):

- diseases and conditions

- specially prescribed diets
- mouth and tooth problems
- unintentional weight loss
- disability, functional impairment and dependency
- nursing homes
- chronic use of multiple medications and alcohol
- poverty and social isolation.

Diseases and Conditions. Certain diseases and conditions are more prevalent in older than in younger adults and often negatively impact nutritional intake which, in turn, can negatively impact nutritional status (3,28-32). Physiological changes that may influence nutritional status are listed in Table 1; it is not clear whether these changes are due to normal aging or disease process.

Diseases or conditions suffered by older adults are not often fatal. Four out of five adults over 65 suffer from arthritis, high blood pressure, heart disease or diabetes, with 35 percent suffering from three or more of these (33). In 1991, one out of three of those 75 years and older rated their health as fair or poor, and a number suffer from chronic conditions that are not well-managed (7,29,32). Older women suffering more long-term chronic disabling diseases seem to bear the brunt of impairments, while older men tend to develop relatively short-term fatal diseases (29,34).

While the complex and involved relationships between all disease and malnutrition cannot be fully addressed here, Table 2 does list some chronic diseases and conditions experts have associated with malnutrition in older people. Acute conditions (meaning severe but of short duration) that are also associated with malnutrition include infection, injury, surgery, radiation, chemotherapy and other medical therapies (5,9).

Table 1. Changes in Organ Function with Aging that May Influence Nutrient Status (adapted from information in Ausman 1994)

ORGAN	FUNCTION CHANGE
Taste and Smell	Decreased taste buds on tongue
	Decrease in nerve ending response to taste and smell
	Change in taste and smell threshold
Salivary Glands	Saliva flow may be reduced
Esophagus	Minor changes that may affect swallowing

Stomach	Decreased secretion of some digestive acids and substances
Liver	Decreased size and blood flow
	Decreased ability in breakdown of drugs and alcohol
Skin	Decreased efficiency in vitamin D synthesis

Other aspects in the complex relationship between malnutrition, disease and conditions deserve mention. Malnutrition due to disease can be further aggravated by any increased energy and nutrient needs (resulting from fever, chronic infection and disease-related changes in metabolism) or by impaired appetite, chewing, swallowing, digestion and absorption of nutrients (6,9). Malnutrition can be both a cause and an effect and its presence can further complicate the progress and outcome of any disease or condition. This is due to the serious health consequences that can result from unattended malnutrition, including decreased immunity, delayed wound healing, weight loss, decreased muscle strength, altered body responses to medications, confusion and disorientation (6,9,35,36). For some older people with weight loss from chronic lack of appetite and malnutrition due to multiple and serious diseases, increased calories and nutrients from even the most aggressive nutritional interventions have not been successful in reversing their decline (37-39); however, according to Dwyer, for these individuals, "nutritional intervention can help to prevent or control malnutrition secondary to disease and minimize adverse health outcomes which would otherwise result" (9).

***Specially Prescribed Diets.* Many older adults are placed on specially prescribed diets as part of medical treatment. However, many do not receive appropriate and adequate nutrition counseling or education (40). Currently nutrition counseling or education is not a commonly reimbursable medical expense, even though a special diet is often a significant part of the first-line treatment for many chronic diseases.**

Common Chronic Diseases and Conditions in Older People Associated with Malnutrition (adapted from information in Roe 1992, Dwyer 1991, Chernoff 1991, Institute of Medicine 1990)

- **Alcoholism**
- **Arthritis**
- **Cancer**
- **Chronic bronchitis and emphysema**
- **Dental and oral disease**
- **Depression, dementia, Alzheimer's disease**
- **Gastrointestinal disorders, including maldigestion/malabsorption syndromes**

- Heart disease
- Kidney disease
- Neurological disease
- Osteoporosis
- Sensory losses, e.g. hearing, smell, vision

Written diet instructions frequently give the older person a long list of foods to avoid without adequate instruction on how to prepare foods so they taste good. Without individualized instruction and ongoing follow-up by trained professionals, older persons placed on special diets may indiscriminately eliminate foods and not substitute foods that will give them adequate calories, nutrients and eating pleasure. Specially prescribed diets often restrict salt, fat and sugar. If not expertly prepared, these same diets may offer less taste, and depress older appetites already depressed from social and chronic disease factors (3). A unique study in Norway looked at the existence of undernutrition and reduced dietary intake in older people living at home just prior to their hospitalization. When compared to a representative group of community-dwelling elders who did not need hospitalization, those recently hospitalized were more often on prescribed diets, enjoyed their food less, and consumed too few calories. The recently hospitalized group also showed more signs of undernutrition than could be attributed to illness alone (41).

For older people living in nursing homes, some special circumstances related to prescribed diets and avoiding malnutrition have been described. Inappropriate use of restricted diets (18,20), residents going without needed modified diets, and diets incorrectly ordered for a resident's nutritional maintenance instead of nutritional replacement or "build-up," all occur in nursing homes and have all been called avoidable causes of malnutrition in older nursing home residents (20).

Mouth and Tooth Problems. An older person's food intake is greatly affected by the condition of their mouth, teeth and oral cavity (42). Oral health problems commonly found in older adults include dental caries (cavities), periodontal (gum, soft tissue and bone) disease, dry mouth, tooth loss, lack of or poor fitting dentures, medication side effects, disease of the oral tissues, and pain (9,42). According to the Institute of Medicine, around 120 physical or mental diseases produce symptoms in the mouth or affect oral function (6).

Elders with mouth and tooth problems may eliminate foods they can no longer bite, chew, or easily swallow and those that irritate an already irritated and painful mouth. The more foods older adults eliminate from their diet, the greater their chance of developing nutritional deficiencies. These nutritional deficiencies may, in turn further impact their mouth, teeth and gums, thus setting up a potentially serious cycle of ever worsening nutritional status (43).

Wearing dentures has been significantly related to poor diet in community-dwelling elders (25). A group of independent older people studied for undernutrition just prior to hospitalization, exhibited significantly more chewing problems than a comparison group who did not need hospitalization (41). Tooth loss is considered a general "yardstick" of the amount of severe oral health problems suffered by groups of people (6). About one third of adults over the age of 65 have lost all of their natural teeth; this rises to 46 percent of those

with low income, and 50 percent to 55 percent of those over 80 (3,6,7). Anywhere from 30 percent to 80 percent of nursing home residents have lost their teeth and are affected by impaired swallowing (25,44,45).

Normal saliva flow is necessary for oral health as it protects teeth and tissues from microorganisms, facilitates chewing and swallowing and is essential for taste (42,43). Nearly one in five older adults is said to suffer dry mouth (xerostomia), a side effect of some diseases and medications (46). In general, elders with dry mouth may have difficulty wearing dentures, may have altered taste, and may have difficulty eating. They may also experience pain due to deteriorating mouth tissues (42,43,46). Older adults with decreased saliva flow and those with diabetes are at special risk for periodontal disease (5,47). All of these problems can contribute to poor nutrition (42,43,46).

Swallowing problems are common in older adults and can profoundly affect food choices. In a study of homebound elders in New York, difficulty in swallowing was positively related to not eating for one or more days (23). Lack of assessment or lack of effective treatment of swallowing problems have been identified as avoidable causes of malnutrition in nursing home residents (20). Overall poor oral health is associated with protein-energy malnutrition, and was found to be a good predictor of involuntary weight loss, one important indicator of poor nutritional status (22,47). It is abundantly clear that oral health problems that interfere with chewing and swallowing, and thus affect food choices, will affect an elder's nutritional status (9,22,24,27,43,47).

Unintentional Weight Loss. When measured by its most serious consequence, weight loss can literally become a marker between life and death. Weight loss is one of the most important and sensitive indicators of malnutrition, with both low body weight and unintentional weight loss highly predictive of death and the rate of disease in older people (17,20,25,28,44,48,49). As early as 1936, weight loss and the outcome of disease and surgery were seen to be related when patients with large weight loss prior to peptic ulcer surgery had a higher death rate compared to weight-stable patients (48). Today, studies have found similar results in surgical patients and in the survival of older nursing home residents (25,45,48).

Although adults as they age experience a decline in metabolism and organ and muscle tissue (3,42,50,51), the most frequent causes of unintentional weight loss are acute and chronic illness (17,22,24,25). An unintentional weight loss greater than 20 percent of a person's usual weight is associated with protein-energy malnutrition, and a weight loss of 10 percent to 20 percent over less than six months places a person at risk for impairment of organ functions. Experts emphasize looking at total weight loss over time, since overweight elders who experience a rapid weight loss may continue to appear overweight and still suffer from protein-energy malnutrition (48).

Recent studies confirm that depression, cancer and other diseases cause involuntary weight loss in older adults; however, in about 25 percent of those studied, the cause could not be identified (52,53). The multiple factors that cause and contribute to unintentional weight loss in older adults are often intertwined and sometimes defy separation, including (25, 52):

- physical disease including cancer, gastrointestinal disorders, uncontrolled diabetes, cardiovascular disorders, alcohol addiction, pulmonary disease infection and hypothyroidism

- psychiatric disorders including depression and dementia
- inadequate energy intake
- mouth and tooth problems
- alterations in gastrointestinal tract function
- drug - drug/nutrient interactions
- functional disabilities
- socioeconomic conditions

Disability, Functional Impairment and Dependency. The ability to shop, cook and eat are necessary functions if older persons are to care for themselves nutritionally. The incidence of disabilities that may interfere with adequate nutritional intake appears to be high among older persons discharged from hospital to home (9). Therefore, for many disabled elders living at home, the ability to function with their disability becomes as important in their life as treatment for their disease (28). Table 3 lists common disabling conditions identified in homebound elders.

Significant numbers of older adults, especially the oldest and the poorest, have difficulty with one or more home management activities, including shopping and cooking (31,32,54). Recently hospitalized elders who were undernourished just prior to their hospitalization, were more often unable to prepare meals for themselves and needed more help for both shopping and cooking (41).

Any disease or condition that eventually affects physical strength and stamina, or thinking, reasoning and making judgements, creates higher risk for malnutrition through loss of function. For example, emphysema can cause such a loss in physical strength and stamina that an older man's physical capacity to leave home, shop for and prepare food is lost completely, even if his energy to eat remains. Serious chronic depression and dementia can affect an older woman's mental capacity for self-care even if her physical health is not initially impaired. Beyond her incapacity to leave home to shop, she can lose her ability to cook and her appetite and eating are affected.

Common Disabling Conditions in Homebound Elders (adapted from information in Rudman 1989)

- Arthritis
- Dementia
- Heart disease
- Hip fractures (post-hospitalization)
- Lung disease
- Parkinson's disease

- **Stroke (post-hospitalization)**

Although these are examples of severe impairments, even less severe impairments can appear in an elder's life in multiples and the impact on function can be significant. Individually, a mild balance problem, beginning loss of vision, and a case of painful but not yet crippling arthritis may seem to be relatively mild conditions. But when combined, they can make the odds of older people getting out their front doors and safely to market seem insurmountable.

In all cases where disease or condition affects function, which in turn affects access to food, and food and nutrient intake, the question becomes does the individual have a support network adequate to compensate where he or she can no longer function? Without adequate support, impaired elders can be in severe jeopardy and at greater risk of becoming poorly nourished, undernourished and even malnourished (9,25,55). The importance of this support for impaired older people is reflected in the fact that out of all the health promotion and disease prevention objectives created for the national Healthy People 2000 project, the one community nutrition service singled out for its own objective is home-delivered meals for the elderly (7).

Nursing Homes. Being admitted to a nursing home does not safeguard older people from nutritional risk (56). The complex causes of malnutrition in nursing homes are rooted in disease, conditions and disability, and deserve special comment here (9,18,45,56).

The diseases and conditions commonly associated with older nursing home residents, and with the development of malnutrition, are chronic mental disorders, kidney failure, emphysema, severe heart disease, cancer, chronic severe depression, and impaired manual dexterity (18,45,56). All these diseases and conditions can cause or contribute to weight loss, while at the same time some cause increased nutritional needs, decreased capacity to think, reason and pay attention, and impaired ability to feed oneself. To make matters even worse, residents' loss of appetite with related weight loss has been found to be already present upon admission to the nursing home (57), and the medications prescribed for these diseases and conditions often affect appetite, chewing, swallowing and other aspects of digestion.

The increased severity of residents' diseases and conditions raises their functional dependence on staff to a critical level. Thus awareness of residents' nutritional needs by nurses, physicians and staff aides, along with allocation of adequate institutional resources, is critical to meeting residents' nutritional needs. Unfortunately, most long-term care institutions struggle with multiple financial, staffing and treatment and care issues that can negatively impact residents' nutritional care.

Food may be served but is not eaten, especially when there are too few staff to feed residents who need feeding (4,18,20,45,58). One study showed an average of six to ten minutes of staff time spent feeding each resident (58), when 30-45 minutes may be necessary to adequately nourish each feeding-impaired resident (45). Another study found eating dependency in nursing home residents significantly related to multiple impairments and early death (45,59).

A high frequency of infections and fevers can occur in a number of older residents, recurring for some as frequently as every three months. With each recurrence, these residents' nutritional needs increase but are unlikely to be met (4,18,44,45,60). These same residents can experience frequent trips to the hospital for various acute episodes, during

which time even more weight can be lost and nutritional needs become even greater, and more difficult, if not impossible, to meet. And finally, physicians often don't recognize the presence of malnutrition and are unaware of how to best manage it (20,56,58,61).

Given these multiple complex problems, it is clear that for nutritional risk and malnutrition many nursing home residents have the deck stacked against them. Rudman calls the nursing home scenario of too little food and the high rate of infection and protein-calorie malnutrition, an "analogy to the nutrition-infection vicious cycle in Third World populations" (44,45).

Chronic Use of Multiple Medications and Alcohol. Older people in the U.S. and Canada consume 25 percent of all prescription drugs, while at the same time they are only 12 percent and 11 percent respectively of their country's population (27,46). Over \$26 billion was spent on outpatient prescription drugs in the U.S. in 1988, and 34 percent of that was spent by those over the age of 65 (29).

Older adults are often treated with multiple medications for multiple chronic diseases, and as a group take more medications than any other age group in this country. It is estimated that older adults living at home take three or more medications per day; those in nursing homes and hospitals take from eight to ten (6,33,62,63). Medications for heart disease, arthritis, neurological disorders, respiratory and gastrointestinal conditions are most often prescribed for older adults (3,33,46). High percentages of older people also regularly take over-the-counter medicines for the more usual aches, pains and maladies of cold, flu, sinus, indigestion, constipation, gas and diarrhea (6,33). Add vitamins, minerals and other "health" supplements to this medication array, along with their added risk of overdose and potential interference with medication absorption and effectiveness, and it's understandable why older adults are more susceptible to medication problems.

