

# International comparisons of obesity prevalence

June 2009

# **International Comparisons of Obesity Prevalence**

## **Executive Summary**

- Obesity prevalence among adults and children has been increasing in most developed countries in recent years
- Robust comparisons between countries are difficult because of different methodological approaches
- The most important of these differences is probably that between measured and self-reported data, with self-reported data likely to lead to underestimates of overweight and obesity
- Reliable data allowing comparisons between countries would help to investigate effects of interventions, thus supporting action to tackle obesity.

## **Introduction**

The purpose of this paper is to provide a single resource for international comparisons of obesity prevalence focused on the United Kingdom (UK) and to inform the debate on trends in adult and childhood obesity levels within the UK by providing a global comparison.

The prevalence of adult obesity and childhood overweight and obesity in the UK appears high compared to many other countries. However one reason for this higher prevalence in the UK may be due to the fact that data for the UK are recent and are mostly based on measured height and weight. Estimates based on self-reported measures are likely to underestimate BMI compared to those based on actual measurements.

The prevalence of adult obesity and childhood overweight and obesity in England appears similar to that for Scotland, Wales, Northern Ireland and the Republic of Ireland.

Differences in time periods, populations studied and methodologies mean that comparisons between countries and over time are difficult. Furthermore, childhood overweight and obesity estimates are for varying age groups and often use different thresholds to define overweight and obesity.

There is a need for robust and comparable international data on the prevalence of adult and childhood overweight and obesity to allow comparative analysis of prevalence and trends between countries.

## Adult Obesity

This paper analyses data from the Organisation for Economic Cooperation and Development (OECD), a recent, comprehensive and easily available source. In addition data from the Health Survey for England; the Survey of Lifestyle, Attitudes and Nutrition (Republic of Ireland); the Welsh Health Survey; the Northern Ireland Health and Wellbeing Survey; the North South Survey of Children's Height, Weight and Body Mass Index (Republic of Ireland) and the Scottish Health Survey were included.

Most of the data used in this analysis were obtained from national health surveys which are likely to be representative of the general population. However, it is possible that non participation results in biased estimates, as overweight or obese individuals may be less likely to participate in such studies than those of normal weight, and as a result the prevalence of obesity will be underestimated. OECD data for Australia, Czech Republic, England, Luxembourg, New Zealand, Scotland and the United States are based on measured height and weight; only the latest prevalence data for Ireland (2007) are based on measured height and weight. All other country estimates are based on self-reported height and weight. These data are not age or sex standardised therefore differences in the age and sex structures of the populations have not been accounted for.

