

# Today's Research on Aging

PROGRAM AND POLICY IMPLICATIONS

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## Underweight, Undernutrition, and the Aging

Considerable research has focused on the growing worldwide pandemic of obesity, including obesity among the elderly (Andreyeva et al. 2005; Jenkins 2004; Jenkins, Johnson, and Ofstedal 2007; Popkin 2006; Popkin 2007). Yet, a significant share of the elderly throughout the world is underweight and does not get enough calories or the right nutrients from what they eat.

The rising number of elderly worldwide makes addressing their nutritional needs more challenging. Life expectancy is increasing, the overall population is aging, and the number of people ages 85 and older is now the most rapidly growing segment of many populations. Moreover, developing countries are experiencing the most rapid growth in people over age 65. By 2030, the elderly population in the developing world is projected to grow 140 percent (NIA, NIH, HHS, and Department of State 2007).

Based on NIA-funded and other research, this newsletter briefly examines the importance of nutrition to the elderly, the prevalence of underweight and undernutrition among this group, and suggests measures to undertake at the individual and population levels to address this issue.

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This review summarizes research related to the objectives of the National Institute on Aging, with emphasis on work conducted at the NIA demography centers. Our objective is to provide decisionmakers in government, business, and nongovernmental organizations with up-to-date scientific evidence relevant to policy debates and program design. These newsletters can be accessed at [www.prb.org/TodaysResearch.aspx](http://www.prb.org/TodaysResearch.aspx).

### Good Nutrition Is Essential for the Elderly

Good nutrition is important at every stage of life for maintaining good health and personal productivity, and it is especially important to the elderly because of the physiological changes that occur in the body as people age. Even in the best of circumstances, aging weakens the immune system. Insufficient calories, lack of protein, and micronutrient deficiencies in the elderly further weaken their immunity and expose them to infections that may reduce absorption of essential nutrients, thereby compounding the cycle of undernutrition and infection.

In addition, studies have shown that elderly people who are underweight are at higher risk of acute illness and death (Beck et al. 1999; Kushner 1993; Marton et al. 1981; Seidell et al. 1996). They also have a significantly higher risk of dying within a year of hospitalization than those with adequate nutrition (Liu et al. 2002).

Moreover, elderly people who are undernourished face other risks, including falls, hospitalization, lengthy hospital stays, and postoperative complications (Beck et al. 1999; Harris and Haboubi 2005). There is also growing evidence that in the elderly, even micronutrient deficiencies not detectable in a physical examination are associated with declines in cognitive ability (Duthie et al. 2002).

Data linking weight and nutritional status of the elderly with functional ability are limited. However, a study in Russia found that weight loss over 3 kg was associated with a higher risk of disability (Zohoori 2001). A study in China showed that low income, rural residence, and low protein and energy intake were associated with losses in muscle and body mass, which are themselves linked with increased illness, functional impairment, and death (Stookey et al. 2001). Another study in Japan found a decline in dietary diversity to be associated with a reduction in functional ability (Kwon et al. 2006). Being underweight is also associated with frailty. One analysis using data from the United States Health and Retirement Study showed that underweight respondents had significantly more difficulty with activities of daily living and

required considerably more hours of weekly informal caregiving (Jenkins et al. 2007).

## The Elderly Face Special Risks for Undernutrition

Anorexia and weight loss are common among the elderly, and a number of risks may prevent them from getting enough of the right foods. Their ability to taste and smell may decrease their appetite for needed foods, and they may have dental problems that make it difficult to eat. Reduced physical activity lessens the need for energy and food consumption. In addition, the elderly may face difficulties because they are socially isolated, lose a spouse, or have problems of mobility (Gariballa 2004; Jenkins, Johnson, and Ofstedal 2007; Kwon et al. 2006; Zohoori 2001). Prescription drugs taken by the elderly and mental health problems can also impair their nutritional status.

Elderly patients who are institutionalized are at especially high risk of undernutrition (Gariballa 2004; Morley 2001). The frail elderly in some developing countries also face this risk as some caregivers may intentionally withhold appropriate care (Zohoori 2001). In addition, elderly people who are poor may also not have regular access to enough food to maintain sufficient calorie consumption (Bhattacharya et al. 2004). A study of body weight in Taiwan and the Philippines found underweight to be more common among people over 70, women, the unmarried, rural residents, and the poor (Jenkins, Johnson, and Ofstedal 2007). Also, the third National Health and Nutrition Examination Survey in the United States found that poverty has a very

significant negative impact on micronutrient intake and nutrition status. Seventy-nine percent of those estimated to have inadequate food consumption lived below the poverty line (Sahyoun and Basiotis 2000). The Hispanic elderly in the United States face the greatest risk of food insecurity associated with poverty (Bhattacharya et al. 2004).

The nutritional status of the elderly, particularly in the developing world, also suffers disproportionately from natural disasters, war and conflict and related displacement, and from the societal effects of HIV/AIDS.

## The Burden of Undernutrition in the Elderly

There is no standard measure of undernutrition, nor is there a universally accepted clinical definition of undernutrition among the elderly. Rather, undernutrition has been measured in many different ways, including Body Mass Index, the Nutritional Risk Index, the Maastricht Index, Determine Your Nutritional Health Checklist, the Instant Nutritional Assessment, and the Malnutrition Risk Scale (Patterson et al. 2002; Naber et al. 1997; Omran and Salem 2002).

