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# CLS Briefings



Following lives from birth and through the adult years

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The Centre for Longitudinal Studies (CLS) is an ESRC Resource Centre based at the Institute of Education, University of London. CLS is responsible for three of Britain's birth cohort studies:

- 1958 National Child Development Study (NCDS)
- 1970 British Cohort Study (BCS70)
- Millennium Cohort Study (MCS)

The studies involve multiple surveys of large numbers of individuals from birth and throughout their lives. Over the years they have collected detailed information on education and employment, family and parenting, physical and mental health, and social attitudes. Because they are longitudinal studies following the same groups of people throughout their lives, they show how histories of health, wealth, education,

family and employment are interwoven for individuals, vary between them and affect outcomes and achievements in later life. Through comparing the different generations in the three cohorts, we can chart social change and start to untangle the reasons behind it. Findings from the studies have contributed to debates and enquiries in a wide range of policy areas over the last half-century.

The aim of CLS Briefings is to provide examples of findings from the three cohort studies. Although the findings they include are not exhaustive, they give an idea of the work that has been carried out and the scope of the studies for future research. Data from the 1958, 1970 and Millennium cohorts is available free of charge from the UK Data Archive ([www.data-archive.ac.uk](http://www.data-archive.ac.uk)), which is administered by the Economic and Social Data Service, University of Essex.

## Obesity, diet and exercise

In this briefing paper we are looking at obesity and the dietary and exercise habits of cohort members. For researchers wishing to carry out further analysis on these topics, examples of questions are listed on page 4.

In the UK today we are more concerned about obesity than ever before. Labelling in supermarkets aims to steer us towards healthier eating habits, Jamie Oliver has brought the low standard of school dinners to the public's attention and in 'Supersize me' Morgan Spurlock showed the world the terrible consequences of eating nothing but fast food for a month. In 2001 the National Audit Office estimated that the total cost of obesity in England will rise to around £3.6 billion by 2010. Obesity, or a body mass index (BMI) of 30kg/m<sup>2</sup> or more, is associated with a number of disorders, including diabetes, heart disease and an increased risk of early death.

**Weight in kilogrammes = Body Mass Index (BMI)**  
**(Height in metres)<sup>2</sup>**

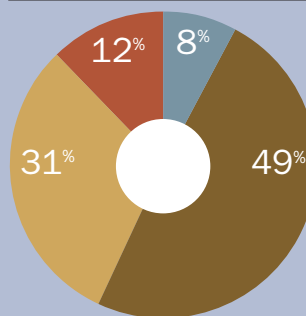
### BMI classifications

- Less than 20kg/m<sup>2</sup> = Underweight
- Over 20kg/m<sup>2</sup> to 25kg/m<sup>2</sup> = Desirable or healthy range
- Over 25kg/m<sup>2</sup> to 30kg/m<sup>2</sup> = Overweight
- Over 30kg/m<sup>2</sup> = Obese

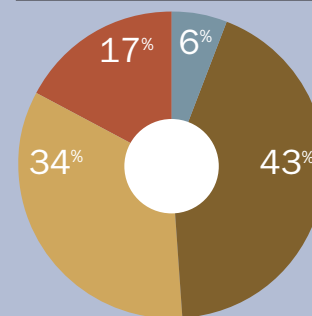
Based on figures from 'Tackling obesity in England', NAO, 2001

Using data from the 1958 and 1970 cohort studies, BMI values were compared when the cohort members were in their early thirties. At this age, people born in 1958 were slimmer than those born in 1970, as the two pie charts show. Over half of the

BMI values for the 1958 cohort at age 33 (1991)



BMI values for the 1970 cohort at age 34 (2004)



### Key

- Underweight (<20kg/m<sup>2</sup>)
- Healthy weight (20-25kg/m<sup>2</sup>)
- Overweight (25-30kg/m<sup>2</sup>)
- Obese (>30kg/m<sup>2</sup>)

1970 cohort was overweight/obese at the age 34 compared with 43% of the 1958 cohort at the age of 33.

Bartley et al (2004) examined parental BMI in the Millennium Cohort Study (MCS). In the UK the overall rate of obese/overweight mothers was 38.5% at the time of the first survey (2001-2002). This varied by country – the rate of overweight/obese mothers was highest in Northern Ireland (40.8%) and lowest in Scotland (36.1%). 43.9% of all MCS fathers were overweight and a further 13.3% were obese. The highest rate of overweight/obese fathers was also in Northern Ireland (63.8%) whilst the lowest rate was in England (55.7%).

## A class issue?

In their analysis of the 1958 cohort, Power and Moynihan (1988) discovered that there was a greater percentage of overweight/obese people in the lower social classes. They also found that children from families with manual social backgrounds were more likely than children from non-manual backgrounds to grow up to be overweight and obese young adults.