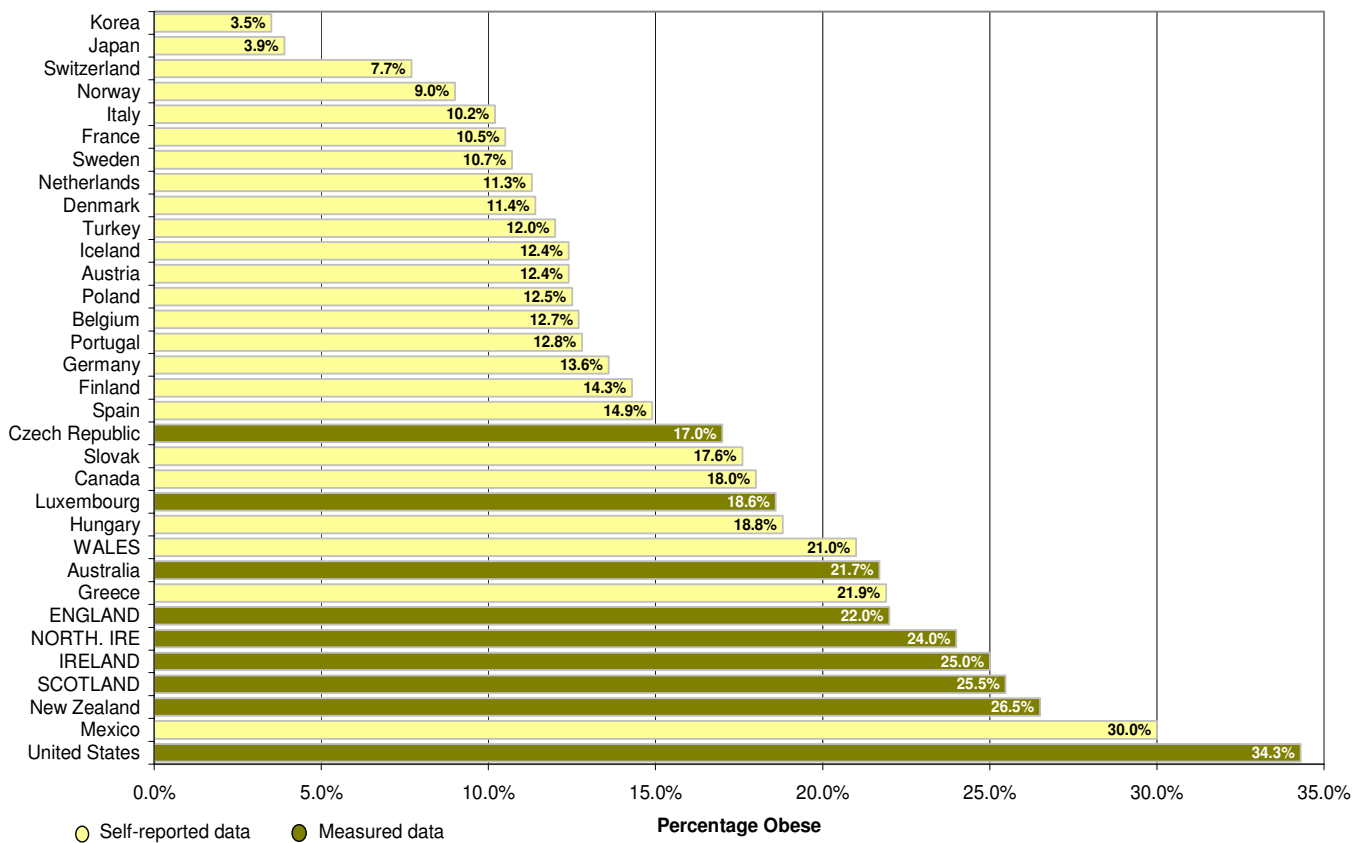
Comparisons across countries were made using the most recent single year estimates for adult obesity (presented in Figure 1). Data from nine out of the 32 countries are based on measured height and weight. The data show that countries with measured height and weight data have a high prevalence of obesity. It is likely that obesity prevalence estimates based on self-reported measures are lower than those based on actual measurements<sup>1</sup>. This difference limits comparison between studies. The OECD data used in this report are mostly based on self-reported height and weight.

The prevalence of obesity in England is estimated using measured weight and height. The 2007 estimate is 22% and is high compared to most other countries, with Korea and Japan having the lowest estimates (3.5% and 3.9% respectively), and the United States having the highest estimates of obesity prevalence (34.3%). It is more appropriate to compare estimates based on the same method of data collection i.e. compare measured height and weight estimates to each other or compare self-reported height and weight estimates to each other. Among the measured height and weight estimates Czech Republic and Luxemburg appear to have lowest prevalence while the United States and New Zealand appear to have the highest. It can be seen that estimates based on measured height and weight are towards the high prevalence end in Figure 1. Estimates for Ireland, Northern Ireland and Scotland are based on measured weight and height. The estimate for Wales is based on self-reported height and weight and is likely to be an underestimate. Ireland, Northern Ireland and Scotland appear to have higher obesity prevalence compared to England but note that Scotland data are for 2003 and Northern Ireland data are for 2005 and no confidence intervals are presented.

---

<sup>1</sup> S. Connor Gorber, M. Tremblay, D. Moher, B. Gorber (2007) 'A comparison of direct vs. self-report measures for assessing height, weight and body mass index: a systematic review' *Obesity reviews* 8: 307-326

**Figure 1 Adult (aged 16+) Obesity Prevalence, latest available data\***



\*Data are for 2005 except; Ireland, England, Wales, New Zealand – 2007, Austria, Finland, France, Italy, Mexico, Netherlands, Spain – 2006, Belgium, Poland, USA – 2004, Greece, Hungary, Turkey, Scotland – 2003, Iceland, Switzerland – 2002, Australia, Portugal – 1999, Metadata for OECD Health Data 2008 can be found at: [www.ecosante.org/oced.htm](http://www.ecosante.org/oced.htm). Obese defined as BMI ≥ 30kg/m2. Metadata for all other countries can be found at: <http://www.ecosante.org/oced.htm>. Obese defined as BMI ≥ 30kg/m2

### Trends in International Adult Obesity Prevalence

Trend data for some OECD countries (e.g. Finland and Japan) are available from 1978 onwards, but for most OECD countries data are available from 1995 (shown in Table 1). Differences in survey methodology mean that opportunities for comparisons across years are limited.

