Obesity in Later Life

An Overview of the Issues

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The increasing prevalence of obesity in the United States has affected all age groups. Between 1980 and 2000, the percentage of the adult population considered obese increased from about 13% to more than 30% (National Center for Health Statistics [NCHS] 2003). The population prevalence of obesity peaks among those aged 50 to 59, and in this age group, the percentage considered obese jumped from 19% to 28% between 1980 and 1990 and has continued to rise. Although the prevalence of obesity in the population declines after age 60, even among those older than age 80 a significant proportion, 13% in 1990, are considered obese by standard measures. Despite the high and rising prevalence of obesity across adult ages, research on the causes and consequences of obesity has largely ignored the older population.

Obesity in later life does not usually occur for the first time in later life but is the result of a lifetime of eating and exercise habits. Fundamentally, obesity results from a mismatch between energy intake and expenditure. Adults reach their full height by their early 20s, but most continue to gain weight. Among women, weight gain often occurs following pregnancy and again at menopause. Throughout adulthood, energy needs tend to decline but food consumption does not. Unless physical activity is increased, weight gain is likely to occur. Weight gain can be influenced by genetic predisposition, environmental influences, and psychological factors. Many gerontological researchers study undernutrition, feeding problems, and healthy eating among the elderly, and these are serious concerns. Inadequate nutrition and

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vitamin deficiencies are serious problems that can lead to the development of chronic and acute diseases. Rapid weight loss can be a sign of underlying disease. Problems with chewing, swallowing, and the loss of the senses of taste and smell can limit the food choices and nutritional quality of an older person's diet.

Why should we be concerned with obesity in later life? The effects of excess weight on physical health are well-documented (National Heart, Lung, and Blood Institute [NHLBI] 1998). Four articles in this issue (Kahng et al., Krueger et al., Wray et al., and Thorpe and Ferraro) provide excellent overviews both of the type of health problems and their consequences in terms of mortality and functioning. As they point out, excess weight is associated with a variety of diseases including heart disease, diabetes, and arthritis. As a result, individuals who are overweight by middle age have shorter life expectancies than those of normal weight (Peeters et al. 2003). In addition, this high rate of chronic disease leads to a greater prevalence of functional limitations (Himes 2000). Given the rising prevalence of obesity at younger ages and throughout adulthood, the health care costs associated with obesity are serious concerns.

Obesity has effects beyond those on physical health. Numerous studies, described by Zagorsky and Fonda et al. (this issue), have examined the effects of obesity on wages, job opportunities, and education. Obese adults tend to have lower socioeconomic status (SES) than those who are not obese. The direction of this relationship is still unclear, but it appears that societal norms of appearance and stereotypical views of the obese as "lazy" and having "weak self-control" lead to discrimination in the workforce. As a result, obese older individuals tend to have lower levels of net worth and may enter their retirement years in a state of economic uncertainty. But these stereotypes that raise negative images in young or middle adulthood may change for the elderly. Images of the "plump" grandmother and the "portly" grandfather may be more positive and obesity seen as less of a social stigma later in life. The intersection of stereotypes of aging and obesity are an area deserving further study.

The standard public health measure of obesity is the body mass index (BMI). This index, used in all of the studies in this issue, is calculated as weight (kg) divided by height^2(m^2). Since 1998, the measurement of obesity has become standard in the United States, adopting the guidelines of the NHLBI (1998). Obesity is defined as a BMI

of 30.0 or higher and is further divided into obesity class I (BMI = 30.0-34.9), obesity class II (BMI = 35.0-39.9), and obesity class III (BMI = 40+). In addition, in some cases it is useful to separate out those who are overweight or "pre-obese," having a BMI of 25.0 to 29.9. BMI itself is merely a proxy for what health researchers are usually interested in—body composition. Although self-reported BMI has been shown to be a good indicator of overall body fat at younger ages, this becomes less true with age. Older adults tend to lose muscle mass, which is heavier than fat, as they age. In addition, the loss of bone density can affect the BMI measurement, especially for women.