Studies of large numbers of patients across several countries found three to eight percent of all hospital admissions were for adverse drug reactions (6). Almost one-third of the adverse drug reactions reported to the U.S. Food and Drug Administration (FDA) were in older people (33). These drug reactions are more frequent after the age of 60 and rise sharply in elders taking five or more drugs per day (63). Additionally, the susceptibility of older people to adverse drug reactions is related to gender, health status, ingestion of drug-interacting foods and alcohol, and a previous drug reaction (33,42,63). Reactions may range in seriousness from less than desired treatment results to drug toxicity (5), which can be life threatening.

A variety of events and factors can come together to cause drug reactions in older adults. These include (3,6,5,33,42,46,63):

- inability to follow complex multiple prescription medicine routines;
- interactions between over-the-counter medications with prescribed drugs;
- error in drug dosage due to issues of optimal doses for older persons;
- prescriptions written by multiple physicians; and
- age-related changes in the body, especially the liver, that alter the way drugs are absorbed, circulated and eliminated from the body.

In addition to an increased risk for drug interactions, multiple drug use over long periods of time can effect how the body uses nutrients. For elders who have chronic illnesses, are chronically malnourished, or both, multiple medication use might further weaken what nutritional reserves they have managed to maintain. Medications can affect the ability to eat (by causing loss of appetite, reduced or altered taste and smell, painful swallowing, reduced saliva flow, nausea and vomiting) and can affect the absorption of nutrients or the body's use of those nutrients once they are absorbed (3,6,33,42,46,62-64). Medications that cause or contribute to malnutrition are most commonly those that cause nausea, vomiting or other adverse reactions to food (5).

In studying risk for drug-induced malnutrition in 390 older nursing home residents from ten different nursing homes, Varma concludes that given the common drugs that are used with older nursing home residents, nutrient deficiencies may occur in vitamins B6, B12, C, D and K, phosphate, potassium, calcium, magnesium and zinc. But perhaps even more important to the issue of malnutrition due to multiple medications is Varma's finding that of those residents taking one or more drugs causing loss of appetite, nausea, vomiting and aversion to food, 41 percent lost more than 10 percent of their body weight over three to 12 months. Only 63 percent of those who lost weight had blood protein levels measured and recorded in their medical records, but of those, almost one-third were below normal (62).

While certain drugs in combination with other drugs or other factors can cause or contribute to malnutrition in older people, malnutrition itself can affect drug absorption, transport, metabolism and clearance (3,5). Therefore, if elders are malnourished, drug absorption and utilization may be altered (42).

Chronic heavy alcohol use can negatively affect the nutritional health of the older person if the alcohol replaces nutritious food in their diet, causes them to lose their appetite or become forgetful, depressed and confused (3,9,18,28,65). Any of these outcomes from excessive drinking can lead to inadequate calories and nutrients, and poor nutritional status may result (3,18,28). Alcohol consumption has been identified as a risk factor for osteoporosis, diabetes, high blood pressure, cancer and liver disease (6,28), and if body organs and functions important to nutrient utilization are damaged (3,18,28), malnutrition secondary to a number of health problems may develop (9).

Poverty and Social Isolation. Poverty is a major problem for many older people. Twenty percent of the 65-plus population were poor or near poor in 1991, with 3.8 million living below poverty and 2.3 million living near poverty (i.e., 125% of poverty) (31). The oldest old, minorities, women, persons living alone and those with disabilities suffer the highest rates of poverty (3,31,32). The risks for undernutrition, emaciation and inadequate intake of vitamins and minerals have been frequently associated with low-income populations over the years, with many researchers reporting the relationship between income and poor nutritional status in older people (6,32,46). For example, a recent study of a representative sample of older adults in South Carolina confirmed poverty in elders was significantly related to their inadequate nutritional intake (66).

Living on fixed incomes and fixed subsistence incomes can make it difficult if not impossible to afford decent housing, utilities, health care, medications, *and* adequate nutritious food (3,5). Often food dollars are the only flexible part of an older person's budget. Cutting back on food, first in quality and variety and eventually in total amount, can be the older person's only choice in meeting expenses. When spending less money on food in order to pay other bills become frequent, serious nutritional problems become more

likely. Even the older person once considered "well off" can find an adequate and stable income eroded by ever-increasing health care and medication costs, become destitute in the midst of affluent surroundings, and begin to eat less and less in an attempt to make ends meet.

Financial independence is also crucial to living independence for disabled or impaired elders who need help to stay in their home, help that includes shopping and cooking. The 1986 Longitudinal Study of Aging reported approximately two million older people were impaired and impoverished, and of those nearly 64 percent received no assistance (29).

The reasons older people don't get adequate food and nutrients are varied and can be explained in part by the concept of food insecurity. Researchers now describe and measure hunger using a concept called "food insecurity," which exists whenever "the availability of nutritiously adequate, safe foods or the ability to acquire personally acceptable foods in socially acceptable ways is limited or uncertain" (67). In other words, elders experience food insecurity when they do not always have adequate food, when they can't always afford to buy enough food, when they can't always get to markets and food programs, and when they can't always prepare and eat the food that is available in their homes (21). Inadequate food and nutrient intake, which can cause malnutrition in older people, can begin with food insecurity. But within the concept of food insecurity lies a number of reasons for elders not getting adequate food.

A national study by the Urban Institute, *Hunger Among the Elderly*, found that older persons with incomes below poverty, especially those with the lowest incomes, suffer the greatest amount of food insecurity. But perhaps an even more important finding of this national study was that elders with incomes up to 200 percent of poverty experienced food insecurity. Thirty-four percent to 41 percent of those with incomes up to 150 percent of poverty reportedly experience food insecurity, with an added 20 percent of those with incomes between 151 percent and 200 percent of poverty also experiencing food insecurity. Although not measured, illness and its inherent medical costs and disability may have played a role in the findings of the Urban Institute Study. The study reported "health conditions," including taking three or more prescription medications or losing five or more pounds in the past six months, to be a strong factor in causing food insecurity.

"The problems of older people are both medical and social" (68), and some have said that poverty and social isolation go hand in hand. The lack of social support can play a role in the development of disease and disability, and researchers have shown a relationship between lack of social support and unhealthy outcomes of illness (6). In older adults, poor physical health and loneliness negatively affect nutrient intake (69). The loss of a spouse can create social isolation, grief and depression. Even up to two years after the loss of a spouse, widowed elders had significantly lower diet quality. Eighty-four percent of those widowed suffered unintentional weight loss that might be explained by their lower intake of calories, which as a group was 28 percent lower than those married (70).

According to the Institute of Medicine in their report *The Second Fifty Years: Promoting Health and Preventing Disability*, "Those suffering from any form of malnutrition have increased risk of being socially isolated, and the process is likely to be self-perpetuating" (6). According to Roe, going without food one or more days a week is determined by social isolation and poverty as defined by loss of mobility and inadequate assistance in obtaining food (5). The Urban Institute found that in addition to poverty, living alone combined with social isolation (defined as having no one who could help in case of illness) plays a

significant role in causing food insecurity in older people (21). Living alone also negatively impacts the nutritional intake of older adults, as elders who live alone skip meals and eat poor quality diets with fewer calories (71,72). The number of older persons living alone in this country increased by 33 percent between 1980 and 1991 to 9.4 million (31).

While experts may be interested in which nutritional risk factors occur first and which are related, it may not matter to the elder in failing health who needs someone to recognize his needs and offer help. Any combination of nutritional risk factors can happen to any older person, in any neighborhood, reflecting any social strata; and the truth may be that the causes of malnutrition in older Americans can only be known one vulnerable person at a time.

Which older people are malnourished and how many are there?

Varying degrees of malnutrition exists in the three settings in which older persons typically reside - in their own communities, in hospitals, and in long-term care facilities.

Community-dwelling elders

True Story

The TV reporter interviewed her with her face hidden, she had wanted it that way. But she couldn't hide her thin frail arms from the camera's eye. She was too embarrassed about their plight, sounded dazed, as if she couldn't comprehend how it had come to this. She and her husband had applied for assistance, but were told they weren't poor enough. They still owned their modest home in the upscale neighborhood and one car, and had some savings left in the bank. But with their deteriorating health and the cost of his heart medication, she began cutting back on her meals and her medication to make ends meet. She could see no other solution, and it went on for some time. It was the drug store check-out clerk who noticed how thin she had become. It was the drug store check-out clerk who called the TV station and asked them to help.

The last place we expect to find malnourished older people is in our own neighborhoods. In presumably healthy, community-dwelling elders, all recent national surveys have found the prevalence of protein-calorie malnutrition to be extremely low, probably less than one percent, and therefore not considered a problem in the general population (9,10,86). However, based on the most recent census, one percent would still represent close to 200,000 persons 65-74 years old and more than 300,000 of all older persons over the age of 65. Studies conducted outside the U.S. report between three percent and seven percent of community-dwelling elders are malnourished (5,27,76). A recent study in Oslo, Norway found nearly four percent of community-dwelling elders with three or more positive indicators of malnutrition (41). One U.S. researcher estimates there may be slightly more than one million malnourished homebound elders in this country (45), exactly the same number if the Oslo study percentage were applied to the general U.S. elderly population.

Speculation aside, it's generally agreed that older people in this country have been underrepresented in most of the past national nutrition and health surveys. Survey participants have been limited to those no older than 74 years, and sample sizes have been too small to give worthwhile information on elderly subgroups, such as those over age 85, the fastest growing group and possibly the group in whom malnutrition is most common

(3,10,28,32,47,49,87). The oldest and frailest elders, who are most vulnerable to malnutrition, are difficult to locate and survey. Finally, relatively few other studies of the nutritional status of older people have included even height and weight data (88).

So if today's published nutritional status survey information falls short in accurately telling us how many community-dwelling elders are likely to suffer from malnutrition, what other information can we look to for answers or insight? Published research and survey information on community-dwelling elders that may be helpful exists in the areas of food insecurity, nutritional risk screening, measures of body height, weight and impairment, and dietary intake information.

Food Insecurity in Community-dwelling Elders. The Urban Institute Study estimates anywhere from eight percent to 16 percent of American seniors, or 2.5 to 4.9 million, suffer food insecurity at least some of the time during any six-month period, with economics, race/ethnicity and health as important underlying causes. Perhaps most noteworthy is that a high level of food insecurity was found in elders living well above the official poverty line, and food insecurity continued for those elders already participating in multiple food assistance programs (21). Having one or more health conditions that interfere with eating, taking three or more prescription medications and losing five pounds within six months without trying, were found to have "the strongest causal impact" on food insecurity in elders (21).

While a national study on food insecurity does not provide definitive answers about the numbers of older people suffering from malnutrition, several key risk factors for inadequate nutritional intake are associated with that measure of food insecurity. For a number of those 2.5 to 4.9 million elders likely to experience food insecurity during any six-month period, the combination and repetition of those risk factors in their lives may determine whether or not they become severely undernourished. In one group of New York homebound elders, researchers found ethnicity, residential location, receipt of Medicaid, living alone, health problems, mobility, age less than 80 years, cancer, nausea, difficulty swallowing, diarrhea, loss of appetite and receipt of food from a food pantry were all characteristic of those not eating for one or more days (23).

Nutritional Risk Screening of Community-dwelling Elders. Screening for nutritional risk among older people is taking place across the country with the advent of the Nutrition Screening Initiative several years ago. Although the screening tools developed by this initiative have come under question (89-91), they've been used as a first-line screen for what's been called *potential* nutritional risk in at least one state (89). In Delaware, approximately 1,000 elders at 40 senior centers were screened with 48 percent reported as scoring in the mid- to high range for nutritional risk (92). In Nebraska, a random sample of 1,500 representative older persons was screened by telephone interview, and 40 percent were classified at nutritional risk (93). In North Carolina, a random sample of over 2,000 nutritional risk screening tools completed by older adults, showed 50 percent scored in the moderate to high range for nutritional risk, with 33 percent scoring in the highest range (94). Throughout the state of Washington over 7,000 elders, 54 percent of whom were over the age of 75, were screened with the average statewide risk score found in the moderate range (95).

Nutritional risk screening is not a direct measure of malnutrition, but it is an attempt to use the research relationships between risk factors and inadequate nutritional intake to

identify those older persons more likely to experience poor nutritional intake and other nutrition problems. While further research is necessary, the fact that nearly half the survey populations in these states were found to have multiple risk factors for inadequate nutritional intake speaks volumes to the numbers of community-dwelling elders with nutritional issues and problems. In a study of the services home health nurses provided in four states to almost 2,500 home health clients, the majority of whom were older adults, nutrition problems ranked sixth out of the nine most frequent problems requiring intervention (96). The unaddressed nutritional problems of many older people in the community can progress to malnutrition.

Recommended Dietary Allowances (RDA): The levels of intake of essential nutrients that, on the basis of scientific knowledge, are judged by the Food and Nutrition Board to be adequate to meet the known nutrient needs of practically all health persons.

Dietary Surveys of Community-dwelling Elders. One-third to one-half of elders' health problems are thought to be related to inadequate nutrient intake (66). Recent surveys, one national and several local, have confirmed continued inadequate intakes of vitamins B6, B12, C and E, manganese and magnesium by elders. At least 40 percent consumed calories at less than two-thirds of the Recommended Dietary Allowance (RDA), and over 40 percent consumed less than two-thirds of the RDA for vitamins A and E, calcium and zinc (16,66,97,98). These recent surveys suggest that the dietary intake of many older people remains inadequate, leaving them at risk for inadequate caloric intake and subclinical nutrient deficiencies which could develop into other health problems and malnutrition.

Multiple dietary restrictions for treatment of multiple chronic diseases can result in insufficient food intake and dietary inadequacies. In a survey of over 3,000 rural older adults living in 11 U.S. southern states, nearly 44 percent were following one or more special diets with all the groups consuming less than recommended calories at two-thirds the RDA or less (99). Of those participating in the senior nutrition program in Virginia, 17 percent of men and 30 percent of women were placed on special diets by their physicians (100). Additionally, 79 percent of geriatric residents in community foster care homes in Baltimore and Honolulu needed special diets (101). For those receiving, or referred to, in-home services, 36 percent to 60 percent have been reported to be on special diets (102-104).