The prevalence of adult obesity in Japan has remained consistently low over the last 30 years; Finland has seen a steady increase over the same period; and the United States has the highest estimate of obesity prevalence throughout the trend period (1978 to 2007). England data are available from 1991 onwards (1980 and 1987 data refer to Great Britain). Figure 2 illustrates a steady rise in obesity in both male and female adults in England. Data for Wales are available from 2004 to 2007 and show a slight increase in prevalence. Scotland data for 1995, 1998 and 2003 show an increase in prevalence, with a greater increase among females. Ireland data are available for 1998, 2002 and 2007. A steep increase is observed for Ireland in 2007. This is likely to be explained by the fact that 2007 data are based on measured height and weight and 1998 and 2002 data on self-reported height and weight. From the most recent data,

prevalence for England, Ireland and Scotland appears similar. It is likely that the prevalence for Wales is an underestimate since data are based on self-reported height and weight.

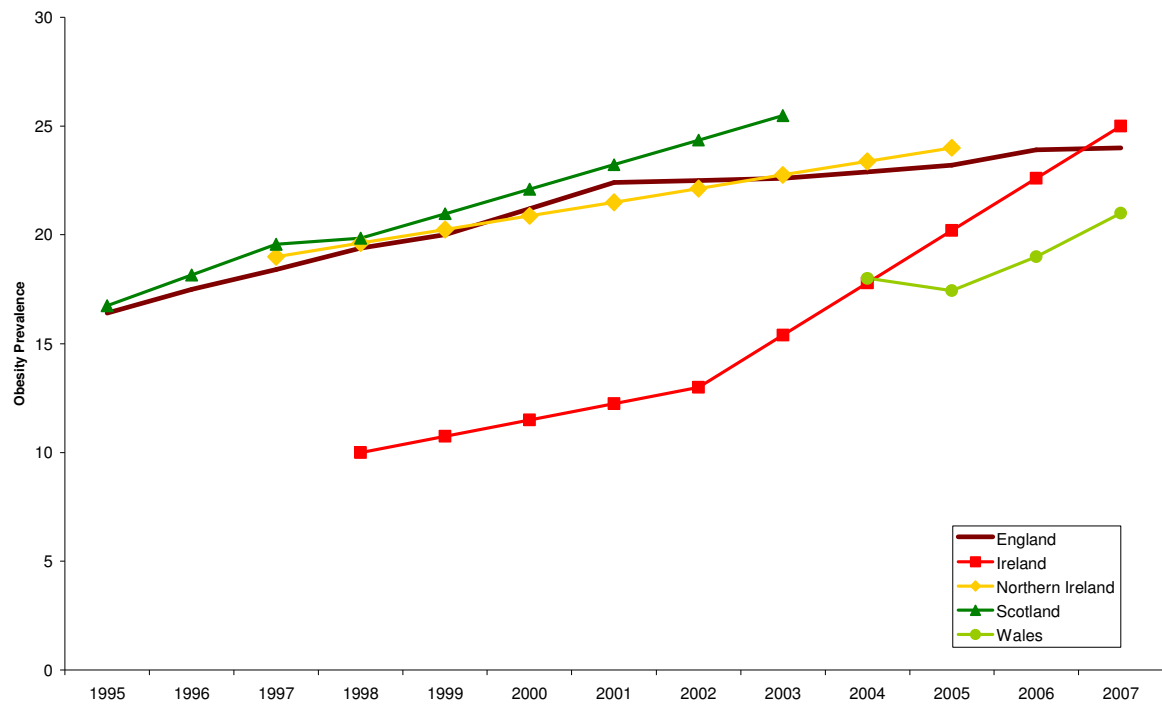
Although data from Middle Eastern countries are not presented here, there have been very high estimates of obesity prevalence recorded for countries such as Bahrain and Kuwait.