Studying obesity in later life presents many unique challenges. It is rare for a researcher to have access to a large, nationally representative sample of older adults for whom height and weight are clinically measured; even rarer, perhaps nonexistent, are longitudinal measures of height and weight. Although the use of self-reports is a problem present in many studies of body size, age presents some new concerns about self-reported data. Do individuals report their current height or weight, or do they report a weight at some earlier age? There is some loss in height with age, which may bias the calculation of BMI in later life. In addition, the gain and loss of weight with age may or may not be reported accurately by older respondents. In the general population, there is a tendency for overweight individuals to report lower than true weights and for underweight individuals to report higher than true weights. If this pattern continues into later life, the distribution of BMI is truncated in the tails.

This special issue contains seven articles using six different sources of data over a time period of nearly 30 years (see Table 1). The articles are representative of the varied studies available for those interested in pursuing a wide range of questions concerning obesity in later life. The articles deal with mortality, chronic health conditions overall and diabetes specifically, and wealth. All but one use self-reported measures of height and weight, and all but one include both men and women. Although race and ethnic backgrounds are included in some of the analyses, they are not the focus of any specific article. This is clearly an area in which greater understanding is needed given the strong relationships observed between ethnicity and body size.

An excellent overview of the scope of the obesity problem is provided in the article by Zablotsky and Mack. Although obesity is often ignored in later life, this article illustrates quite clearly the need to

TABLE 1
Summary of Sources of Data and Measures Used by Authors in This Issue

Author	*Title*	*Data Source*	*Measure of Obesity*	*Age/Gender*	*Time*
Zablotsky and Mack	"Changes in Obesity Prevalence Among Women Aged 50 Years and Older: Results From the Behavioral Risk Factor Surveillance System, 1990-2000"	Behavioral Risk Factor Surveillance Study	Self-reported	Women aged 50-plus	1990-2000
Kahng et al.	"The Relationship Between the Trajectory of Body Mass Index and Health Trajectory Among Older Adults: Multilevel Modeling Analyses"	Americans' Changing Lives	Self-reported	Men and women aged 65-plus	1986-1994
Wray et al.	"Diabetes Diagnosis and Weight Loss in Middle-Aged Adults"	Health and Retirement Survey	Self-reported	Men and women aged 51-61	1992-1996
Krueger et al.	"Body Mass, Smoking, and Overall Cause-Specific Mortality Among Older U.S. Adults"	National Health Interview Survey	Self-reported	Men and women aged 60-plus	1986-1997
Thorpe and Ferraro	"Aging, Obesity, and Mortality: Misplaced Concern About Obese Older People?"	National Health and Nutrition Examination Survey	Measured	Men and women aged 50-plus	1971-1992
Zagorsky	"Is Obesity As Dangerous to Your Wealth as to Your Health?"	National Longitudinal Study of Youth	Self-reported	Men and women aged 14-22 in 1979	1985-2000
Fonda et al.	"Relationship of Body Mass and Net Worth for Retirement-Aged Men and Women"	Health and Retirement Survey	Self-reported	Men and women aged 51-61	1992

address this oversight. For their state level analysis of the increase in obesity among older women in the 1990s, Zablotsky and Mack use the Behavioral Risk Factor Surveillance Study (BRFSS) begun in the 1980s as a method for tracking changes in health and health behaviors at the state level. States use a standard core telephone questionnaire, which they may supplement with additional questions relevant in that state. Although the levels of obesity reported in the BRFSS are somewhat lower than those collected in the National Health and Nutrition Examination Survey (NHANES), the trend over time is very similar. And the BRFSS provides a geographic level of measurement that cannot be captured in national surveys.

What Zablotsky and Mack observe is a rapid rise and westward expansion of obesity prevalence rates among women aged 50 years or older. In 1990, only one state, Mississippi, reported an obesity prevalence of greater than 20%. By 1998, a dramatic 25 states were in that category, and 36 states reached that level by 2000. Obviously, obesity is not a problem limited to one region of the country, one age group, or one gender. They argue that most interventions have not addressed the special needs of the older population and that successful intervention will require attention to the older population.