Measures of Height, Weight and Functional Impairments in Community-dwelling Elders. Body weight for height is one measure of malnutrition that may reflect underlying chronic disease (105) and helps determine strength versus frailty. National health and survey data from 20 years ago showed five percent of community-dwelling elders 65-74 years old to be underweight (102). A more recent regional study with over 1,100 community-dwelling elders, and several local studies on hundreds of community-dwelling elders showed that anywhere from ten percent to 34 percent were found underweight compared to recommended guidelines (88,106,107), and 18 percent of homebound elders receiving home-delivered meals in the state of New York were found to be underweight (104).

As discussed earlier, frailty and functional impairments that affect food intake are important factors in determining where an older person may sit on the continuum of well-nourished to malnourished. Given the nine-year study of over 1,500 urban elders that found two to eight times as many impaired or disabled elders cared for in the community as in institutions (108), it's especially appropriate to consider the level of impairment of community-dwelling elders in relation to their potential risk for malnutrition.

Approximately six percent of elders, age 65-69, have difficulty with one activity of daily living, and that number increases to 34 percent for those over the age of 85; when the difficulty lies in shopping for and preparing food, inadequate nutritional intake and malnutrition may lie just around the corner. For community-dwelling elders of all ages, 11 percent have difficulty shopping, with approximately seven percent unable to shop without help. Nearly eight percent have difficulty cooking, with five percent unable to cook without help (29).

Malnutrition and Community-dwelling Older Minorities. The information found in this review on the prevalence of malnutrition in minorities deserves special and separate comment. However, what is most notable is that for the most part nothing was found; only one study was located that specifically researched the presence of malnutrition in minority elders.

Williams and Boyce report a marked prevalence of protein malnutrition (in the absence of energy undernutrition) in older Navajos using several measures of malnutrition. They conclude that long-term protein malnutrition, and not just malnutrition due to acute illness, exists in this population (109). Another study of the diets of Alaska Native adults reports increasing rates of heart disease, cancer and diabetes among those studied; however, the population studied ranged in age from 21 to only 60 years of age (110). Otherwise, information from the Indian Health Service indicates that no dietary or other nutrition and health data has been published from the Navajo Health and Nutrition Survey of 1991-92 and all past HANES surveys excluded Indian reservations (111).

An important study was found that measured the nutritional status of older Asian-Americans in the Chicago area. Most notable from this investigation are the large percentages of Chinese (64%), Japanese (74%) and Korean (38%) women classified as thin and very thin by body muscle and fat measures. Although dietary intake was taken for only one 24-hour period, the most problem nutrients were calcium for all groups and protein for Korean women (112).

No investigations into the presence of undernutrition/malnutrition in Hispanic- and African-American elders were found, as most research attention on these two ethnic groups has been placed on the prevalence of chronic diseases such as diabetes and heart disease (106,113,114).

One recent dietary study specific to Black elders in the Boston area showed that diets of older Blacks were, on average, very low in energy, calcium, and vitamin B6, and slightly low in protein, thiamin, riboflavin, and iron. The low quality of these Black elders' diets was related to the number of meals they ate and their past and present use of support services, a measure of impairment. Over 50 percent were found eating two or less meals per day; however, in this study income was not measured or controlled (113).

A more recent local food frequency survey of older Mexican-Americans found they may have lower intakes of foods that are good sources of vitamins A and C, while a national survey found older Hispanic women to have lower than recommended calcium intakes (115,116).

Finally, one last set of information relevant to minority elders was located among the nutritional risk screening data collected in Washington State. Over 7,000 older people were screened for nutritional risk using the Nutrition Screening Initiative DETERMINE checklist and three risk score categories: 0-2 implies little risk, 3-5 implies moderate risk, and over 5 implies high nutritional risk. Statewide mean risk scores were determined for

the entire group of 60-plus elders (3.41) and for subgroups of elders. For all non-white elderly groups surveyed, statewide mean nutritional risk scores were higher than for whites (2.88), with Pacific Islander (9.65), Hispanic (6.27), Native American Indian (5.98), Korean (5.59) and Chinese (5.58) elders scoring highest for identified nutritional problems (95).

In summary, no definitive numbers are available now for how many community-dwelling elders suffer from malnutrition. However, from the research published since 1988 an estimated 2.5 million community-dwelling elders are likely to suffer from food insecurity in any six-month period, 40 percent to 50 percent are reported with moderate to high potential for nutritional risk, 40 percent are reported to be deficient in diet in typically three or more nutrients, and up to 34 percent of those admitted to nursing homes have been found malnourished. Together, these findings paint a picture of a population quite vulnerable to becoming malnourished.

Hospitalized elders

True Story

He was only 21 when he contracted polio, not long after serving in World War II. He survived the virus and the iron lung like he'd survived the war, fighting his way through a painful rehabilitation. He went on to school, to marry, to make a living and have a family. That family was shocked when, in 1992 at the age of 67, his chronic and debilitating pain was diagnosed as symptoms of post-polio syndrome. After months on slow-release morphine, after being in and out of the hospital while doctor after doctor tried to determine what was wrong, he lost the wherewithal to take care of himself. His appetite dulled by the morphine, his strength drained by the never-ending pain, he lost ground to the day-to-day struggle to eat. Concentrating on his source of pain, the doctors somehow missed his weight loss. His oldest daughter, who traveled across the country to help after his release, was even more shocked that any hospital, even if they couldn't cure his condition, would release her father so malnourished. "He looks like a skeleton," she said. He died shortly thereafter, but without malnutrition listed on his death certificate. His daughter, convinced that he died too soon, helped scatter his ashes in the desert.

Studies have identified large numbers of malnourished older people in hospitals (11, 14,27,41,73-79). This is not surprising since older people who go to a hospital are sick, debilitated with increased metabolic requirements and possibly already undernourished. These older hospital patients encounter health care professionals who aren't adequately trained to recognize and adequately treat malnourished elders (61). These same patients encounter hospital routines and policy that can add further insult to malnutrition or create it, such as not feeding patients prior to and after tests, surgery and other treatments, and required shorter hospital stays that make it virtually impossible to treat and correct serious malnutrition during the stay (11,77,79).

There is no standard way to measure malnutrition in older people and the number of elders counted as malnourished can change significantly depending upon which measure of malnutrition, and how many, are used. For example, in one study, 83 percent of surgical patients could be classified as malnourished when a single measure of malnutrition was used; that number dropped to 28 percent when malnutrition was defined using three

measures (78).

Studies using two or more measures of malnutrition found six percent to 39 percent of hospitalized elders were malnourished (78-80). It's interesting that Hart and Associates' opinion survey found that health care professionals provided similar estimates of 34 percent to 50 percent when interviewed; geriatric physicians estimated 50 percent, geriatric nurses 43 percent and hospital administrators 34 percent (75). All other studies reviewed reported percentages of malnutrition between five percent and 63 percent; however, either only one measure of malnutrition was used or it was impossible to determine if more than one measure of malnutrition was used (76,77,81-83).

Elders in institutional long-term care

True Story

In her wheelchair, carefully draped with soft coverlets, she looks tall and proud, somehow almost statuesque even with her 5'5" frame sitting. She's 100 years old and with caring hands they tend to her. It takes the rest home staff some time to feed her. They must be patient, spoonful after spoonful, waiting to see if she'll swallow. She can detect the tiniest lump in any one of her pureed foods and then the rejection begins. She receives no special supplement, no boosting of her meals with extra calories and protein. No relative could find a better rest home for their loved one with any more caring staff, yet no staff member thinks it unusual that a 100-year-old weighs less than 65 pounds.

The next likely place to find malnourished older people is in nursing homes, where some of our most frail and debilitated elders, with some of the most complex chronic disease and disability problems, live. Given the complex problems of disease, disability, poor food intake, cycle of infection and malnutrition in this group discussed earlier, it's not surprising that a number of recent publications quote percentages of malnourished older nursing home residents as high as 85 percent (17,20,28,73,75). However, figures from studies using two or more measures of malnutrition fall between 34 percent and 50 percent (18,44,84,85). In fact, two studies, one in the U.S. using four or more measures of malnutrition and one in Canada using three or more measures, found 39 percent and 45.5 percent respectively of their institutionalized residents were malnourished (84,85). The U.S. study measured malnutrition upon admission to the nursing home and found more of the residents admitted from hospitals suffered from malnutrition (48%) than those admitted from their homes (34%) (85).

In a chart review of 150 nursing home residents from six different institutions, over 65 percent had excessive weight loss and/or chronic loss of appetite, with about two-thirds of the residents having the problem when admitted (57). The numbers of older people admitted to nursing homes from their homes in poor nutritional state and even malnourished, confirms that for some elders malnutrition begins and progresses during their last years of living in the community.

How does malnutrition among older people affect society?

The cost of malnutrition among older people should seriously concern all of society, as

"the outcome of unrecognized and untreated malnutrition is often considerable dysfunction and disability, reduced quality of life, and in some instances, premature or increased disease and death" (24).

From an individual standpoint, the cost is high as all older persons who become malnourished lose weight, muscle and strength (11), which affects the most basic functions of standing, walking and lifting. The seriously malnourished are likely to suffer decreased immunity (11,25,117-119), leaving them more vulnerable to developing pneumonia, influenza and other infections and illness that can become life-threatening (5,11,58). They are more vulnerable to adverse drug reactions and more likely to heal more slowly and with more complications should they need surgery or other serious medical procedures (12,118). They may eventually suffer from extreme fatigue, confusion and disorientation (11,36), which can further hasten their decline and complicate diagnosis and treatment.

For all of society, poor nutrition increases health problems, increases use of health care services and therefore increases health care costs. Malnutrition tends to worsen disease and complication rates (40). For hospital patients, the added financial burden of undernutrition and malnutrition has been calculated in costs associated with longer stays in the hospital, slower healing, more complications, increased readmission rates and higher death rates (12,120-123). These factors can increase Medicare, Medicaid and other third-party payer costs. Studies have shown that when compared to well-nourished hospital patients, malnourished patients have two to 20 times more complications (119,120,124), and have hospital stays that are 40 percent to 100 percent longer (25,120) and \$2,000 to \$10,000 more costly per patient (120,124).

Nutritional risk has been found to be the most important predictor of the total number of older adult visits to the hospital, the hospital emergency room and to physicians (12,125). Malnourished patients were found readmitted to the hospital earlier and more frequently (123). Yet poor nutritional status and malnutrition due to inadequate dietary intake can often be reversed, and if increased attention to malnutrition yields even a slight reduction in readmissions, the health care system could realize considerable savings (123,126).

More and more information is being reported on the cost effectiveness of nutrition intervention, such as in the treatment of pressure sores and hip fractures. Pressure sores, insufficient nutritional intake, severe protein-calorie malnutrition, impaired mobility and functional dependence are all factors associated with increased medical complications, infection and four times the risk of death (127,128). The medical costs from pressure sores can increase from \$2,000 to \$10,000 per patient (129). The average cost of treating a pressure sore is \$15,000 (40). Nursing homes have found pressure sores in 100 percent of severely malnourished residents with the severity of the sores related to the severity of the residents' malnutrition (25,120,129). A recent survey reported slightly more than 17 percent of new nursing home residents were admitted with pressure sores, with malnutrition considered a major risk factor (5,25,127,128). For hospital patients with pressure sores, those who received a nutrition supplement healed faster than those who didn't (40). Nutrition intervention is necessary if pressure sores are to heal (5,128), and is crucial in elderly pressure sore cost management (128).

More than 1.5 million bone fractures occur every year due to osteoporosis, costing between \$8 billion and \$10 billion (130). Hip fractures cost, on average, over \$34,000 per patient with one-third of patients needing in-home services and many never recovering their former level of function (131). In two longitudinal studies, hip fracture was more

likely than heart attack, stroke and cancer to cause functional impairment (131). Patients' hip fractures respond to early nutrition intervention with improved and earlier patient mobility (130). Studies have also shown falls in elderly hip fracture cases to be related to the effects of malnutrition on balance, leading to the recommendation that in addition to looking at calcium intake for bone strength and density, physicians should pay attention to their older patients' caloric intake and the possibility that they are malnourished (132). Other studies have shown that in older hip fracture patients, the rates of healing and complications were improved significantly up to seven months after fracture by giving additional calories, protein, vitamins and minerals through eight ounces of an oral supplement, given on average for only 38 days (133,134).

Chronic malnutrition also takes its toll on families. Malnutrition that causes or exacerbates debilitating frailty costs families in worry and concern about their loved one, and often tremendous time and energy in caregiving. Family members' lives (usually caregiver daughters) and community resources can be consumed by the caretaking needs of the debilitated and functionally impaired older person. Residing in a nursing home and dependency in the community are highly associated with age (135), and chronic poor nutritional status and malnutrition in the aged may cost our society even more in contributing to frailty and dependency in the oldest old.

Those 85 years of age and older currently represent 22 percent of nursing home residents (28), and require five to six times the amount of in-home assistance compared to the younger old (30,135). Moreover, the 85-plus population is expected to more than triple in size by the year 2030 (29), while the number of community caregivers shrinks, due to shortages in nurses, less children born, and more women in the workplace. These trends cause experts to ask who will provide good care for an increasing number of dependent elders if disability and dependency rates are not reduced (135).

Treatment or prevention of poor nutritional status among community-dwelling elders, and among older people in nursing homes and hospitals, may make a significant contribution in the quest to reduce disability and dependency. Older clients receiving home-delivered meals are reported to have fewer hospitalizations and decreased mortality compared to case-managed clients without home-delivered meals and older people on waiting lists for home-delivered meals (103,104,136-139). Moreover, frail and underweight home-delivered meals clients who received enhanced in-home nutrition services gained weight and lean body mass (muscle). An equivalent group of home-delivered meals clients who received only regular meal service lost weight and lean body mass (13).

What National Programs Address Malnutrition among Older Americans? Administration on Aging (AoA), Older Americans Act (OAA) Title III and Title VI Programs

Title III Congregate and Home-Delivered Nutrition Programs. Over the last 20 years, the OAA has become the major source of funding for nutrition programs for the elderly in most communities. With federal OAA funds, local funds and program contributions from elders themselves, these programs provide nutrition services including meals and nutrition education to ambulatory and homebound elders 60 years of age and older and their spouses (of any age), with preference for those in greatest economic and social need. Programs are to serve at least one meal five days a week, except in rural areas if five-day-

per-week service is not feasible. Transportation to meal sites may be available for congregate diners; for the homebound, meals are delivered to their homes either hot daily, frozen or a combination of both. Shopping assistance services may also be available but are usually limited. Nutrition screening, assessment and counseling are services that can be paid for with Title III nutrition funds; however, the majority of programs, even with multiple funding sources beyond OAA funds, have had difficulty meeting their local demand for meals before expanding into additional services.

