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# Prevalence and costs of obesity

Tim Lobstein

## Abstract

Obesity has become a worldwide epidemic. Its prevalence among adults and, especially, children has risen dramatically in a single generation. A high prevalence affects nearly all affluent countries and is rapidly increasing among more affluent populations of poorer countries. The burden of ill health that results is already significant and due to rise, putting greater burdens on hard-pressed health services, an increasing burden on families and social support services, and reducing the productivity of national economies.

**Keywords** BMI; costs; economic; overweight; prevalence

## Definition of obesity

Practitioners and researchers should take care in the definitions of obesity and overweight, especially in the case of children whose weights, heights and related measures will be changing during normal growth. For adults, the classification used by the World Health Organization based on body mass index (BMI) is widely used (Table 1). For children, national growth charts or charts available from the World Health Organization<sup>1</sup> can be used, while for surveillance purposes many surveys use an international set of thresholds for defining overweight and obesity,<sup>2</sup> based on the BMI of children aged 2–18 years.

Besides using BMI, adiposity may also be estimated using waist measurements or skin-fold measures. Without a detailed examination, such indicators of adiposity are only estimates and are of most value when summarizing obesity prevalence in population groups and showing their trends over time. Individual cases should be examined for high levels of muscle mass, stunted growth or other potential causes of misclassification.

## Prevalence

The prevalence of overweight (BMI >25 kg/m<sup>2</sup>) and obesity (BMI >30 kg/m<sup>2</sup>) has increased dramatically in many developed economies, led in time by the USA but followed by other countries. Globally, one-third of all adults were estimated to be overweight by the year 2010.<sup>3</sup> The highest prevalence of obesity is seen in a number of small communities, including some Pacific Islands, Malta, Mauritius and the Gulf States, where as many as half of all adults may be obese. Figure 1 shows the rapid rise for several middle-income countries where repeated surveys are available. It should be noted that the data provided by some

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## What's new?

- The prevalence of obesity is rising rapidly in developing countries
- In 2010, one-third of adults globally were overweight
- 70% of middle-aged adults are overweight in the UK
- Medical costs of related ill health cost the UK £5bn and the USA \$150bn annually

countries may be based on heights and weights self-reported by adults through questionnaires and interviews, whereas data from other countries may be based on nurses weighing and measuring adults. There is good evidence that self-reported data tend to underestimate actual BMI (with women tending to underestimate their weight and men tending to overestimate their height).<sup>4</sup> All surveys may also underestimate the prevalence of obesity if the heaviest people opt out of the process.

Rising levels of obesity in developing economies are found especially in urban areas where the population is most likely to be exposed to 'Westernized' diets and lower demands for physical activity. In India, the national Family Health Surveys show that obesity affects about 1% of adult women in rural areas, whereas in urban areas it affects over 6%; in South Africa, the Demographic and Health Survey shows that obesity affects 20% of white men although only 10% of men in all other racial groups.

Adult obesity is most common in later middle age. Data from the 2011–2012 Health Surveys for England<sup>5</sup> show that overweight is most common in adults aged 55–75, with a small decline in prevalence among older people (Figure 2). The rise during adulthood can be explained by the well-known difficulty in losing weight once gained. Figure 2 also shows equivalent data for 1993–1994, indicating similar age-related patterns, but with generally lower levels of overweight and especially a steeper decline after age 75. The decline in BMI in later old age has virtually gone, possibly as the earlier, leaner cohorts give way to

## Classification of adult weight status

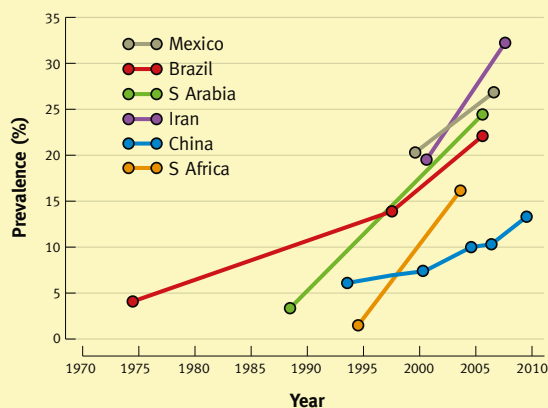
	BMI <sup>a</sup> cut-off points
<b>Underweight</b>	<b>&lt; 18.50</b>
Severe thinness	<16.00
Moderate thinness	16.00–16.99
Mild thinness	17.00–18.49
<b>Normal range</b>	<b>18.50–24.99</b>
<b>Overweight</b>	<b>≥25.00</b>
Pre-obese	25.00–29.99
<b>Obese</b>	<b>≥30.00</b>
Obese class I	30.00–34.99
Obese class II	35.00–39.99
Obese class III	≥40.00

<sup>a</sup> Body mass index (BMI) is defined as the weight in kilograms divided by the square of the height in metres (kg/m<sup>2</sup>).

Source: World Health Organization ([www.who.int](http://www.who.int)).

**Table 1**

**A rapid rise in obesity prevalence among middle-income countries**



Source: World Obesity Federation 2014

Figure 1

modern, fatter ones. While BMI tends to remain stable after age 65, waist circumferences still increase, indicating greater amounts of body fat and less muscle mass in older people.