Concern about obesity has come about largely due to associated health risks. Although cross-sectional data show that those who are obese in late life have more chronic health conditions and functional limitations, less clear is the effect of obesity on the trajectory of disease and functioning or the effect of declining BMI on health. These longitudinal concerns are the subject of the article by Kahng, Dunkle, and Jackson. The Americans' Changing Lives survey provides three waves of data with measures of BMI, health conditions, and functional limitations and thus is an excellent source of information for answering these questions.

Kahng et al. are able to confirm many of the results of previous studies, primarily that obesity is linked to both more chronic health conditions and limitations in functioning. However, they also find that the commonly observed decline in BMI with age is not related to gender or race but appears to be largely a function of age alone. This is contrary to the pattern of weight gain in earlier life that is strongly related to gender and race. The universality of the BMI decline with age is important for those studying the importance of weight mainte-

nance in later life and the relationship of weight decline to functioning and health.

Among the host of health problems associated with obesity, diabetes is one of the most common. There is a strong correlation between being overweight as an adult and developing Type 2 diabetes, and weight control is a primary focus of diabetes treatment. Based on the advice given patients about smoking cessation, there is reason to believe that physicians do not uniformly advise patients with respect to health behaviors. Furthermore, their advice may vary by the SES, gender, or age of the patient.

Building on this work in smoking cessation, Wray and her colleagues examine the relationship among diabetes diagnosis, weight loss, and SES. Using data from the Health and Retirement Study (HRS), they find that in contrast to studies on smoking cessation among those who had suffered heart attacks, SES was not a significant factor in predicting weight loss among those diagnosed with diabetes. Perhaps physicians are more uniform in the advice they provide patients, or perhaps weight loss is difficult to achieve regardless of your SES. However, weight loss did occur among those who had been living with diabetes for a longer time, suggesting that behavior modification may occur over time.

The relationship between smoking and obesity is complex. Smokers have higher mortality risks than nonsmokers, but smokers also tend to have lower body masses than those who don't smoke. Both smoking and obesity have been linked to some of the same health problems, but often studies of obesity exclude smokers or fail to control for its effects. In the next article, Krueger and his colleagues attempt to untangle this relationship by examining both overall and cause-specific mortality among smokers and nonsmokers, overweight and underweight.

The National Health Interview Survey (NHIS) provides a relatively long series of data with information on health status and behaviors. Linked to the National Death Index, the combined data allow for an examination of mortality as well. As others have noted, Krueger et al. find that being underweight is more strongly associated with death than being overweight, but the effects of obesity on overall mortality appear only after controlling for smoking. Furthermore, being underweight appears to be related to underlying poor health. Clearly, there is a need for research that can follow the weight and health relation-

ship over a long period of time. When examining cause-specific mortality, obesity emerges as a clear risk factor for increased risks of mortality from diabetes and circulatory diseases, and Krueger et al. argue against taking the stance that obesity may be protective in later life. In addition, they note that the benefits of physical activity, whether they translate into weight loss or weight management, are likely to be beneficial at all ages.

Thorpe and Ferraro also are interested in the relationship between BMI and mortality. They approach the question with a different set of data than Krueger and colleagues, the NHANES. The important difference between NHANES and NHIS data is the measurement of height and weight. Although NHIS relies on self-reports, the NHANES provides clinical measures of both. This enhances the reliability of the measures, but the smaller sample of the NHANES I and its companion, the Epidemiologic Follow-Up Study (NHEFS) can make some subgroup comparisons difficult.

How to account for underlying disease and illness is a constant problem in mortality studies. Central to the concern is whether obesity itself is a risk for higher mortality, or whether it operates only through illness. Thorpe and Ferraro conclude that the effects of obesity on mortality after age 50 are indirect; the obese tend to develop more serious health problems and these illnesses lead to death but obesity itself is not related to increased mortality risks. Interestingly, this is not true for adults younger than the age of 50. For that group, obesity remains a direct risk for mortality even after prevalent diseases are controlled.