In FY 1993 slightly less than 127 million congregate (55%) and nearly 103 million home-delivered (45%) meals were served, with the most growth coming from substantial increases in home-delivered meals (142). Since 1980 there has been nearly a 200 percent increase in home-delivered meals, compared to only two percent for congregate meals (50). A number of factors may be contributing to increased home-delivered meal service, including (50,143,144):

- rapid increase in the numbers of persons age 85 and older;
- increased diversion of elders from institutions, creating increased need for in-home services;
- earlier hospital discharge of older patients with various illnesses and nutritional needs;
- inability of many nutrition programs to maintain or rebuild their congregate meals programs with the new generation of young old; and
- growing emphasis on targeting services to those in economic, social, physical and functional need.

Since the last national evaluation of these programs is more than a decade old, and program information has lacked standardization within and across states, it's difficult today to say exactly how well the programs are reaching the most socially and economically disadvantaged elders. However, data does suggest that programs are serving low-income elders, ill, frail and impaired elders, and minority elders, at least to their proportion of the general population (50,145). New data will soon be available since the 1992 OAA reauthorization mandated a national evaluation of OAA-funded nutrition services. This national evaluation is expected to be completed in 1995.

It isn't surprising that compared to the congregate nutrition program, the home-delivered program serves older and less well elders, and more impaired and low-income elders. In 1993, 73 percent of home-delivered clients were frail and disabled and 55 percent had low incomes, compared with 27 percent frail and disabled, and 45 percent low-income congregate clients (142). It's important to note the 27 percent of frail and disabled congregate clients, as this figure dispels any myth that all congregate clients are functionally independent and well.

However, when considering malnutrition among older people, perhaps the more important issue is how many congregate clients who remain *functionally independent* are in reality *nutritionally dependent* upon the program? This same question is crucial for home-delivered program clients if we're to understand the true impact these programs have on those who use them. Yet to date, national information on the nutritional dependency of

nutrition program clients does not exist.

Although these programs reach their targeted client types, overall they serve a small total number of clients. In addition, there are "eligible" elders not participating in these two programs, including various hard-to-reach groups and a variety of minority elders (21,50,146-148).

Studies over a number of years have shown that these nutrition programs do offer their clients a nutritional advantage over those who don't use them. A recent review of research from the late 1970s on found that program clients can receive a significant percentage of their total nutrient intake (40-60% of average intake for most nutrients) and a substantial proportion of the RDA (50-60+% for most nutrients) from program meals. When compared to nonparticipants, program clients have higher intakes of most nutrients, particularly protein and calcium (50,137,145). It's also important that while one study showed home-delivered meals are associated with less food insecurity and hospitalizations, three studies showed that for some low-income, underweight, and frail and disabled elders, typical congregate and home-delivered nutrition service is not enough to avert food insecurity/lack of food or further loss of weight and lean body mass (13,21,23,148).

Areas of concern and constructive criticism for the congregate and home-delivered nutrition programs cited from a number of studies include:

- not targeting well enough and not creating necessary innovations to serve socially impaired elders, homeless elders, older residents in single-room housing, alcoholics or other substance abusers, those who may have been de-institutionalized and greater numbers of minorities (50,145-147,149)
- not culturally diverse enough in program staffing, operations and foodservice (113,146,149,150 & 151-OAA services in general)
- unable to serve meals over a variety of day and evening times or to offer menu choices, therapeutic diets or nutritional supplements (12,137,147)
- unable to serve multiple meals and meals on weekends and holidays (12,21,137,146,147,152, 153)
- inadequate nutrition education (154)
- the need for improved and researched eligibility criteria for participation to insure those most in need are enrolled (136,137,143,149,155,156)

These constructive program criticisms notwithstanding, some nutrition programs across the country have developed more innovative and expanded services (13,146,152,153,157-165) such as those listed below.

Title III Health Promotion and Disease Prevention Program. This program funds health promotion and disease prevention services targeted to areas of states that are medically under-served and where there are large numbers of economically needy older persons. Some of the services that can be provided include health risk assessment, routine health screening which includes nutrition screening, nutritional counseling and educational services, health promotion programs, physical fitness programs, home injury control

services, depression and mental health screening and education, medication management, and counseling for social services and follow-up health services. In a number of states, these program funds are being used by elderly nutrition programs for nutrition screening and intervention, many in partnership with health departments, cooperative extension and various health and professional societies and organizations (166,167).

Congregate and Home-delivered Nutrition Program Innovations

- **Weekend, evening or multiple home-delivered meals**
- **Weekend and supper congregate meals**
- **Breakfast meals**
- **Holiday meals**
- **Therapeutic diet meals**
- **Reduced-price or for-donation-only nutrition supplement programs**
- **Nutritional risk screening, nutrition counseling by nutrition professionals**
- **Public-private partner research on the nutritional status of in-home meals clients**
- **Ethnic meal sites**
- **Meal sites for homeless elders**
- **Special outreach programs for extremely isolated minorities**
- **Meal service in extremely isolated geographic areas using frozen meals**
- **Nursing home, board and care home visits to nutrition sites**
- **Meal service and inter-generational programming in public schools**

Title VI Grants for Native American Nutrition Programs. Title VI of the OAA funds nutrition services (comparable to Title III Nutrition Services) to Native Americans, Alaskan Natives, and Native Hawaiians. In 1991, slightly less than 2.4 million congregate and home-delivered meals were served to almost 59,000 Native American elders. A comprehensive evaluation of the Title VI programs was conducted in 1982 and concluded that overall, Title VI services, including nutrition services, had improved the health of the elders and reduced social isolation (167-169).

Nutrition Screening Initiative. Over the last three years the Nutrition Screening Initiative (NSI) has championed a national cause of addressing malnutrition among older Americans by promoting nutrition screening and better nutritional care in all health care and social services networks serving older adults, and through public awareness and self-screening by elders themselves. Formed as a five-year joint effort of the American Academy of Family Physicians, The American Dietetic Association and the National Council on Aging, the

multi-disciplinary approach to addressing the problem of older people at nutritional risk has evolved into a three-tiered approach to nutrition screening using the DETERMINE Checklist (alerts older Americans and caregivers to warning signs for potential nutritional risk), the Level I screen (used by professionals in health and social services), the Level II screen (used in medical settings), and multidisciplinary intervention strategies (24,42,140). Statewide screening, local screening, screening in hospitals, nursing homes, rest homes, senior centers, and during assessments for in-home services has taken place throughout the country (141). Although more work on validating the Initiative's screening tools remains (89-91), the Initiative has 1) focused national attention on the issue of at-risk and malnourished elders, 2) created across the country the opportunity to collect more standardized information on key food and nutrition concerns for elders, and 3) begun the necessary national discussion about the role nutrition screening and more comprehensive nutrition services should play in health care reform and long-term care.

Food Stamp Program (FSP). The FSP provides monthly income (which is not counted as income for other food assistance) in the form of coupons redeemable for food at authorized retail stores (147). One in five of the older adults surveyed nationally in the Urban Institute study on food insecurity said they need food stamps but are not eligible (21). Otherwise, about 2 million households headed by older people (40-80% of those eligible) currently participate (32). However, many eligible elders don't participate, for such reasons as "stigma of welfare," lack of program information, and perceived complexity in the application process (32). Many FSP-eligible elders don't participate because the benefits are small (half of those eligible are entitled to the minimum of \$10). One in 12 older persons surveyed by the Urban Institute said it isn't worth the trouble to apply (21). Still, the program reaches elders with very low incomes and few assets, and while these participants spend about \$5 to \$10 more on food per month than non-participants, their nutrient intake has been measured at three percent to six percent higher than non-participants (147).

Nutrition Program For the Elderly (NPE). The NPE provides grants, cash and commodities to states to supplement OAA Title III and Title VI funded congregate and home-delivered meals. These programs gain additional spending power from this cash/commodity program by receiving either food commodities, cash at a pre-determined amount (linked to the movement of the Consumer Price Index and the level of appropriations) for each eligible meal served to each eligible older participant, or pre-determined percentages of both food and cash (147). In 1994, USDA spent nearly \$150 million through the NPE, with about \$144 million in cash and \$6 million in commodities (213).

Commodity Supplemental Food Program-Elderly (CSFP-Elderly). The CSFP provides supplemental food (which is not counted as income for other food assistance), nutrition education and referrals to health services for older persons who have low incomes or who are at nutritional risk. A substantial majority of participants have incomes below the poverty line or live alone. The CSFP-elderly food package is tailored where possible to the participant's health status and individual needs, and may include rice, hot cereal, canned and dry milk, canned meat or poultry, dried beans, peanut butter, and juice. The package has been found to contribute significantly to an elder's intake of several critical nutrients. The programs may use volunteers to transport participants to the food distribution sites and deliver pre-packaged commodities to homebound elders. In addition, programs may

set special distribution hours for the elders (147).

Adult Day Care in the Child Care Food Program. The adult day care component of the Child Care Food Program provides cash reimbursement and commodity assistance for meals and snacks served to chronically impaired elders in community adult day care centers.

Participants are automatically eligible for free meals if they are members of a food stamp household, receive Social Security Income or Medicaid benefits; otherwise, they are eligible for a reduced-price meal if they meet other eligibility criteria (147). Forty-three percent of eligible adult day care centers participate in the program, with a typical center serving approximately 30 clients three meals and snacks per day. Most clients are older white women with low incomes, but substantial percentages of men and minorities are also served. A recent study of the program found that although day care centers consider the program's meal reimbursement rates too low, meals served do meet one-third of the RDA. Lack of knowledge, center ineligibility and perceived burden of record keeping are the main reasons more centers have not participated in the program (170,171).

Food Distribution Program on Indian Reservations (FDPIR). The FDPIR distributes commodity foods for more nutritious diets for low-income persons living on or near Indian reservations. Income criteria are identical to the Food Stamp Program income limits. FDPIR is an alternative to food stamps, and participants may not participate in both programs. Food packages are allocated based on the number of household members and usually include anywhere from 25 to 35 different commodities each month (147). In 1988 FDPIR operated in 215 project areas with program participation estimated at 135,000 persons in 27 states. Older participants can have their food package delivered when such service is available. The foods offered in the FDPIR package have evolved from only surplus commodities to foods that now represent the four basic food groups. Efforts to improve the food package based on U.S. Dietary Guidelines have resulted in an improved package which now provides 101 percent of the RDA in calories, with 34 percent of those from fat. However, Indian Health Service and tribal nutritionists indicate that further reductions in fat and sodium are needed (172).

Health Care Financing Administration (HCFA) Medicaid Home and Community-Based Services Waiver Programs. Medicaid waiver home and community-based services programs are an alternative to long-term institutionalization. Utilizing in-home services, these programs help older people continue to live in their communities. Across the country, slightly more than one-third of state and federally funded Medicaid waiver programs have included meals in their allowed package of services (173). In addition to meals, a few of these programs also fund in-home nutrition assessment and counseling (173). However, the challenge remains for case managers without geriatric nutrition expertise and training to determine which waiver clients should receive these services. For example, the one-year statistics for a waiver program that includes in-home nutrition assessment and counseling by qualified nutrition professionals (but without guidelines or training for case managers on how to assess and refer clients for this service), showed case managers referred over 43 percent of waiver clients for home-delivered meals, but less than one percent of the same clients were referred for in-home nutrition assessment and counseling (174). One positive suggestion for helping case managers and their clients overcome this challenge is the use of dietitians in a "nutrition case manager" role, combining functional assessment with

nutritional assessment to accomplish a more comprehensive and qualified team assessment of in-home service needs of elders (158).

Medicare. The Medicare program is a federal health insurance system that reimburses hospitals, physicians, and other health care providers for services they provide to Medicare beneficiaries (i.e., eligible people aged 65 years and older and the disabled of all ages). Nutrition services by law are not recognized as an independent service under Medicare (175). Yet, in recent testimony before Congress, an HCFA official summarized Medicare-covered nutrition services for older adults as: 1) medically necessary nutritional services involved in the treatment of a medical condition, 2) nutrition education and counseling provided in the hospital for certain medical conditions such as diabetes, 3) nursing home residents' initial and periodic assessments required to include a nutrition component completed by a qualified full-, part-time or consultant dietitian, and 4) nutritional counseling required in Medicare hospices (175).

However, in practice, equal and consistent Medicare coverage around the country for these types of nutrition services remains a challenge. In recent testimony compiled from registered dietitians across the U.S., cases were cited where Medicare reimbursement for nutrition services for older Americans was limited, sporadic and even denied, although the medical and dietary need for these older patients clearly fit Medicare requirements (40). Furthermore, in the hospital, due to the complex Medicare reimbursement guidelines, a patient's nutrition services compete for reimbursement within the hospital environment, and thus nutrition services that are perceived as increasing the hospital's costs may be limited or not provided at all (32).

What are the Challenges, Limitations and Gaps in Nutrition and Aging Research?

The issue of defining, measuring and surveying for malnutrition among older people is a complex issue, and there are knowledge and research limitations that are important to understand. Good research information is lacking in four key areas:

- consensus on the definition of undernutrition and malnutrition and how these conditions are identified in older people
- the prevalence of malnutrition in the general older population, especially among hard-to-find subpopulations of elders liable to be at high risk for malnutrition
- the impact of functional capacity and socioeconomic factors on the nutritional status of older individuals
- the effectiveness of various strategies for preventing or resolving poor nutritional status among older people

Lack of consensus on the definition of undernutrition and malnutrition and how these conditions are identified in older people.

In a clinical setting, nutritional status is measured in four dimensions: 1) dietary intake in relation to need, 2) body levels of nutrients measured in blood and other tissues, 3)

anthropometric measures as compared with normal reference values, and 4) presence of clinical signs of deficiency (6). Interpretation of values is difficult because reference ranges for normal values, developed on younger adults, may not be applicable to older adults, especially the very old. The biochemical markers can be influenced by disease and conditions other than malnutrition. In older adults many clinical signs of malnutrition, such as changes in skin and hair, mimic those caused by other conditions. Therefore, a clinical diagnosis of malnutrition requires that symptoms of malnutrition from at least two dimensions be present.

Much field research on the prevalence of malnutrition among older people reports rates of abnormal levels on only one of the above four dimensions (rather than the preferred multi-dimensional profile). Because abnormal values are not specific to malnutrition, such findings are suggestive, but of uncertain accuracy for determining true prevalence of malnutrition. Classification of subjects into "acceptable/not-acceptable" categories often is arbitrary or traditional rather than scientific.