**People born into the lower social classes are more likely to be obese in adulthood**

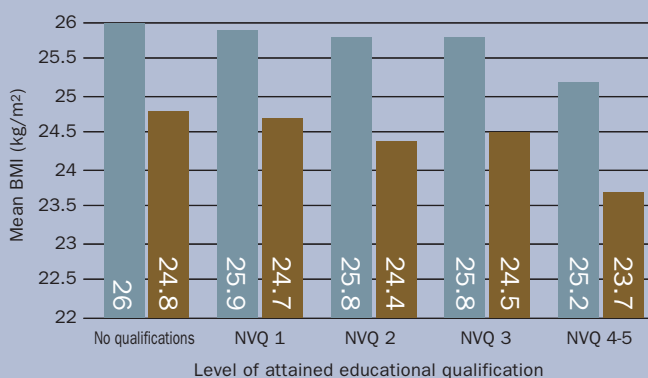
Viner and Cole's research (2006) also takes social background into account. In their study of the 1970 cohort they found that people in the higher social classes were more likely to reduce their BMI between the ages of 16 and 30.

Bartley et al's (2004) research using MCS data revealed that that overweight and obese mothers were more common in disadvantaged wards than in advantaged wards (41.6% v 36.6% when the MCS babies were nine months old).

## Education

In the 1970 cohort, educational qualifications also appear to be linked to BMI, as the bar chart shows. For both men and women in this cohort, those with the highest levels of qualifications (NVQ 4-5) had the lowest BMI – 25.2kg/m<sup>2</sup> for men and 23.7kg/m<sup>2</sup> for women (Wadsworth et al, 2003).

**Mean BMI at age 30 in the 1970 cohort**



### Key

■ Men ■ Women

Source: Wadsworth et al, 2003

- NVQ 1** = GCSE/O level/CSE grades below A-C; lowest level of vocational certificates
- NVQ 2** = Academic/vocational qualifications equivalent to GCSE/O level grades A-C
- NVQ 3** = 2 or more A levels or academic/vocational equivalent
- NVQ 4-5** = All tertiary qualifications (diplomas, degrees, post-graduate qualifications)

## From one generation to the next

Lake et al (1997a) carried out research on body mass index and its associations with parental obesity. Using data from the 1958 study, they found that cohort members with two overweight parents were most likely to be fat as children. These children were also at greater risk of being obese in adulthood.

## Diet and physical activity

Parsons et al (2005a) wanted to find out if adults in the 1958 cohort had improved their diet and levels of physical activity between 1991 and 1999, in line with recommendations issued over the same time period. They discovered that lifestyle habits are slow to change. Over the time period in question there was little change in the overall levels of physical activity undertaken by cohort members or in their consumption of fried food. However, there appeared to be some improvement in the consumption levels of fruit and vegetables and wholemeal bread. And significantly more cohort members decreased rather than increased their consumption of chips (32% decreased their consumption while only 17% increased it).

Parsons et al (2005a) found that when changes in the consumption of fried food were considered, those from the lower social classes appeared to be more likely to improve their lifestyles. However, where fruit and vegetable intake was concerned, those from the higher social groups or with a lower BMI were more likely to make dietary changes in this area. As Parsons et al (2005a) note, this implies that health messages may be taken up differently by different social groups, possibly due to food preferences, availability of certain types of food and cost.

For the cohort born in 1970, Viner and Cole (2006) found that increased BMI between the ages of 16 and 30 was linked to eating takeaway meals two or more times a week and consuming two or more carbonated drinks per day. They also found that dieting is unlikely to cause long-term weight loss, in fact their study revealed the opposite to be true, those with a history of dieting to lose weight were more likely to have higher BMI scores at age 30. Furthermore, for the group in question, Viner and Cole (2006) found no evidence that eating breakfast or having family meals together at 16 years old influenced BMI in adulthood.

### Physical exercise and BMI: exploring the link

Parsons et al (2005b) looked at physical activity and its relationship to BMI. At 11, 33 and 42 years, both men and women in the 1958 cohort who undertook more exercise had lower body mass indexes. This was also true for women only at the age of 23. By the age of 42, those who were the most active had a lower average BMI than the least active, by 0.83kg/m<sup>2</sup> in men and 1.03kg/m<sup>2</sup> in women. BMI and activity appeared to be unrelated at 16 years in females and 23 years in men.

Viner and Cole (2005b) examined television viewing in early childhood and its impact on adult BMI in the 1970 cohort. They found that children who watched higher levels of TV at the weekends were more likely to be obese as adults. Each additional hour of television watched at weekends at age 5 led to an increased risk of adult obesity by 7%.

**Children who watch higher levels of TV at the weekends are more likely to be obese as adults**

Further research by Viner and Cole (2006) looked at the causes of increased BMI between the ages of 16 and 30. They found that 4 or more hours of sedentary behaviour each day at age 16 was linked to increased body mass at age 30.