**Table 1 Percentage of Adults who are Obese (BMI>30 kg/m<sup>2</sup>)**

<b>Country</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
Australia	19.8	-	-	-	21.7	-	-	-	-	-	-	-	-
Austria	-	-	-	-	9.1	-	-	-	-	-	-	12.4	-
Belgium	-	-	11.1	-	-	-	11.7	-	-	12.7	-	-	-
Canada	-	11.4	-	13.6	-	-	13.9	-	14.3	-	18.0	-	-
Czech Republic	-	11.3	-	-	14.2	-	-	14.8	-	-	17.0	-	-
Denmark	-	-	-	-	-	9.5	-	-	-	-	11.4	-	-
<b>England</b>	16.4	17.5	18.4	19.4	20.0	21.2	22.4	22.5	22.6	22.9	23.2	23.9	24.0
Finland	10.4	10.2	9.9	9.5	10.1	11.2	11.4	11.8	12.8	14.0	14.1	14.3	-
France	7.0	8.3	7.4	8.2	-	9.0	-	9.4	-	9.4	-	10.5	-
Germany	-	-	-	-	11.5	-	-	-	12.9	-	13.6	-	-
Greece	-	-	-	-	-	-	-	-	21.9	-	-	-	-
Hungary	-	-	-	-	-	18.2	-	-	18.8	-	-	-	-
Iceland	-	-	-	-	-	-	-	12.4	-	-	-	-	-
<b>Ireland</b>	-	-	-	10.0	-	-	-	13.0	-	-	-	-	25.0
Italy	-	-	-	-	8.8	8.6	8.5	8.5	9.0	-	9.9	10.2	-
Japan	2.6	2.5	2.7	3.1	2.8	2.9	3.2	3.6	3.2	3.0	3.9	-	-
Korea	-	-	-	2.2	-	-	3.2	-	-	-	3.5	-	-
Luxembourg	-	-	14.9	15.8	15.1	16.3	17.9	17.3	18.4	18.2	18.6	-	-
Mexico	-	-	-	-	-	24.2	-	-	-	-	30.2	30.0	-
Netherlands	6.9	6.9	8.1	8.4	8.7	9.4	9.3	9.7	10.7	10.9	10.7	11.3	-
New Zealand	-	-	18.8	-	-	-	-	-	25.0	-	-	-	26.5
<b>Northern Ireland</b>	-	-	19.0	-	-	-	-	-	-	-	24.0	-	-
Norway	5.0	-	-	6.4	-	-	-	8.3	-	-	9.0	-	-
Poland	-	11.4	-	-	-	-	-	-	-	12.5	-	-	-
Portugal	-	11.5	-	-	12.8	-	-	-	-	-	-	-	-
<b>Scotland</b>	16.8	-	-	19.9	-	-	-	-	25.5	-	-	-	-
Slovak Republic	-	-	-	16.2	-	-	-	-	15.4	16.5	17.6	-	-
Spain	10.3	-	11.7	-	-	-	12.6	-	13.1	-	-	14.9	-
Sweden	-	-	7.9	8.1	8.1	9.2	9.2	10.2	9.7	9.8	10.7	-	-
Switzerland	-	-	6.8	-	-	-	-	7.7	-	-	-	-	-
Turkey	-	-	-	-	-	-	-	-	12.0	-	-	-	-
United States	-	-	-	-	-	30.5	-	30.6	-	32.2	-	34.3	-
<b>Wales</b>	-	-	-	-	-	-	-	-	-	18.0	17.4	19.0	21.0

Source OECD

**Figure 2 Trends in Obesity Prevalence in the UK and Ireland**



## Childhood Obesity

The relationship between body mass index and fatness in children varies substantially with age, so reference curves are used to define overweight and obesity in different age groups. There are several commonly used references within the UK, of which the UK 1990 Growth Reference (UK90) is the most widely used, although the International Obesity Task Force (IOTF) thresholds, World Health Organisation Growth Reference and the Center for Disease Control Growth Reference are also used.

All estimates in Table 2 are based on measured height and weight and use the UK90 reference centiles to define overweight and obese. Wales appears to have the highest prevalence of childhood obesity, followed by Northern Ireland. The lowest prevalence is observed for Ireland, although the data are for 2002 and it is likely that more recent data would show a higher prevalence. Using the UK90 Growth Reference, overweight & obesity\* prevalence is higher among boys than girls.

**Table 2 Percentage of Children Obese and Overweight & Obese in the UK and Ireland**

Country	Year	Age (years)	Obese		Overweight & obese		Data source
			Boys	Girls	Boys	Girls	
England	2007	2-15	17%	16%	31%	30%	Health Survey for England
Ireland	2002	4-9, 11-16	10%	8%	24%	22%	North South Survey of Children's Height, Weight & Body Mass Index
Northern Ireland	2005	2-15	20%	15%	39%	31%	Northern Ireland Health and Wellbeing Survey
Scotland	2003	2-15	18%	14%	35%	30%	Scottish Health Survey
Wales	2007	2-15	20%	19%	35%	37%	Welsh Health Survey

International data on the prevalence of overweight & obesity are available from the International Association for the Study of Obesity and are presented in Table 3. The majority of these estimates are based on measured height and weight and use the IOTF thresholds to classify individuals as overweight & obese. The United States appears to have the highest prevalence of childhood overweight & obesity. Scotland, England, Northern Ireland and Ireland all appear to have high prevalence of childhood overweight & obesity. However as is clearly demonstrated in these tables, data are collected over different time periods for different age groups and different thresholds may be used. As mentioned for adult obesity it is also possible that non participation results in biased estimates. Overweight or obese children may be less likely to participate in such studies, and as a result the prevalence of overweight and obesity will be underestimated making any meaningful comparisons difficult. In Table 3 the most recent data show higher prevalence of childhood overweight & obesity compared to less recent data.