Hospitals and nursing homes have the capability to measure two or more dimensions, and, not surprisingly, most of the data on prevalence of malnutrition in older people has been collected in these settings. However, measurements attributable to disease often cannot be separated from measurements attributable to malnutrition.

Identification of malnutrition in older people would be greatly enhanced by the development of a valid indicator, specific to older men and women, even into their very advanced years. Such an indicator would ideally:

- maintain validity across a wide range of diseases/medications;
- be generalizable to all older persons, or delineate specific normal ranges for specific ages/gender/races;
- would identify early stages of malnutrition as well as late; and
- be composed of measures that are inexpensive and easy to obtain in a wide variety of settings.

A valid marker of poor nutritional status in older people would also improve research on the relationships of factors of lifestyle, environment, or functional capacity to nutritional status. Having a defined and clear measure of replete nutritional stores would improve evaluations of interventions for preventing debilitation secondary to poor nutritional status. Such a marker would help distinguish malnutrition from other influences, and could form the basis for developing a valid nutritional screening tool (8). The need to clarify geriatric assessment components to aid in such research was suggested by a National Institutes of Health consensus panel (176) and by the Office of Technology Assessment (177). There is a clear and pressing need for research to define and validate a nutritional status index specific to older adults and separate from clinical markers of acute or chronic illness. Not only would such a marker provide clinicians and researchers with a specific benchmark against which to evaluate individuals, but program planners and policy makers would be better able to evaluate interventions.

Other knowledge areas important for the successful measure of nutritional status in older people have historically lacked good research information and include:

- dietary intake data beyond the limited 24-hour intake. This data can provide an estimate of the group mean intake, but not anyone individual's *usual* intake, nor can conclusions be drawn about an individual's nutrition status based on the collection of one 24-hour intake; this serious limitation is often overlooked.
- reference data for heights and weights for older Americans. Lean body mass is diminished and fat increased in older adults, relative to total weight (178). Height also decreases with age, thus body mass index standards used in younger adults may not apply to elders (179). Although several small studies have been done, reference data on a large representative sample of older Americans over the age of 75 is lacking (180), as is reference data on subgroups of minority elders (88).

Recommended Dietary Allowance (RDA) specific to the older population. Much of the research on which the recommendations are currently based was conducted on younger adults. Sufficient evidence now exists that, at least for some nutrients, the RDA for older adults ought to be different than those for younger adults. Continued research on how nutrient requirements for older people may differ from other age groups is needed (47, 181).

The Third National Health and Nutrition Examination Survey (NHANES III) is beginning to address the lack of information in the first two of these areas through their current data collection.

Lack of good information on the prevalence of malnutrition in older populations, especially among hard­to­find subpopulations of elders liable to be at high risk for malnutrition.

Adequate data on nutritional status of older people in the U.S. is lacking, especially in the subgroups of the very old, minorities, and the hard­to-reach. In addition to the lack of clear definition of what constitutes malnutrition among older adults, there is a lack of good information on the nutritional status of older people as a group, and there are a number of reasons for this.

Previous national studies have excluded individuals older than 74 years; within the age group 65­74, the numbers of older individuals were small. Response rates among elders may be low, thus raising questions about whether study participants were healthier than those who chose not to participate. Numbers of minorities or Native Americans were too small for meaningful analysis. Since both minority status and low­income status are believed to be associated with poorer nutritional status in older people, the National Health and Nutrition Examination Survey III (NHANES III) is designed to correct some of these shortcomings by oversampling elders and setting no age limits. Also, steps were taken to improve the older adult response rate, such as collecting 254 home examinations on subjects not able to get to the examination site (182,183). In addition to the 24­hour dietary intake collected at the examination site, two more 24­hour dietary recalls on subjects 50 years and over were taken (182). However, the numbers of minority elders in the very oldest age category (ages 80 years and above) may still be too small for meaningful subgroup analysis (184).

There has been a large time lag between data collection and availability of data to researchers and decision makers, thus seriously diminishing the data's usefulness. With

population shifts, changes in lifestyles, new models of community-based care and changes in available food in the marketplace, data collected over 20 years ago may have little relevance to current and future elders. Progress is being made in this area as advance data from the first phase of NHANES III data collected in 1988-91 is now available (185,186).

Also of great concern is the lack of data on prevalence and causes of undernutrition in "the hard-to-reach and frail" older population (10). These hard-to-reach and frail elders have not been included in national surveys; the extent to which characteristics of these older people are known come from small surveys which cannot be generalized beyond the group and locale in which the research was conducted. Even in reported small studies, selection bias may exist which systematically excludes these individuals (187). In addition to information on nutritional status, data is especially needed for these groups on risk factors for poor nutritional status in order to appropriately address ways of correcting the problems (10). This need is especially critical since this is the targeted group for nutrition programming under the OAA.

Lack of good information about the impact of functional capacity and socioeconomic factors on the nutritional status of older individuals.

Some relationships between environmental variables and a specific nutritional status indicator, such as serum hemoglobin, have been reported in population studies. A number of studies have also shown a relationship between low dietary intake in individuals and lifestyle or socioeconomic variables. However, nutritional status is multidimensional, and one measure of poor nutritional status is not definitive. Studies demonstrating the relationship between risk factors and the multidimensional nutritional status are lacking. The Surgeon General suggested that "the interactions among nutritional status, lifestyle and behavior, and environment" in older adults should be a priority for investigation (47).

Good information exists on the prevalence of functionally impaired older individuals: 18 percent of all males report having difficulty with 1 or more Activities of Daily Living (ADLs), and this increases to 35 percent for those over the age of 85. Of all females, almost 26 percent report needing assistance with 1 or more ADLs, and this increases to slightly more than 44 percent of females over the age of 85 (7). The percentages are larger for Instrumental Activities of Daily Living (IADLs), which include needing assistance with shopping, meal preparation, and money management.

However, there is a lack of good research exploring the possible synergism in these relationships, especially those which might reinforce one another. This constitutes a critical gap in information, since it is known that approximately 20 percent of older people are home-bound (188) and are probably functionally impaired, either physically or mentally. Functional impairments often include difficulty with shopping and meal preparation which may contribute to poor nutritional status, which in turn contributes to poorer functional or health status. With impaired older people increasingly residing in the community, it's imperative that good information on these relationships be available; this need was identified in the 1988 Surgeon General's Workshop (6,189).

Environmental and lifestyle risk factors that have a high correlation with poor nutritional status, as defined in a multidimensional profile, could serve to screen older persons at risk for malnutrition. Several screening instruments have been proposed, but more work is needed to assure that they correctly identify elders at nutritional risk (24,89-

91,190). Such a tool would be especially valuable for assessment of older adults known to have some degree of disability (6).

Lack of good information about the effective strategies for preventing or resolving poor nutritional status among older people.

The OAA Title III nutrition programs were originally designed to promote better health through improved nutrition in older people, and were to target minority and low-income persons. A few small studies, and a great deal of anecdotal information, exists on the contribution of these nutrition programs to dietary intake, but there has not been a systematic national study of the impact on the nutritional status of older Americans. States and Area Agencies on Aging have been allowed wide latitude in designing and implementing services in order to address local needs. Data is lacking on how these needs are assessed, prioritized and how well they are being met.

Increasingly, OAA nutrition programs are being relied upon to supply home-delivered meals to elders in many different types of community settings (100,102). These clients exhibit a wide variety of nutritional needs such as number of meals required weekly, textural modifications, special diets or diet counseling (100,102,136,137). Some nutrition programs providing nutrition services under the OAA specifically target the older person who is newly discharged from the hospital and is expected to regain some measure of independence and "graduate" either to a congregate dining center or off the program. Other programs have targeted the long-term client who will need to be maintained for months or years (136,137). Information is sparse on unmet needs, and there is little data on how many older adults need home-delivered meals, what percent of such needy individuals receive service, and effectiveness in improving nutritional status.

It is unknown what happens to older adults who need services but are not in the targeted (and eligible) category, who are beyond the geographical boundaries of service, or at the end of a long waiting list. Provision of home-delivered meals to clients does not appear to be based on an assessment of nutritional need, but rather on some other surrogate factors which differ from program to program (136,137). A critical need exists to develop criteria for measuring effectiveness of nutrition services.

Until recently little good data existed on numbers of dependent older persons residing in a community. This lack has been remedied by questions on mobility and limitations in self-care included in the 1990 census. This data, along with other information such as residential arrangements, income, and educational status have been arranged by age categories for older adults (191). This information will be useful for determining prevalence of dependency in a community among various categories of elders, and for estimating potential need for home-delivered meals within a geographical area.

Many states are currently moving toward developing a variety of models for providing residential care for dependent elders. It is unknown what consideration is being given in these models for assurance of adequate nutritional care, or even what the needs will be (192). Since residents in such facilities will undoubtedly be functionally disabled, better understanding of the relationships between nutritional status and functional disabilities discussed above would be of great value.

Revisions to the Food Stamp program in the 1980s increased benefits to low-income elders. This resource appears to be underutilized as less than 50 percent of eligible older people participate in the Food Stamp Program (3,147). No information was found on the

extent to which the Food Stamp Program or the Commodity Distribution Program has impacted on the nutritional status of older Americans.

What Recent Legislative and Public Policy Responses to Malnutrition among Older People?

1992 Reauthorization of the Older Americans Act (OAA). The 1992 amendments to the OAA do not address solving malnutrition in older adults; however, these amendments are perhaps the most comprehensive nutrition services mandates ever in the history of the OAA Act, with some mandates relevant to the issue of poor nutritional status and malnutrition among older people, including (167):

- the designation of a full-time officer responsible for administering nutrition services, and requiring that person to have the credentials of a registered dietitian;
- the immediate completion of a national evaluation of OAA nutrition services;
- nutrition projects are to provide at least semiannual nutrition education to congregate and home-delivered meals clients; AoA and USDA may provide technical assistance and appropriate materials to agencies responsible for carrying out nutrition education;
- State Units on Aging (SUA) are to administer and monitor nutritional services with the advice of a dietitian or person of comparable expertise;
- SUA are to develop non-financial criteria for those clients eligible to receive home-delivered meals, and periodically evaluate those clients for continuing to meet those criteria;
- SUA must adhere to lower fund transfer guidelines; the Secretary of Agriculture is to donate equivalent amounts of commodities or cash, up to \$.61/meal, to be adjusted according to changes in the Consumer Price Index; payments made by a SUA or Area Agency on Aging (AAA) for meals may not be reduced to reflect increases in commodities or cash-in-lieu;
- nutrition projects are to ensure that all meals meet the Dietary Guidelines for Americans and that one, two or three meals served must meet 1/3, 2/3 or all of the RDA, respectively;
- Title III Disease Prevention and Health Promotion program funds may be used for nutrition risk screening, nutrition assessment, and nutrition education and counseling for clients and their primary caregivers.

National Institutes of Health (NIH) Revitalization Act of 1993. Section 1902 of the National Institutes of Health Revitalization Act of 1993, entitled "Malnutrition in the Elderly," requires the DHHS, acting through the National Institute on Aging (NIA), to 1) conduct a three-year study on the effectiveness and cost-effectiveness of a nutrition screening and intervention program, 2) measure the prevalence of malnutrition in older hospital patients, nursing home residents and community-dwelling elders, and 3) determine whether or not

an institutionalized program of nutrition screening and intervention should be adopted (193). Application for research was advertised in August, 1994. Key research topics of interest included evaluation of nutritional assessment in older people, causes of pathologically low food intake in older persons, and evaluation of the effectiveness of screening for malnutrition in the independent, hospitalized and long-term care older population (194).

***Nutrition and Health Information Act.* An effort to further our understanding about malnutrition in older adults was introduced in July 1993 in the U.S. House of Representatives by Ron Wyden (D-Ore.). His bill, entitled the "Nutrition and Health Information Act," amended the Public Health Service Act to require the Surgeon General to create a biennial report on nutrition and health (195,196).**

***National Nutrition Monitoring and Related Research Act of 1990.* The purpose of this act was to integrate the various national nutrition monitoring and research activities that were being conducted by diverse agencies within the USDA and the USDHHS into one comprehensive and collaborative program (197). A Ten-Year Comprehensive Plan for the National Nutrition Monitoring and Related Research Program was published in 1993, outlining objectives as well as current and future activities (198). This plan addresses some of the issues discussed earlier in this paper. Surveillance of nutritional status of older adults who are home-bound, low-income or minorities will be improved by better sampling procedures. The plan also mandates attention to issues of food insufficiency as well as evaluation of effectiveness of food assistance and Federally funded food service programs. Effective implementation of the plan should provide important information for future program planning to address malnutrition in older Americans.**

***AoA's Nutrition/Malnutrition Initiative.* The AoA has created a national initiative to focus attention on hidden hunger and malnutrition among older people. Key goals of the Initiative are 1) to educate the public and federal and local governments about food insecurity and malnutrition and their effects on the health and independence of older people, 2) to provide leadership in promoting a national nutrition agenda for the future, 3) to develop prevention and intervention strategies which enhance older persons' nutritional status, and 4) to ensure that public policy promotes access for older people to food and nutrition services, especially low-income, minority and nutritionally-at-risk older people. A variety of action step strategies are planned for reaching these goals, including the creation of a National Resource and Policy Center on Nutrition and Aging, a three-year cooperative agreement award through OAA Title IV Discretionary Funds. The Center will become an important partner with AoA in implementing the Nutrition/Malnutrition Initiative to promote and improve nutritional and health status for older Americans (199, 200).**

***The 1995 White House Conference on Aging (WHCoA).* Congress has identified the purpose of the WHCoA to include increasing public awareness about the interdependence of generations; examining common generational problems; recommending executive and legislative action to improve the well-being of older people; and developing recommendations for coordinating federal, state and local needs (201). Because the WHCoA is intended to produce policy recommendations to guide national aging policy over the next decade, mini-conferences on aging will be held in regional districts throughout the country prior to the national Conference (202). Some regional conferences**

will either highlight or focus specifically on nutrition and aging issues, with attention given to the issue of malnutrition among older Americans.

The National Eldercare Institute on Nutrition White Paper on Choices for Nutrition Programs. The National Eldercare Institute on Nutrition (NEIN), sponsored by the National Association of Nutrition and Aging Services Programs (NANASP) and supported by the AoA, has developed a white paper on choices for community nutrition programs for the elderly (204,205).

