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## Obesity in Old Age

Ian McPhee Chapman

Department of Medicine, Royal Adelaide Hospital, University of Adelaide, Adelaide, Australia

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### Abstract

Many older people in developed countries are overweight or obese. The prevalence is increasing as more people reach old age already overweight. Obesity in old age is associated with increased morbidity and a reduction in quality of life. The relative increase in mortality is less in older than young adults and the body weight associated with maximal survival increases with advancing age. Although intentional weight loss by overweight older people is probably safe and beneficial, caution should be exercised in recommending weight loss to overweight older people on the basis of body weight alone. Methods of achieving weight loss in older adults are the same as in younger adults. Weight loss diets should be combined with an exercise program to preserve muscle mass, as dieting results in loss of muscle as well as fat, and older people have reduced skeletal muscle mass in any case. Weight loss drugs have not been extensively studied in older people, and there is the potential for drug side effects and interactions. Weight loss surgery appears to be safe and effective, albeit slightly less so than in younger adults, but little is known about the outcomes of such surgery in those over 65 years.

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### Overnutrition and Obesity in Older People

#### *Prevalence*

In most developed countries a substantial minority, and in some countries the majority, of older people are overweight according to standard body weight criteria. According to recent large surveys [1, 2], approximately 71% of Americans 60 years or older and 60% of those 65 years or older were overweight (body mass index, BMI  $\geq 25$  kg/m<sup>2</sup>), while approximately 32% of those 60 years or older and 20% of those 65 years or older were obese (BMI  $\geq 30$ ). Similarly, 29% of 55- to 64-year-olds in England were obese [3], while 43% of Australians over 65 were overweight and 25% of Australians aged 65–74 years and 14.4% over 75 years were obese [4].

Not only are many older people overweight or obese, but the rates are increasing rapidly, in parallel with the dramatic increase over recent years in rates in younger

adults. For example, the prevalence of obesity ( $\text{BMI} \geq 30$ ) among people in the USA over 60 years increased from 20 to 32% between 1988–1994 and 1999–2000 [5] and among those over 70 years from 11.4 to 15.5% between 1991 and 2000 [6]. There have been similar increases in other countries [4].

An understanding of the causes and consequences of excess weight in older people is aided by an understanding of the changes in appetite, food intake, energy expenditure and body composition that occur with ageing.

### **Changes in Appetite and Food Intake with Increasing Age**

On average, adults become less hungry and eat less as they get older, even if healthy [7]. This physiological, age-related reduction in appetite and energy intake has been termed ‘the anorexia of aging’ [8] and appears to have many causes [9]. Average daily energy intake decreases by up to 30% between 20 and 80 years [7]. Most of the age-related decrease in energy is probably a response to the decline in overall energy expenditure that also occurs as people get older. Changes in body weight and body composition reflect the balance of these two declines. As indicated below, body weight tends to increase through early adult life into middle age, suggesting a more rapid decline in energy expenditure than in food intake during this time. In contrast, body weight tends to decrease in older people, suggesting a faster decline in food intake than in energy expenditure in later life.

### **Changes in Body Weight and Body Composition with Increasing Age**

#### *Body Weight*

Population studies show that on average people in westernised countries gain weight until they are about 50–60 years old and after that tend to lose weight [10]. Although some of the decline in mean body weight after age 50–60 years detected in cross-sectional studies is due to the premature death of obese people, the decline in body weight among older people has also been demonstrated in longitudinal studies. For example, in one 2-year prospective study, community-dwelling American men over 65 years lost on average 0.5% of their body weight per year and 13.1% of the group had weight loss of 4% per annum or more [11]. As a result of this weight loss in older people, and the premature death of obese people at younger ages, the prevalence of overweight and obesity, as defined by standard BMI criteria ( $\text{BMI} > 25$  and  $\geq 30$ , respectively) peaks around age 50–60 years. It then remains fairly stable until about age 70–75 years, before decreasing.

A substantial minority of older people have quite marked weight changes over time. In one study [12], 17% of home-dwelling people in the USA over 65 years lost

5% or more of their initial body weight over 3 years, while 13% gained 5% or more. Other studies provide similar numbers [11]. There is evidence for interactive effects on health of body weight category and change in body weight, particularly of adverse effects in already underweight people who lose weight and in already overweight people who gain weight [13].

## *Body Composition*

### *Enlargement and Redistribution of Fat Stores*

With normal aging there is a progressive increase in fat and decrease in fat-free mass, the latter mainly due to loss of skeletal muscle. Consequently, at any given weight, older people, on average, have substantially more body fat than young adults. In one study, the mean body fat of 75-year-old men weighing 80 kg was 29%, compared to 15% in 20-year-old men of the same weight [14]. The increase in body fat with aging is multifactorial in origin, with decreased physical activity as a major cause, and contributions from reduced growth hormone secretion, declining sex hormone action and reduced resting metabolic rate and thermic effect of food.

Not only do older adults have more body fat than young adults, but it is distributed differently. A greater proportion of body fat in older than young people is intrahepatic, intramuscular, and intra-abdominal (versus subcutaneous) [15], changes that in both young and older adults are associated with increased insulin resistance [16]. For example, in one study intramuscular fat stores were 50% greater, intrahepatic stores four times greater and insulin resistance two times greater in older (65–74 years) than young adults (20–32 years) [16]. In younger adults, such changes to body fat stores and increases in insulin resistance are associated with adverse metabolic outcomes, including increased rates of diabetes mellitus and cardiovascular disease. It might, therefore, be predicted that the age-related changes in body fat stores would lead to particularly bad metabolic outcomes in older people. This is not proven, however. Given that the body weight compatible with longest survival increases with increasing age (see below), and much if not all of the increase in body weight is due to increased fat stores, it may be that advancing age blunts in some way the harmful effects of increasing body fat. This possibility warrants further study.

### *Loss of Skeletal Muscle (Sarcopaenia)*

Ageing is associated with a decrease in muscle mass and strength, with loss of up to 3 kg of lean body mass per decade after age 50 years. After age 60 years, loss of body weight is disproportionately of lean body tissue, predominantly skeletal muscle. The causes of age-related skeletal muscle loss are multiple and not fully understood, but probably similar to those leading to fat gain, including reduced exercise and anabolic hormone action. When excessive, this leads to sarcopaenia (from the Greek meaning