Despite the lack of a standard measure or agreed clinical definition, data suggest that undernutrition among the elderly is an important issue. A study in the United Kingdom indicated that 12 percent of the noninstitutionalized elderly were undernourished, compared with 20 percent of those living in institutions and 40 percent of those who were hospitalized. French studies indicated that about 3 percent of the elderly living at home, and about 40 percent of those institutionalized, were undernourished (Raynaud-Simon and Lesourd 2000). Similar results were found in Norway (Mowe et al. 1994) and Canada (Payette 2005). A study estimated that about 40 percent of the elderly in the United States do not get enough to eat (Ryan et al. 1992).

There is relatively little data on the prevalence of undernutrition among the elderly in the developing world. However, studies of the African elderly showed that up to 36 percent of the men and 27 percent of the women were undernourished (Charlton and Rose 2001). A recent study in the Philippines showed about 30 percent of the elderly were underweight (Jenkins, Johnson, and Ofstedal 2007). The tribal population in India is among India's poorest groups, and one study found that more than 60 percent of the tribal men and women over age 60 suffered from a chronic deficiency in needed calories (Arlappa et al. 2005).

### Risks to Adequate Nutrition Among the Elderly

- Decreased ability to taste and smell
- Dental problems
- Reductions in physical activity and lack of mobility
- Social isolation due to the death of one's spouse
- Pharmaceuticals
- Poor mental health
- Being institutionalized
- Intentionally inadequate care
- Poverty
- Displacement/societal disruption

**Sources:** Bhattacharya et al. 2004; Gariballa 2004; Jenkins, Johnson, and Ofstedal 2007; Morley 2001; Zohoori 2001.

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## Addressing Undernutrition in the Elderly

Steps need to be taken so that the problem of undernutrition in the aging can be better recognized, existing best practices put in place, and more effort undertaken to better understand which prevention and treatments strategies are most cost-effective (Clarke et al. 1998; Dangour and Ismail 2003; Meydani et al. 2005). The World Health Organization guidelines on nutrition and aging summarize current knowledge (WHO 2002).

Studies have also suggested that preventing undernutrition in the elderly will require action on several fronts. These include raising awareness about the nature of the problem, enhancing the context within which people eat so they are not isolated, encouraging physical activity, and educating the elderly and their caregivers about appropriate eating (Clarke et al. 1998; Jenkins et al. 2007; Ryan et al. 1992). Because many elderly lose some of their sense of taste but the preference for sweet-tasting foods does continue in old age, using strong flavors, particularly sweetness, may enhance food intake among the elderly (Schiffman, Warick, and Mackey 1993; Schiffman 2000; Schiffman, Rogers, and Zervakis 2004).

Government assistance may be required to help the elderly buy food and eat more healthfully. For example, Mexico has a cash transfer program to support the nutritional needs of its elderly; Chile provides supplemental food to those over 70; and Botswana and South Africa have pensions for the elderly. A study of the South African program, however, indicated that some of the pension money, especially for females, was likely to go to working-age male relatives who then worked less than

### Obesity and Malnutrition in the Elderly

Obesity is a growing problem globally and is also associated with micronutrient deficiencies in the elderly. Despite getting sufficient calories, the obese may have vitamin and mineral deficiencies. According to Katherine Tucker, director of the Dietary Assessment and Epidemiology Research Center at Tufts University, obese elderly need a very high-quality diet to maintain good nutrient status without weight gain. Another major issue among the obese is maintenance of muscle mass. Many obese elderly may have “sarcopenic obesity” in which their lean muscle mass is low despite high body weight. Inadequate muscle mass slows metabolism, lowering the number of calories required even further. Low muscle mass also increases the risk of falls among these elderly.

before, so that the pension did not help women (Bertrand et al. 2001). The developed countries generally offer pensions and programs, such as Meals on Wheels, to get food to dependent elderly living in their own homes.

Suggestions for assessing and enhancing the nutritional status of both community-living and hospitalized elderly patients include better training of health care workers in nutritional management, incorporating nutritional management into clinical practice, and using simple tools for assessing nutritional status (Kopelman and Lennard-Jones 2002). One American study suggested eight quality indicators that could guide the care of the undernourished elderly, including measurement and evaluation of weight (Reuben 2004). The WHO guidelines also recommend approaches to assessing the nutritional status of the elderly.

Some studies done of nutrition supplementation for the underweight elderly indicated that providing a nutritional supplement with key vitamins and minerals boosted immune response. Supplementation with specific micronutrients, including vitamin B6 and long-term provision of beta carotene, also improved physiological responses to infection. Vitamin E supplementation helped reduce the incidence and duration of upper respiratory tract infections in nursing home patients. The results of supplementation with multiple micronutrients, however, were ambiguous (Meydani et al. 2005).

Undernutrition of the elderly is a substantial problem globally. Even though science and practice have improved, the problem is still insufficiently understood, and cost-effective measures to prevent and treat it are not clearly established. Some proposed long-run solutions include supplementation and fortification of selected foods; and for the developing world, the development of nutrient-enriched crops (Meydani et al. 2005). However, in light of the growing number of elderly worldwide and the many who will be underweight and undernourished, additional studies must be carried out to assess these and other alternative solutions.

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## The NIA Demography Centers

The National Institute on Aging supports 13 research centers on the demography and economics of aging, based at the University of California at Berkeley, the University of Chicago, Harvard University, the University of Michigan, the National Bureau of Economic Research, the University of North Carolina, the University of Pennsylvania, Pennsylvania State University, Princeton University, RAND Corporation, Stanford University, the University of Southern California/University of California at Los Angeles, and the University of Wisconsin.

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