The 1988 Surgeon General's Workshop on Health Promotion and Aging. The 1988 Surgeon General's Workshop on Health Promotion and Aging produced a number of public policy recommendations, including (189):

- Credentialed nutritionists/registered dietitians should be employed at all levels of the Federal Government in all agencies involved in policy, planning, administration and evaluation of aging programs
- All DHHS agencies responsible for services for older persons must provide ongoing formal geriatric nutrition training for staff with nutrition responsibilities in their service networks
- Federal agencies, professional societies, and private health organizations should coordinate efforts to develop new or adapt existing health promotion messages to the special concerns of elders, assuring wide dissemination of education materials and messages to older persons
- State and local agencies should use the expertise of credentialed nutritionists/registered dietitians
- Federal, state and local legislators and agency administrators should give high priority to nutrition services, education, and research on aging when they allocate and target both existing funds and any future increases
- Federal and private third-party payers should pay for nutrition counseling services provided by credentialed nutritionists/dietitians for older persons at nutritional risk
- State and federal agencies should encourage development and implementation of innovative public-private sector models for health promotion and education including nutrition for older adults, with successful models widely disseminated by federal and state agencies
- Funding should be provided from third parties and other sources, e.g. Medicare, Medicaid, OAA, and private insurance, for outpatient and in-home nutrition and other services that permit older Americans who are ill to remain in their homes with an optimal quality of life and function

The Urban Institute. The Urban Institute Study made public policy recommendations in the area of hunger and food insecurity. These include 1) augmenting the resources of OAA nutrition programs, 2) continued improved targeting of OAA nutrition services to low-

income and minority elders, 3) allocation of increased state and local resources to feeding programs for seniors, and 4) expanding income supports for low-income elders through health care reform payment for prescription drugs, shifting public resources from affluent to low-income seniors, and/or increasing Social Security Income levels up to at least the poverty line (21).

The American Dietetic Association. Medicare and Medicaid policy has not consistently resulted in reimbursement for medically necessary nutrition therapy (40). As a result, The American Dietetic Association recently developed a national legislative recommendation to incorporate such nutrition services into any national health care reform plan (207). Older people as a group have a high risk for malnutrition, are most liable to have diseases or conditions responsive to medical nutrition therapy, and need to have access to professional nutritional assessment and intervention.

Have we checked our attitudes and awareness lately?

As this issue paper comes to conclusion, one final issue begs discussion. In our youth-oriented society, with Madison Avenue having swept our gray hairs, laugh lines and elders under the carpet, we may have ingrained in ourselves such subtle negative attitudes about growing old that we aren't able to see when our elders are becoming too thin, too frail, or malnourished. Unfortunately, without healthy older media role models for decades, we may expect people to become thin and debilitated as they age. However, with continuing research there is growing understanding that chronological aging itself causes less impairment than previously thought (208,209).

It's important to understand the potential serious consequences of negative attitudes and lack of awareness about what constitutes "normal" aging. Researchers have found that attributing health problems to aging can exceed 60 percent for some conditions and is associated with a delay in seeking appropriate health care. One study which controlled for demographics, physical health problems, self-rated health and social involvement, found attributing health problems to old age was associated with mortality (208). These apparently detrimental negative attitudes and lack of awareness about what constitutes normal aging can be held by anyone in our society, including health and social service professionals, caregivers and even older people themselves.

Morley writes about physicians' lack of awareness that malnutrition exists in their patients and lists three major barriers to doctors recognizing and appropriately treating malnourished elders; 1) poor training in spotting and diagnosing malnutrition or even more importantly, malnutrition in the making, 2) a lack of awareness that malnutrition may be the presenting feature of a number of treatable diseases in older people, and 3) a lack of awareness about how best to treat and manage the malnourished older person (61). Many older people come in contact with health and social service professionals other than physicians. These professionals may also hold subtle negative attitudes and lack awareness about normal aging and, due to little or no training, may be unable to recognize the difference between aging and malnutrition.

From a total chart review in 26 Veterans Administration nursing homes, Abbasi and Rudman found that physicians and nurses frequently didn't record nutritional deficiencies of older patients. These investigators concluded that this is a serious concern with the potential for increasing the occurrence or aggravating the severity of malnutrition in these

older patients, since action to prevent or correct malnutrition begins with the nurse or physician (20). Their findings are similar to others who have reported on the underdiagnosis and less-than-optimal treatment for malnutrition in older patients (79,83,210).

Family and family caregivers may also lack awareness about the aging of older people versus nutritional decline. A recent study found that caregivers were generally aware of malnutrition in older persons and did offer more nutritional care such as liquid nutrition supplements, increased food and encouraging the elder to eat. However, these measures were taken only after the elder had declined to a severe level of malnourishment, with no increased nutritional care for elders at risk of or beginning early stages of malnourishment (211).

Elders themselves hold subtle negative attitudes and lack awareness about what constitutes aging versus malnutrition. In a *New York Times* article, a physician from Mt. Sinai Medical Center's Geriatric Evaluation and Treatment Unit talks about the 40 percent of his older patients who are malnourished, and their family and professional caregivers who didn't recognize it. According to the doctor, the patients themselves didn't see it either. He explained "If they were objective, they would see themselves as skeletons, but they just see themselves as old" (212).

Like the perceptive friend in the following story, if society is to keep as many of our elders as possible from needlessly becoming malnourished, we must first see the problem, then take the time to stop and help.

True Story

Martin and his wife Ruth, both retired, liked to travel and volunteered at the local Senior Center a few times each month. Since they were always on the go, it wasn't unusual for the Center to go for weeks at a time without hearing from them. Their friends would talk about Ruth and Martin's latest adventure and look forward to hearing all the details when they returned.

One day an observant friend noticed that their car had been in the driveway for some time, the yard was overgrown and the curtains closed. Growing concerned, she knocked and was shocked when a thin and bearded Martin slowly answered. Ruth had suffered a stroke two months before and was now in a nursing home. Martin, proud and not wanting to burden his friends or his daughter back East, had tried to cope on his own. Heartbroken without his wife of more than 50 years by his side, his desire and skills to shop and cook had vanished and he began a downhill slide. He'd lost much weight and couldn't seem to get over a viral infection he'd had for almost a month. Martin's friend quickly realized he was on the verge of slipping away from a loneliness he had never known before.

His friend slowly convinced him to come back to the Center; they needed him for a new fundraising project. Gradually Martin did come back until he was eating lunch there every day and sharing stories with a group of servicemen like himself. Six months later, Ruth was stable enough to come home with the help of home-delivered meals. Martin spends less time at the Center now, preferring to enjoy precious days with Ruth. Together again, they refuse to think about what might have happened without the help of the Center's programs and the caring friends who noticed they were missing.

References

1. Jellinek I. **Hunger and Food Insecurity Among the Elderly in New York City: Testimony for Legislative Roundtable.** NY: Council of Senior Centers and Services of New York City, Inc.; 1993 Nov 16.
2. **Webster's New World Dictionary of American English, Third College Edition.** NY: Simon and Schuster; 1988.
3. Chapman N, Sorenson A. **Health promotion and aging: nutrition.** Abdellah FG, Moore SR. **Surgeon General's Workshop: Health Promotion and Aging Background Papers;** Washington, DC: USPHS; 1988.
4. Vellas B. **Effects of the aging process on the nutritional status of elderly persons.** In Munro H, Schlierf G, ed.: **Nestle Nutrition Workshop Series: Volume 29. Nutrition of the Elderly.** NY: Raven Press, Ltd.; 1992.
5. Roe DA. **Geriatric Nutrition, Third Edition.** Englewood Cliffs, NJ: Prentice­Hall, Inc.; 1992.
6. **Institute of Medicine, Division of Health Promotion and Disease Prevention. The Second Fifty Years: Promoting Health and Preventing Disability.** Berg RL, Cassells JS ed.; Washington, DC: National Academy Press; 1990.
7. NCHS. **Health, United States, 1992 and Healthy People 2000 Review.** Hyattsville, MD: USPHS; 1993.
8. Ahmed FE. **Effect of nutrition on the health of the elderly.** J. Am. Diet. Assoc. 1992; 92: 1102­1108.
9. Dwyer J. **Screening Older Americans' Nutritional Health: Current Practices and Future Possibilities.** Washington, DC: Nutrition Screening Initiative; 1991.
10. **Life Sciences Research Office. Core Indicators of Nutritional State for Difficult­to­Sample Populations.** Anderson SA ed.; Bethesda, MD: Federation of American Societies for Experimental Biology; 1990.
11. Young ME. **Malnutrition and wound healing.** Heart and Lung. 1988; 17: 60­67.
12. **Nutrition Strategic Study: A Report to the Director of The Ohio Department of Aging.** Columbus, OH: Ohio Department of Aging; 1989.
13. **Boldt M, AAA PSA 10B, Inc. Ohio Department of Aging Home­Delivered Nutrition Services Demonstration Grant: The Effects of Home­Delivered Meals and Dietary Supplements on the Nutritional Status of Homebound Elderly.** Columbus, OH: Ohio Department of Aging; 1993.
14. Rammohan M, Juan D, Jung D. **Hypophagia among hospitalized elderly.** J. Am. Dietet. Assoc. 1989; 89: 1774­1779.

15. Stotts NA, Whitney JD. Nutritional intake and status of clients in the home with open surgical wounds. *J. Comm. Health Nurs.* 1990; 7: 77­86.
16. Ryan AS, Craig LD, Finn SC. Nutrient intakes and dietary patterns of older Americans: a national study. *J. Geront.* 1992; 47: M145­M150.
17. Silver AJ. Anorexia of aging and protein­energy malnutrition. In Morely JE, Glick Z, Rubenstein LZ, ed.: *Geriatric Nutrition: A Comprehensive Review*. NY: Raven Press, Ltd.; 1990.
18. Goodwin JS. Social, psychological and physical factors affecting the nutritional status of elderly subjects: separating cause and effect. *Am. J. Clin. Nutr.* 1989; 50: 1201­1209.
19. Wolinsky FD, et al. Progress in the development of a nutritional risk index. *J. Nutr.* 1990; 120: 1549­1553.
20. Abbasi AA, Rudman D. Observations on the prevalence of protein­calorie undernutrition in VA nursing homes. *J. Am. Geriat. Soc.* 1993; 41: 117­121.
21. Burt MR. *Hunger Among The Elderly: Local and National Comparisons, Final Report of a National Study on the Extent and Nature of Food Insecurity among American Seniors*. Washington, DC: The Urban Institute; 1993 Nov.
22. Sullivan DH, et al. Oral health problems and involuntary weight loss in a population of frail elderly. *J. Am. Geriat. Soc.* 1993; 41: 725­731.
23. Frongillo EA, et al. Characteristics related to elderly persons' not eating for 1 or more days: implications for meal programs. *Am. J. Pub. Health.* 1992; 82: 600­602.
24. *Report of Nutrition Screening 1: Toward A Common View*. Washington, DC: The Nutrition Screening Initiative; 1991.
25. Fischer J, Johnson MA. Low body weight and weight loss in the aged. *J. Am. Diet. Assoc.* 1990; 90: 1697­1706.
26. Egbert AM. "The dwindles": failure to thrive in older patients. *Postgrad. Med.* 1993; 94: 199­212.
27. Rauscher C. Malnutrition among the elderly. *Canadian Family Physician.* 1993; 39: 1395­1403.
28. Sorenson A, Chapman N, Sundwall DN. Health promotion and disease prevention. In Chernoff R, ed.: *Geriatric Nutrition: The Health Professional's Handbook*. Gaithersburg, MD: Aspen Publishers, Inc.; 1991.
29. Senate Special Committee on Aging, AARP, Federal Council on the Aging, AoA. *Aging America: Trends and Projections 1991 Edition*. Washington, DC: USDHHS; 1991.
30. Bureau of the Census (U.S.), Taeuber CM. *Current Population Reports, Special Studies, P23­178, Sixty­five Plus in America*. Washington, DC: U.S. GPO; 1992.

- 31. AARP Program Resource Department, AoA. A Profile of Older Americans. Washington, DC: AARP; 1992.**
- 32. Posner BM, Levine E. Nutrition services for older Americans. In Chernoff R, ed.: Geriatric Nutrition: The Health Professional's Handbook. Gaithersburg, MD: Aspen Publishers, Inc.; 1991.**
- 33. Blumberg JB, Suter P. Pharmacology, nutrition, and the elderly: interactions and implications. In Chernoff R, ed.: Geriatric Nutrition: The Health Professional's Handbook. Gaithersburg, MD: Aspen Publishers, Inc.; 1991.**
- 34. Verbrugge LM. Gender, aging and health. In Markides KS, ed.: Aging and Health: Perspectives on Gender, Race, Ethnicity, and Class. Newbury Park, CA: SAGE Publications, Inc.; 1989.**
- 35. Chernoff R. Nutritional support in the elderly. In Chernoff R, ed.: Geriatric Nutrition: The Health Professional's Handbook. Gaithersburg, MD: Aspen Publishers, Inc.; 1991.**
- 36. Lipschitz DA, Mitchell CO. The correctability of the nutritional, immune, and hematopoietic manifestations of protein calorie malnutrition in the elderly. J. Am. College of Nutr. 1982; 1: 17­25.**
- 37. Heber D. Cancer and malnutrition. In Morley JE, Glick Z, Rubenstein LZ, d.: Geriatric Nutrition. NY: Raven Press, Ltd.; 1990.**
- 38. Gorbien MJ. Cardiac cachexia. In Morley JE, Glick Z, Rubenstein LZ, ed.: Geriatric Nutrition. NY: Raven Press, Ltd; 1990.**
- 39. Carr JG, et al. Prevalence and hemodynamic correlates of malnutrition in severe congestive heart failure secondary to ischemic or idiopathic dilated cardiomyopathy. Am. J. Card. 1989; 63: 709­713.**
- 40. Finn SC. Adequate Nutrition: The Difference Between Sickness and Health for the Elderly, Testimony before the House Select Committee on Aging. Washington, DC: The American Dietetic Association; 1992 Jul 30.**
- 41. Mowe M, Bohmer T, Kindt E. Reduced nutritional status in an elderly population (70 y) is probable before disease and possibly contributes to the development of disease. Am. J. Clin. Nutr. 1994; 59: 317­324.**
- 42. Nutrition Interventions Manual for Professionals Caring for Older Americans. Washington, DC: Nutrition Screening Initiative; 1992.**
- 43. Martin WE. Oral health in the elderly. In Chernoff R, ed.: Geriatric Nutrition: The Health Professional's Handbook. Gaithersburg, MD: Aspen Publishers, Inc.; 1991.**
- 44. Rudman D, et al. Epidemiology of malnutrition in nursing homes. In Morley JE, Glick Z, Rubenstein LZ, ed.: Geriatric Nutrition: A Comprehensive Review. NY: Raven Press, Ltd.; 1990.**