\* The terms 'overweight & obesity' and 'overweight & obese' are used to refer to data where subjects are classified as either overweight or obese.

**Table 3 Percentage of Children Overweight & Obese**

Country	Year	Age (years)	Overweight & obese		Threshold	Measured height & weight
			Boys	Girls		
Australia	2007	9-13	25.0	30.0	IOTF	Yes
Austria	2003	8-12	22.5	16.7	90th centile	Yes
Belgium	1998	5-15	27.3	26.7	85th centile	Yes
Canada	2004	12-17	32.3	25.8	IOTF	Yes
Czech Republic	2005	5-17	23.2	15.3	IOTF	Yes
Denmark	1996	5-16	14.1	15.3	IOTF	Yes
<b>England</b>	2004	5-17	29.0	29.3	IOTF	Yes
Finland	1999	12, 14 & 16	17.2	10.1	IOTF	Yes
France	2000	7-9	17.9	18.2	IOTF	Yes
Germany	2003	5-17	20.4	20.1	IOTF	Yes
Greece	2003	13-17	29.6	16.1	IOTF	Yes
Hungary	1993	10 & 15	17.8	15.9	IOTF	Yes
Iceland	1998	9	22.0	25.5	IOTF	Yes
<b>Ireland</b>	2005	2-15	23.0	28.0	IOTF	Yes
Italy	2006	8-9	32.4	34.0	IOTF	Yes
Japan	1996	6-14	16.2	14.3	IOTF	Yes
Korea	2003	7-17	16.3	10.0	IOTF	Yes
Luxembourg						
Mexico	2006	10-17	30.5	31.5	IOTF	Yes
Netherlands	2003	5-17	14.7	18.0	IOTF	Yes
New Zealand	2000	11 & 12	30.0	30.0	IOTF	
<b>Northern Ireland</b>	2005	2-11	27.0	26.0	IOTF	Yes
Norway	1996	10	21.0	21.0	IOTF	
Poland	2001	7-9	13.6	14.7	IOTF	Yes
Portugal	2002	7-9	29.5	34.3	IOTF	Yes
<b>Scotland</b>	2004	11-12	34.8	32.7	85th centile	Yes
Slovak Republic	1995	11-17	9.8	8.2	IOTF	Yes
Spain	2000	13-14	35.0	32.0	IOTF	Yes
Sweden	2001	6-11	17.6	27.4	IOTF	Yes
Switzerland	2007	6-13	16.7	13.1	CDC	Yes
Turkey	2001	12-17	11.4	10.3	IOTF	Yes
United States	2003	6-17	35.1	36.0	IOTF	Yes

Source: International Association for the Study of Obesity

Trend data indicate that the prevalence of overweight and obesity among children in the UK is increasing (Table 4). These data are based on measured height and weight and use the UK90 reference centiles to classify individuals as overweight and obese. Data for years with a lower sample size are less reliable than those with higher sample sizes, for example data for 2007 are more reliable than data for 2004.

**Table 4 Prevalence of Obesity, and Overweight & Obesity among children aged 2-15 in England, 1995 – 2007**

		1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Obese	%	11.5	11.9	12.6	13.4	15.1	14.3	15.0	17.0	16.6	18.8	18.3	16.0	16.5
Overweight & obese	%	24.5	24.9	25.6	27.5	29.0	26.8	30.1	30.8	31.2	34.0	32.6	29.7	30.4
Sample size	n	3,819	4,146	6,132	3,853	1,927	1,718	3,352	7,381	2,845	1,206	2,193	5,493	5,679

Source: Health Survey for England

## Conclusions

There is a need for comparable data on international obesity prevalence. It is more appropriate to compare estimates based on the same method of data collection i.e. compare measured height and weight estimates with each other or compare self-reported height and weight estimates with each other. It is recommended that measured height and weight are collected, as self-reported figures are likely to underestimate true height and weight. There are limitations when comparing international childhood obesity prevalence data as estimates are often based on different time periods for different age groups and may use different thresholds. Data obtained from national health surveys (such as OECD data) are likely to be representative of the general population, but differences in methodology between years and countries mean that comparisons are limited.