In developed economies, obesity is more common among adults in households with lower income, or lower educational or employment status. The socioeconomic gradient of obesity is particularly steep for women: in England, in 2012, 19% of women in the richest fifth of households were obese, while in the poorest fifth of households 31% of women were obese.<sup>6</sup> The gradient of prevalence with social deprivation is most marked for extreme obesity. In the UK, a BMI  $\geq 40$  kg/m<sup>2</sup> is three times as common in the most deprived sectors compared to the least deprived. Not only is a difference in income level a predictor of

obesity prevalence, but so is the size of that difference: countries with the most unequal distributions of income experience a higher prevalence of obesity at all income levels.<sup>7</sup> This association between social inequity and obesity has also been found for children.<sup>8</sup>

As with adults, adiposity among children has reached epidemic proportions. Taking Europe as a whole, some 20% of children are overweight or obese, and in North America the figure is above 30%.<sup>9</sup> This reflects a very rapid, recent rise: data from the Health Survey for England show the proportion of children affected rising from 7% in the early 1980s to 28% by 2012. Interestingly, the rise in child obesity witnessed in many regions since the 1980s may be easing in some countries: the USA, Sweden, the UK, Switzerland and France have all reported a recent levelling of the previous upward trend in child obesity.

**Costs**

It is now widely recognized that poor diet and lack of physical activity are the cause of more chronic disease and premature death than tobacco smoking.<sup>10</sup> Estimates of the relative contribution from different risk factors to the total health burden of Western European countries are shown in Table 2. Note that the risk factors overlap considerably, with dietary risks (primarily low fruit and vegetable consumption, high sodium consumption) overlapping with high blood pressure, and low physical activity overlapping with high BMI.

**Healthcare costs**

The expenditure involved in treating obesity appears to be greatly outweighed by the costs of treating its secondary medical consequences. Pharmaceutical treatment of obesity alone can cost some £400 per patient per year, while obesity surgery can cost several times this amount. In the UK the number of prescriptions for one of the treatment drugs, orlistat, rose from 18,000 in 1998 when it was licensed, to 650,000 in 2005,<sup>11</sup> and has continued above 550,000 per year since. A UK parliamentary

**Overweight prevalence peaks in later middle age**



Source: All adults, Health Surveys for England 1993-1994 and 2011-2012

Figure 2

**Health burden attributed to different risk factors, Western Europe**

Risk factor	Contribution in DALYs <sup>a</sup>
Dietary risks (primarily lack of fruit and high sodium)	14.2 m
Tobacco smoking	11.8 m
High blood pressure	10.9 m
High Body Mass Index	10.2 m
Low physical activity	5.6 m
High fasting blood glucose	4.9 m
Alcohol use	4.6 m
High blood cholesterol	4.0 m
Air pollution	2.5 m
Workplace hazards	2.4 m

<sup>a</sup> Disability-Adjusted Life Years = the years of life lost to disease and early death, annually, in the population.

Source: IHME 2014.

Table 2

report in 2004 estimated the health service costs of treating obesity itself to be some £50m but the costs of managing the chronic disease consequences to be around £1bn.<sup>12</sup> In 2014 the UK government stated that costs to the NHS in England alone exceeded £5bn,<sup>13</sup> some 5% of the total NHS budget. Estimates in other European countries and North America suggest obesity-related ill-health is absorbing between 6% and 10% of total health service budgets, with the US healthcare costs exceeding \$147bn in 2008 prices.<sup>14</sup> These figures are based on the proportion of costs of diseases which can be attributed to obesity, but data are available for very few of these (usually only diabetes mellitus, heart disease, colon cancer and gallstones). Costs attributable to excess weight among overweight but non-obese patients are rarely included in such analyses, and even though the cost may be less per patient, the numbers of overweight, non-obese adults are likely to be greater.

#### Individual costs

Individuals also bear costs as a result of their own obesity. Food costs are likely to be greater, clothing may need replacing, furniture may need strengthening, and additional support services (taxis, cleaning, hygiene, etc.) may need to be purchased. Health insurance premiums may be set at a higher level for obese people. There are also psychological costs: an obese person may experience a reduced quality of life, for example, through reduced ability to travel, reduced social networking and reduced self-esteem. Studies show that overweight young women tend to have a more limited friendship circle, fewer years of school education, a lower likelihood of marriage, reduced employment prospects and reduced household income.<sup>15</sup> These stressors may exacerbate weight gain and reduce the motivation for change.

#### Indirect costs

Besides the direct costs in healthcare, further costs arise from obesity-related ill-health leading to absence from work, lost productivity, disability support, early pension payments and increased demand on community resources. These additional costs are as high, or higher, than the direct healthcare costs, and are forecast to rise significantly.<sup>16</sup>

The impact of obesity in the community is harder to calculate but can have a significant cost implication. For example, airlines in the USA spend more than \$275m annually in extra fuel as a result of the rise in average body weight among American adults.<sup>17</sup> Burning this extra fuel releases nearly 4 million tonnes of CO<sub>2</sub> emissions along with other pollutants. Similar calculations can be assumed for Europe and, increasingly, other regions of the world. ♦

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