45. Rudman D, Feller AG. Protein­calorie undernutrition in the nursing home. *J. Am. Geriat. Soc.* 1989; 37: 173­183.
46. Rhodus NL, Brown J. The association of xerostomia and inadequate intake in older adults. *J. Am. Dietet. Assoc.* 1990; 90: 1688­1692.
47. DHHS, Public Health Service. *The Surgeon General's Report on Nutrition and Health.* Washington, DC: U.S. GPO; 1988.
48. Heymsfield SB, Tighe A, Wang Z. Nutritional assessment by anthropometric and biochemical methods. In Shils ME, Olson JA, Shike M, ed.: *Modern Nutrition in Health and Disease, Eighth Edition.* Philadelphia: Lea & Febiger; 1994.
49. National Research Council, Committee on Diet and Health. *Diet and Health: Implications for Reducing Chronic Disease Risk.* Washington, DC: National Academy Press; 1989.
50. Ponza M, Ohls JC, Posner BM. *Elderly Nutrition Program Evaluation Literature Review.* Princeton, NJ: Mathematica Policy Research, Inc.; 1994.
51. Berry EM. Undernutrition in the elderly: a physiological or pathological process? In Munro H, Schlierf G, ed.: *Nutrition of the Elderly, Nestle Nutrition Workshop Series, Volume 29.* NY: Raven Press; 1992.
52. Robbins LJ. Evaluation of weight loss in the elderly. *Geriat.* 1989; 44: 31­37.
53. Thompson MP, Morris LK. Unexplained weight loss in the ambulatory elderly. *J. Am. Geriat. Soc.* 1991; 39: 497­500.
54. Longino CF, Warheit GJ, Green JA. Class, aging and health. In Markides KS, ed.: *Aging and Health: Perspectives on Gender, Race, Ethnicity, and Class.* Newbury Park, CA: SAGE Publications, Inc.; 1989.
55. Kaye LW. *Home Health Care.* Newbury Park, CA: SAGE Publications, Inc.; 1992.
56. Johnson LE, Dooley PA, Gleick BS. Oral nutritional supplement use in elderly nursing home patients. *J. Am. Geriat. Soc.* 1993; 41: 947­952.
57. Bartlett BJ. Characterization of anorexia in nursing home patients. *Ed. Geront.* 1990; 16: 591­600.
58. Prentice AM, et al. Is severe wasting in elderly mental patients caused by an excessive energy requirement? *Age and Ageing.* 1989; 18: 158­167.
59. Siebens H, et al. Correlates and consequences of eating dependency in institutionalized elderly. *J. Am. Geriat. Soc.* 1986; 34: 192­198.
60. Herbelin K. Infection control in the long­term­care nursing facility. *J. Am. Dietet. Assoc.* 1989; 89: 1808­1809.
61. Morley JE. Why do physicians fail to recognize and treat malnutrition in older

persons? *J. Am. Geriat. Soc.* 1991; 39: 1139­1140.

62. Varma RN. Risk for drug­induced malnutrition is unchecked in elderly patients in nursing homes. *J. Am. Dietet. Assoc.* 1994; 94: 192­194.

63. Livingston J, Reeves RD. Undocumented potential drug interactions found in medical records of elderly patients in a long­term­care facility. *J. Am. Dietet. Assoc.* 1993; 93: 1168­1170.

64. Ausman LM, Russell RM. Nutrition in the Elderly. In Shils ME, Olson JA, Shike M, ed.: *Modern Nutrition in Health and Disease*, Eighth Edition. Philadelphia: Lea & Febiger; 1994.

65. Koehn V, et al. Prevalence of malnutrition in alcoholic and nonalcoholic medical inpatients: a comparative anthropometric study. *J. Parent. Enteral Nutr.* 1993; 17: 35­40.

66. Ryan VC, Bower ME. Relationship of socioeconomic status and living arrangements to nutritional intake of the older person. *J. Am. Dietet. Assoc.* 1989; 89: 1805­1807.

67. Campbell CC. Food insecurity: a nutritional outcome or a predictor variable? *J. Nutr.* 1991; 121: 408­415.

68. Roe DA. *Geriatric Nutrition*, Second Edition. Englewood Cliffs, NJ: Prentice­Hall, Inc.; 1987.

69. Walker D, Beauchene RE. The relationship of loneliness, social isolation, and physical health to dietary adequacy of independently living elderly. *J. Am. Dietet. Assoc.* 1991; 91: 300­304.

70. Rosenbloom CA, Whittington FJ. The effects of bereavement on eating behaviors and nutrient intakes in elderly widowed persons. *J. Gerontol.* 1993; 48: S223­S229.

71. Davis MA, et al. Living arrangements and dietary quality of older U.S. adults. *J. Am. Dietet. Assoc.* 1990; 90: 1667­1672.

72. Davis MA, Murphy SP, Neuhaus JM. Living arrangements and eating behaviors of older adults in the United States. *J. Gerontol.* 1988; 43: S96­S98.

73. Miller DK, et al. Abnormal eating attitudes and body image in older undernourished individuals. *J. Am. Geriat. Soc.* 1991; 39: 462­466.

74. Braun JV, Wykle MH, Cowling WR. Failure to thrive in older persons: a concept derived. *Gerontol.* 1988; 28: 809­812.

75. *A Survey of Attitudes Toward Elderly Nutrition*. Washington, DC: Peter D. Hart Research Associates, Inc.; 1993.

76. Lipski PS, et al. A study of nutritional deficits of long­ stay geriatric patients. *Age and Ageing.* 1993; 22: 244­255.

77. Weddle DO, et al. Inpatient and post-discharge course of the malnourished patient. *J. Am. Dietet. Assoc.* 1991; 91: 307-311.
78. Delhey DM, Anderson EJ, Laramie SH. Implications of malnutrition and diagnosis-related groups (DRGs). *J. Am. Dietet. Assoc.* 1989; 89: 1448-1451.
79. Sullivan DH, et al. Patterns of care: an analysis of the quality of nutritional care routinely provided to elderly hospitalized veterans. *J. Parent. Enteral Nutr.* 1989; 13: 249-254.
80. Burns JT, Jensen GL. Nutritional indices of elderly subjects admitted to different hospital services: a problem of physician awareness. *Nutrition Screening 2: New Approaches to Care, An Interdisciplinary Strategy*; 1993 May 10; Washington, DC: Nutrition Screening Initiative; 1993.
81. Rowan ML, et al. Nutritional status of the frail elderly in an acute-care eldercare service. *Nutrition Screening 2: New Approaches to Care, An Interdisciplinary Strategy*; 1993 May 10; Washington, DC: Nutrition Screening Initiative; 1993.
82. Stuart D, Barrett E. Successful strategies in an acute care setting. *Nutrition Screening 2: New Approaches to Care, An Interdisciplinary Strategy*; 1993 May 10; Washington, DC: Nutrition Screening Initiative.
83. Mowe M, Bohmer T. The prevalence of undiagnosed protein-calorie undernutrition in a population of hospitalized elderly patients. *J. Am. Geriat. Soc.* 1991; 39: 1089-1092.
84. Keller HH. Malnutrition in institutionalized elderly: how and why? *J. Am. Geriat. Soc.* 1993; 41: 1212-1218.
85. Nelson KJ, et al. Prevalence of malnutrition in the elderly admitted to long-term-care facilities. *J. Am. Dietet. Assoc.* 1993; 93: 459-461.
86. Life Sciences Research Office. *Nutrition Monitoring in the United States: An Update Report on Nutrition Monitoring Prepared for DHHS and USDA.* Washington, DC: U.S. GPO; 1989.
87. *Gaps Between Poor and Nonpoor Elderly Americans.* Washington, DC: GAO; 1992.
88. Kubena KS, et al. Anthropometry and health in the elderly. *J. Am. Dietet. Assoc.* 1991; 91: 1402-1407.
89. Wellman NS, Weddle D. *Florida Nutrition Screening and Intervention Pilot Program: Final Report.* Miami, Florida: Florida International University; 1993.
90. Coulston AM, et al. Comparison of the NSI's "Checklist" with traditional nutrition assessment criteria in a population applying for meals and wheels. *Nutr. Screening 2: New Approaches to Care, An Interdisciplinary Approach*; 1993 May 10; Washington, DC: Nutrition Screening Initiative; 1993.

91. Rush D. Evaluating the Nutrition Screening Initiative. *Am. J. Pub. Health.* 1993; 83: 944­945.
92. Abraham NE, Stroh K. Establishing linkages in a community setting­Delaware Nutrition Screening Program. *Nutrition Screening 2: New Approaches to Care, An Interdisciplinary Strategy* ; 1993 May 10; Washington, DC: Nutrition Screening Initiative; 1993.
93. Grandjean AC, Patil K, Reimers KJ. NSI ­ getting started in Nebraska. *Nutrition Screening 2: New Approaches to Care, An Interdisciplinary Strategy*; 1993 May 10; Washington, DC: Nutrition Screening Initiative; 1993.
94. North Carolina Department of Human Resources, Vacendak SR. Raleigh, North Carolina; 1993. *National Nutrition Screening Initiative Survey Results and Follow­up Survey.*
95. Zylstra RE. Nutrition Screening Initiative, Washington State Congregate Mealsite Survey: Who's at Risk in Washington State? Bellingham, WA: Northwest AAA; 1992.
96. Martin KS, Scheet NJ, Stegman MR. Home health clients: characteristics, outcomes of care and nursing interventions. *Am. J. Pub. Health.* 1993; 83: 1730­1734.
97. Hartz SC, et al. Nutrient supplement use by healthy elderly. *J. Am. College Nutr.* 1988; 7: 119­128.
98. Vaughan LA, Manore MM. Dietary patterns and nutritional status of low income, free­living elderly. *Food Nutr. News.* 1988; 60: 27­30.
99. Lee CJ, et al. Impact of special diets on the nutrient intakes of southern rural elderly. *J. Am. Dietet. Assoc.* 1993; 93: 186­188.
100. Harris LJ, et al. Comparing participants' and managers' perception of services in a congregate meals program. *J. Am. Dietet. Assoc.* 1987; 87: 190­195.
101. Braun KL, Horwitz KJ, Kaku JM. Successful foster caregivers of geriatric patients. *Health Social Worker.* 1988; Winter: 25­34.
102. New York State Office for the Aging, Rosenzweig LY. A Population at Risk: Current Findings and Future Needs. *Nutrition Program for the Elderly.* Albany, NY: 1993 Mar.
103. Bartlett BJ. Testimony: Governor's Home and Community Care Council Regional Hearing. Columbus, OH: Bartlett, OH Dietet. Assoc.; 1988 Oct 4.
104. Bartlett BJ. Community-based care should stress nutrition. *Nutr. Week.* 1989; 19: 4-5.
105. LaCroix AZ, et al. Prospective study of pneumonia hospitalizations and mortality of U.S. older people: the role of chronic conditions, health behaviors, and nutritional status. *Pub. Health Reports.* 1989; 104: 350­360.
106. Stevens J, Gautam SP, Keil JE. Body mass index and fat patterning as correlates of lipids and hypertension in an elderly, biracial population. *J. Gerontol.* 1993; 48:

M249­M254.

107. Posner BM, et al. Nutritional risk in New England elders. *J. Gerontol.* 1994; 49: 3: M123-M132.

108. Ford AB, et al. Impaired and disabled elderly in the community. *Am. J. Pub. Health.* 1991; 81: 1207­1209.

109. Williams R, Boyce WT. Protein malnutrition in elderly Navajo patients. *J. Am. Geriat. Soc.* 1989; 37: 397­405.

110. Nobmann ED, et al. The diet of Alaska Native adults: 1987­ 1988. *Am. J. Clin. Nutr.* 1992; 55: 1024­1032.

111. Strauss KF, Indian Health Service, Personal Communication. Rockville, MD: 1994.

112. Kim KK, et al. Nutritional status of Chinese­; Korean­; and Japanese­; American elderly. *J. Am. Dietet. Assoc.* 1993; 93: 1416-1422.

113. Cohen NL, Ralston PA. Final Report: Factors Influencing Dietary Quality of Elderly Blacks. Amherst, MA: AARP Andrus Foundation; 1992.

114. Sucher KP, Kittler PG. Nutrition isn't color blind. *J. Am. Dietet. Assoc.* 1991; 91: 297­298.

115. Looker AC, et al. Calcium intakes of Mexican Americans, Cubans, Puerto Ricans, non­Hispanic whites, and non­Hispanic blacks in the US. *J. Am. Dietet. Assoc.* 1993; 93: 1274­1279.

116. Bartholomew A, et al. Food frequency intakes and sociodemographic factors of elderly Mexican­Americans and non­ Hispanic whites. *J. Am. Dietet. Assoc.* 1990; 90: 1693­1696.

117. Chandra RK. Effect of vitamin and trace­element supplementation on immune responses and infection in elderly subjects. *The Lancet.* 1992; 340: 1124­1127.

118. Mitchell CO, Chernoff R. Nutritional assessment of the elderly. In Chernoff R, ed.: *Geriatric Nutrition: The Health Professional's Handbook.* Gaithersburg, MD: Aspen Publishers, Inc.; 1991.

119. Dempsey DT, Mullen JL, Buzby GP. The link between nutritional status and clinical outcome: can nutrition intervention modify it? *Am. J. Clin. Nutr.* 1988; 47: 352­356.

120. Gallagher­Allred C, McCamish MA. Malnutrition: A Hidden Cost in Health Care. Columbus, OH: Ross Products Division, Abbott Laboratories; 1993.

121. Sullivan DH, Walls RC, Lipschitz DA. Protein­energy undernutrition and the risk of mortality within 1 y of hospital discharge in a select population of geriatric rehabilitation patients. *Am. J. Clin. Nutr.* 1991; 53: 599­605.