What do these two studies, Krueger et al. and Thorpe and Ferraro, tell us? Using two different sets of data, slightly different controls and variables, and somewhat different models, they both conclude that obesity, primarily through its relationship to other critical diseases, raises the mortality risks of older adults. Both studies find that being simply overweight, however, is associated with a lower overall mortality risk. Future research could benefit from more finely distinguishing those in the "overweight" category at older ages. Are they formerly obese individuals who have lost weight late in life, either in response to health advice or because of illness? Or are they "normal"-weight individuals who have gained weight in later life due to sedentary activity?

Obesity clearly has implications for health and mortality. Those who are obese tend to have more chronic health conditions and experi-

ence more functional limitations. Because of their higher rate of illness, older persons who are obese experience elevated mortality risks. But obesity may have effects beyond the physical. Some evidence suggests that the obese population experiences greater levels of discrimination in education and employment. Rates of depression are higher among the obese than those with BMIs in what is considered the "normal" range. How do these factors, both physical and psychological, affect earnings and wealth? The last two articles in the issue address that question. Both examine a population in the middle years of adulthood. In the case of Zagorsky's research, the sample respondents are aged 35 to 51 at the time of the final interview in 2000; in the article by Fonda et al., respondents are aged 51 to 61. This stage of the life course is an important phase of the life cycle. It represents a time in which both body size and wealth are increasing and when inequalities in both tend to increase.

The first of these two articles, by Jay Zagorsky, uses the 1979 National Longitudinal Study of Youth (NLSY) sample, which has been supplemented with wealth modules beginning in 1985. In 1979, the sample was aged 14 to 22, an age range covering the peak of the "baby boom" population. By 2000, when the data end, this group is middle-aged, 35 to 51, and the oldest members are entering their last decade before normal retirement from the workforce. The trend in the relationship between net worth and body size is clear. At younger ages, individuals who are overweight (but not obese) have the highest net worth, but with age this advantage quickly erodes. By 2000, those in the "normal"-weight range have the highest level of net worth, followed by those in the overweight range. Across the time span, 1985 to 2000, the obese respondents are disadvantaged with respect to total net worth.

Why does this shift occur? Zagorsky explores a variety of possible explanations including discrimination in the labor market, different consumption patterns, or lower levels of education. Surprisingly, one factor that emerges as a possible explanation is the lower rate of gifts and transfers to obese respondents. It is unclear how or why this might work, but it presents a fascinating avenue for research into the intergenerational transmission of both wealth and health.

Another perspective on the relationship between body size and wealth is provided by Stephanie Fonda and her colleagues. They are particularly interested in the gender effects—is the relationship between SES and body size different for men than it is for women? Using the HRS, a sample slightly older than the individuals studied by Zagorsky, Fonda et al. compare net worth by body size for men and women. Although the analysis is cross-sectional, the use of net worth introduces a measure of lifetime experiences. Net worth, measured by housing plus savings minus debt, is built up over long periods of time and reflects differences in earnings, consumption, and other sources of income.

Fonda et al. find some interesting patterns in their article as body size seems to be related to net worth in very different ways for men and women. They observe that obese men actually have higher net worth than other men, whereas an opposite relationship is observed for women. In contrast to Zagorsky's joint analysis of the NLSY data in which gender did not have an effect on net worth, Fonda et al. estimate separate models for men and women. Is the finding of no gender effect by Zagorsky a result of the difference in age between the two samples or in the analysis plan? Because wealth accumulation does not occur evenly over the life span, perhaps younger individuals have not yet differentiated themselves by body size. Again, the gender, wealth, and body size relationship provides a rich avenue of research.

Although the articles in this issue address many critical issues, there are several areas of research open for new investigation and new questions raised by these articles. The increased availability of longitudinal measures of health and body size will allow us to begin to understand the interrelated trajectories of both. Gender differences are clearly important, both in terms of health and wealth. Are women less disadvantaged by their excess weight than men? Central to those interested in the life-course perspective and intergenerational ties is the intergenerational transfer of obesity. What are the environmental and genetic factors that link families? To what extent can they be separated? The following articles provide an excellent view of the data available for research, the questions to be asked, and the potential for new work in this field.

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