122. Sullivan DH, et al. Impact of nutrition status on morbidity and mortality in a select population of geriatric rehabilitation patients. *Am. J. Clin. Nutr.* 1990; 51: 749­758.
123. Sullivan, DH. Risk factors for early hospital readmission in a select population of geriatric rehabilitation patients: the significance of nutritional status. *J. Am. Geriat. Soc.* 1992; 40: 792­798.
124. Reilly JJ, et al. Economic impact of malnutrition: a model system for hospitalized patients. *J. Parent. Enteral Nutr.* 1988; 12: 371.
125. Wolinsky FD, et al. Health service utilization among the non­institutionalized elderly. *J. Health Social Behav.* 1983; 24: 325.
126. Ryan VC. Nutrition identified as a risk factor for elderly Medicare patients' hospital readmission. *J. Nutr. Elderly.* 1990; 9: 81­87.
127. Breslow RA, et al. The importance of dietary protein in healing pressure ulcers. *J. Am. Geriat. Soc.* 1993; 41: 357­362.
128. Ferrell BA, Osterweil D. Pressure sores and nutrition. In Morely JE, Glick Z, Rubenstein LZ, ed.: *Geriatric Nutrition*. NY: Raven Press, Ltd.; 1990.
129. Pinchcofsky­Devin GD, Kaminski MV. Correlation of pressure sores and nutritional status. *J. Am. Geriat. Soc.* 1986; 34: 435­440.
130. Finn SC. ADA's nutrition & health campaign for women promotes research and behavioral change. *Persp. Appl. Nutr.* 1993; 1: 3­7.
131. Congress of the United States, Office of Technology Assessment. *Hip Fracture Outcomes in People Age 50 and Over: Mortality, Service Use, Expenditures, and Long­term Functional Impairment*. Washington, DC: OTA; 1993.
132. Vellas B, et al. Malnutrition and falls. *The Lancet.* 1990; 336: 1447.
133. Bonjour JP, et al. Hip fracture, femoral bone mineral density, and protein supply in elderly patients. In Munro H, Schlierf G, ed.: *Nutrition of the Elderly, Nestle Nutrition Workshop Series, Volume 29*. NY: Raven Press, Ltd; 1992.
134. Tkatch L, et al. Benefits of oral protein supplementation in elderly patients with fracture of the proximal femur. *J. Am. College Nutr.* 1992; 11: 519­525.
135. Kovar MG, Hendershot G, Mathis E. Older people in the United States who receive help with basic activities of daily living. *Am. J. Pub. Health.* 1989; 79: 778­779.
136. Roe DA. Development and current status of home­delivered meals programs in the United States: who is served? *Nutr. Reviews.* 1990; 48: 181­185.
137. Roe DA. Development and current status of home­delivered meals programs in the United States: are the right elderly served? *Nutr. Reviews.* 1994; 52:30­33.
138. Hughes SL, et al. Impact of long­term care on mortality, functional status, and

- unmet need. Health Services Research. 1988; 23: 269­294.
139. Edwards DL, et al. Home­delivered meals benefit the diabetic elderly. J. Am. Dietet. Assoc. 1993; 93: 585­587.
140. Gallagher­Allred CR. Implementing Nutrition Screening and Intervention Strategies. Washington, DC: Nutrition Screening Initiative; 1993.
141. Nutrition Screening 2: New Approaches to Care, An Interdisciplinary Strategy; 1993 May 10; Washington, DC: Nutrition Screening Initiative.
142. Administration on Aging. National Summary of Program Activities under Title III and VI of the Older Americans Act, Fiscal Year 1993. Washington, DC: Office of Community Programs, AoA, DHHS; 1994.
143. Frongillo EA, et al. Continuance of elderly on home­delivered meals programs. Am. J. Pub. Health. 1987; 77: 1176­1179.
144. Administration on Aging. National Summary of Program Activities under Title III and VI of the Older Americans Act, Fiscal Year 1992. Washington, DC: Office of Community Programs, AoA, DHHS; 1993.
145. O'Shaughnessy C. CRS Report for Congress: Older Americans Act Nutrition Program. Washington, DC: CRS, Library of Congress; 1990.
146. Balsam AL, Rogers BL. Service Innovations in the Elderly Nutrition Program: Strategies for Meeting Unmet Needs. Medford, MA: Tufts University School of Nutrition; 1988 Jul.
147. Ponza M, Wray L. Evaluation of the Food Assistance Needs of the Low­Income Elderly and Their Participation in USDA Programs (Elderly Programs Study). Princeton, NJ: Mathematica Policy Research, Inc.; 1990.
148. Clark RL, et al. Who Uses Food Assistance Programs?: Factors Associated with Use Among the Elderly. Washington, DC: The Urban Institute; 1993 Sep.
149. Skinner JH. Targeting benefits for the black elderly: The Older Americans Act. In Harel Z, McKinney EA, Williams M, ed.: Black Aged: Understanding Diversity and Service Needs. Newbury Park, CA: SAGE Publications, Inc.; 1990.
150. Balsam AL, Bottum CL, Rogers BL. Project director characteristics in the elderly nutrition program. J. Nutr. Elderly. 1992; 11: 33­44.
151. Stanford EP. Diverse black aged. In Harel Z, McKinney EA, Williams M, ed.: Black Aged: Understanding Diversity and Service Needs. Newbury Park, CA: SAGE Publications, Inc.; 1990.
152. Balsam AL, Carlin JM, Rogers BL. Weekend home­delivered meals in Elderly Nutrition Programs. J. Am. Dietet. Assoc. 1992; 92: 1125­1127.
153. Walden O, et al. The provision of weekend home delivered meals by state and a pilot

study indicating the need for weekend home delivered meals. *J. Nutr. Elderly.* 1988; 8: 31­43.

154. Hutchings LL, Tinsley AM. Nutrition education for older adults: how Title III­C Program participants perceive their needs. *J. Nutr. Ed.* 1990; 22: 53­58.

155. Harel Z. Older Americans Act related homebound aged: what difference does racial background make? *J. Gerontol. Social Work.* 1987; 9: 133­143.

156. Harel Z. Nutrition site service users: does racial background make a difference? *The Gerontologist.* 1985; 25: 286­291.

157. State of Connecticut, Department of Social Services, Buck DR. Hartford CT; 1994.

158. Saffel­Shrier S, Athas BM. Effective provision of comprehensive nutrition case management for the elderly. *J. Am. Dietet. Assoc.* 1993; 93: 439­444.

159. Hamilton MS. Oswego County Senior Services Breakfast Program. Fulton, NY: Oswego County Opportunities, Inc.; 1993.

160. Suidara H. The Nutrition Risk Program for Older Adults, Southfield Michigan. *Nutrition Screening 2: New Approaches to Care, An Interdisciplinary Strategy*; 1993 May 10; Washington, DC: The Nutrition Screening Initiative; 1993.

161. NM State Agency on Aging, Grisham ML. Santa Fe, NM; 1993 Jul 12.

162. Balsam AL, Ostersaas G. Developing a continuum of community nutrition services: Massachusetts Elderly Nutrition Programs. *J. Nutr. Elderly.* 1987; 6: 51­67.

163. Area Office on Aging of Northwestern Ohio, Inc., Northwestern Ohio Community Action Commission. Ohio Department of Aging Home­Delivered Nutrition Services Demonstration Grant: Developing a Meal Delivery System to Reach Homebound Seniors in Isolated Rural Areas. Columbus, OH: Ohio Department of Aging; 1993 Nov.

164. Mobile Meals Inc., Area Agency on Aging PSA 10B, Inc. Minority Outreach Project. Columbus, OH: Ohio Department of Aging; 1992 Apr.

165. Roe DA. Nutritional surveillance of the elderly: methods to determine program impact and unmet need. *Nutr. Today.* 1989; 24­29.

166. Nutrition Screening Initiative. Part F funding for community nutrition programs. *Nutrition Screening Initiatives.* Washington, DC: 1994; 11: 3.

167. Compilation of the Older Americans Act of 1965 and the Native American Programs Act of 1974 as Amended through December 31, 1992. Washington, DC: U.S. GPO; 1993.

168. Jackson MY, Godfrey F. Federal nutrition services for American Indian and Alaska native elders. *J. Am. Dietet. Assoc.* 1990; 90: 568­571.

169. AoA. Native American Elders Report. Washington, DC: AoA; 1993.

- 170. Ponza M, et al. National Study of the Adult Component of the Child and Adult Care Food Program (CACFP). Princeton, NJ: Mathematica Policy Research, Inc; 1993.**
- 171. Older Americans Report. USDA studies participation in Adult Day Care Program. Older Americans Report. Silver Springs, MD: 1994 July 8.**
- 172. Food Assistance Programs: Nutritional Adequacy of Primary Food Programs on Four Indian Reservations. Washington, DC: GAO; 1989.**
- 173. National Eldercare Institute on Long Term Care. Eldercare in the Home and Community: Long Term Care Information­Medicaid Home and Community Based Services Waivers for the Elderly. Washington, DC: NASUA; 1992.**
- 174. Shkolnik C. Columbus, Ohio; 1993.**
- 175. Buto K. Statement of Kathy Buto, Director, Bureau of Policy Development, HCFA, Testimony before the House Select Committee on Aging; 1992 Jul 30; Washington, DC.**
- 176. NIH. Consensus development conference statement on geriatric assessment methods for clinical decision making. J. Am. Med. Assoc. 1988; 259: 2456.**
- 177. Congress of the United States, OTA. Preventive Health Services for Medicare Beneficiaries: Policy and Research Issues. Washington, DC: OTA; 1990.**
- 178. Munro HM. Protein nutriture and requirements of the elderly. In Munro HN, Danford DE, ed.: Nutrition, Aging and the Elderly. NY: Plenum Press; 1989.**
- 179. Taybeck M, Kumanyika S, Chee E. Body weight as a risk factor in the elderly. Arch. Internal Med. 1990; 150: 1065­1072.**
- 180. Kuczmarski RJ. Need for body composition information in elderly subjects. Am. J. Clin. Nutr. 1989; 50: 1150­1157.**
- 181. Russell RM, Suter PM. Vitamin requirements of elderly people: an update. Am. J. Clin. Nutr. 1993; 58: 4­14.**
- 182. Harris T, et al. NHANES III for older persons: nutrition content and methodological considerations. Am. J. Clin. Nutr.. 1989; 50: 1145­1149.**
- 183. Nutrition Monitoring in the United States: The Directory of Federal and State Nutrition Monitoring Activities. Wright J ed. Hyattsville, MD: Public Health Service; 1992.**
- 184. Van Nostrand J. An Aging America: Data to Address Current Issues. 1994 NCHS Data Users Conference; 1994 Jul 20; Bethesda, MD.**
- 185. McDowell MA, et al. Energy and macronutrient intakes of persons ages 2 months and over in the United States: Third NHANES, Phase 1, 1988-91. Advance Data from Vital and Health Statistics; No-255. Hyattsville, MD: NCHS; 1994.**
- 186. Alimo K, et al. Dietary intake of vitamins, minerals and fiber of persons ages 2 months and over in the United States: Third NHANES, Phase 1, 1988-91. Advance Data from Vital**

and Health Statistics; No-258. Hyattsville, MD: NCHS; 1994.

187. Smiciklas & Wright H, et al. Nutritional assessment of homebound rural elderly. *J. Nutr.* 1990; 120: 1535 & 1537.

188. Kerstetter JE, Holthausen BA, Fitz PA. Malnutrition in the institutionalized older adult. *J. Am. Dietet. Assoc.* 1992; 92: 1109 & 1116.

189. Nutrition Working Group. Abdellah FG, Moore SR. Surgeon General's Workshop: Health Promotion and Aging Proceedings; 1988 Mar 20; Washington, DC.: PHS; 1988.

190. Wolinsky FD, et al. Further assessment of reliability and validity of a nutritional risk index. *Health Services Research.* 1986; 20: 977.

191. Bureau of the Census. 1990 Census of Population and Housing: Special Tabulation Program (STP) 14: Special Tabulation on Aging. Washington, DC: U.S. Department of Commerce, Bureau of the Census; U.S. DHHS, AoA; 1994.

192. Hughes SL. Home care: where are we now and where do we need to go. In Ory MG, Duncker AP, ed.: *In-Home Care for Older People: Health and Supportive Services.* Newbury Park, CA: SAGE Publications, Inc.; 1992.

193. National Institutes of Health Revitalization Act of 1993, PL 103 & 43. Washington, DC: U. S. GPO; 1993.

194. Aging News Alert. NIA to fund research on studies of malnutrition in older persons. *The Senior Services and Funding Report.* Silver Springs, MD: Aging News Alert; 1994 Aug 10.

195. H.R. 2643 "Nutrition and Health Information Act". Washington, DC; 1993.

196. Preventive Health Amendments of 1993, PL 103 & 183. Washington, DC: U. S. GPO; 1993.

197. National Nutrition Monitoring and Related Research Act of 1990, PL 101-445. Washington, DC: U.S. GPO; 1990 Oct 22.

198. Ten Year Comprehensive Plan for the National Nutrition and Related Research Program. *Federal Register.* 1993 June 11; 58: 11: 32752-32806.

199. Torres-Gil FM. "Role of Elderly Nutrition in Home and Community Based Care", 77th Annual Meeting of The American Dietetic Association. Orlando, FL: 1994 Oct 19.

200. National Resource and Policy Center on Nutrition and Aging. *Federal Register.* Washington, DC: 1994 May 13; 59: 92: 25075-25076.

201. White House Conference on Aging. White House Conference on Aging Fact Sheet. Washington, DC: AoA; 1994.

202. White House Conference on Aging: Recognition of Mini Conferences. *Federal Register.* Washington, DC: 1994 Apr 22; 59: 78: 19178.

- 203. AoA. Overview to State Performance Reporting Requirements. Washington, DC: AoA; 1994.**
- 204. National Eldercare Institute on Nutrition. Nutrition Institute Moves Forward with Strategic Planning Process. Eldercare Nutrition News. Grand Rapids, MI; 1993: 3.**
- 205. Wolfe CB. Nutrition Programs for the Elderly: Linking Research, Policy and Practice. Nestle Worldview. Washington, DC; 1993: 12.**
- 206. Dodds JM, et al. The New York State Food and Nutrition Policy Council: experience in interagency coordination. J. Nutr. Ed. 1992; 24: 202­206.**
- 207. Legislative Highlights: ADA continues push for medical nutrition therapy, improved child nutrition programs, and labeling of dietary supplements. J. Am. Dietet. Assoc. 1994; 94: 721.**
- 208. Rakowski W, Hickey T. Mortality and the attribution of health problems to aging among older adults. Am. J. Pub. Health. 1992; 82: 1139­1140.**
- 209. Evans W, Rosenberg IH. Biomarkers: The 10 Determinants of Aging You Can Control. NY: Simon & Schuster; 1991.**
- 210. Miller DK, et al. Formal geriatric assessment instruments and the care of older general medical outpatients. J. Am. Geriat. Soc. 1990; 38: 645­651.**
- 211. Albert SM. Do family caregivers recognize malnutrition in the frail elderly? J. Am. Geriat. Soc. 1993; 41: 617­622.**
- 212. Bennet J. Hidden malnutrition worsens health of elderly. New York Times. NY; 1992 Oct 10.**
- 213. Jefferies, LG. USDA, FNS. Personnal communication. 1994.**