## The consequences of obesity

### Socio-economic, psychosocial and social outcomes

Using 1970 cohort data, Viner and Cole (2005a) examined childhood and adult obesity and self-reported socio-economic, psychosocial and social outcomes (measured at age 30). They found that for women, persistent obesity was associated with poorer employment and relationship outcomes in adult life. However, these same associations were not found among men. In addition, individuals who were obese in childhood but not as adults did not report poorer employment and relationship outcomes in adulthood. In other words, individuals who manage to control their weight in adulthood do not appear to suffer long term social consequences of childhood obesity.

**Persistent obesity is associated with poorer employment and relationship outcomes for women but not for men**

Viner and Cole (2005b) suggest that future efforts to reduce obesity should focus on continual obesity from childhood into adulthood.

### Obesity and type-2 diabetes

Using data from the 1958 study, Hyppönen et al (2003) found that the effect of adult obesity on the risk of type-2 diabetes was “overwhelming”. (Type-2 diabetes = non-insulin dependent diabetes that is controlled by diet or tablets.) Their research also discovered a link between childhood obesity and type-2 diabetes – children who gained weight rapidly ran a higher risk of developing diabetes than those who did not. Previous research has claimed a link between low birth weight and the later development of diabetes but this study using 1958 cohort data found this only to be true when a low birth weight baby also experienced an excessive increase in BMI from birth. Half the participants with type-2 diabetes in their early forties were already in the highest third of BMI scores at the age of 7, and they continued to gain weight rapidly. However, those who were overweight as children but managed to maintain a normal weight thereafter ran a much lower risk of this type of diabetes.

### Obesity and women's reproductive health

Lake et al (1997b) examined data from the 1958 cohort to determine whether or not childhood or adulthood BMI had an impact on the reproductive health of women. High body mass index in childhood was linked to menstrual problems but appeared to have little other impact on reproductive health. However, being overweight or obese in adulthood was more serious as it appeared to increase the risk of menstrual problems, hypertension in pregnancy and sub-fertility (a failure to conceive after two years).

**For women, being overweight or obese in adulthood increases the risk of menstrual problems, hypertension in pregnancy and sub-fertility**

This briefing has given examples of just a small selection of research done on obesity, diet and exercise using data from the 1958, 1970 and Millennium birth cohort studies. If you want further information on any of the research featured here, full references are listed in *Further reading*. Some of the questions that cohort members were asked on these topics are listed on page 4.

The related press release is available at [www.cls.ioe.ac.uk/obesitypressrelease](http://www.cls.ioe.ac.uk/obesitypressrelease).

## Further reading

Bartley, M., Kelly, Y., Schoon, I. and Hope, S. (2004) 'Parent health'. In S. Dex and H. Joshi (eds) *Millennium Cohort Study first survey: a user's guide to initial findings*, London: Centre for Longitudinal Studies.

Hyppönen, E., Power, C. and Smith, G.D. (2003) 'Prenatal growth, BMI, and risk of type 2 diabetes by early midlife', *Diabetes Care*, 26(9): 2512-2517.

Lake, J.K., Power, C. and Cole, T.J. (1997a) 'Child to adult body mass index in the 1958 British birth cohort: associations with parental obesity', *Archives of Disease in Childhood*, 77: 376-380.

Lake, J.K., Power, C. and Cole, T.J. (1997b) 'Women's reproductive health: the role of body mass index in early and adult life', *International Journal of Obesity*, 21(6): 432-438.

National Audit Office (2001) *Tackling obesity in England*, London: The Stationery Office.

Parsons, T.J., Manor, O. and Power, C. (2005a) 'Changes in diet and physical activity in the 1990s in a large British sample (1958 birth cohort)', *European Journal of Clinical Nutrition*, 59: 49-56.

Parsons, T.J., Power, C. and Manor, O. (2005b) 'Physical activity, television viewing and body mass index: a cross-sectional analysis from childhood to adulthood in the 1958 British cohort', *International Journal of Obesity*, 29: 1212-1221.

Power, C. and Moynihan, C. (1988) 'Social class and changes in weight-for-height between childhood and early adulthood', *International Journal of Obesity*, 12(5): 445-453.

Viner, R.M. and Cole, T.J. (2005a) 'Adult socioeconomic, educational, social, and psychosocial outcomes of childhood obesity: a national birth cohort study', *British Medical Journal*, 330: 1354-1358.

Viner, R.M. and Cole, T.J. (2005b) 'Television viewing in early childhood predicts adult body mass index', *The Journal of Pediatrics*, 147(4): 429-435.

Viner, R.M. and Cole, T.J. (2006) 'Who changes body mass between adolescence and adulthood? Factors predicting change in BMI between 16 years and 30 years in the 1970 British Birth Cohort', *International Journal of Obesity*, advance online publication, doi:10.1038/sj.ijo.0803183.

Wadsworth, M., Butterworth, S., Montgomery, S., Ehlin, A. and Bartley, M. (2003) 'Health'. In E. Ferri, J. Bynner and M. Wadsworth (eds) *Changing Britain, changing lives: three generations at the turn of the century*, London: Institute of Education.

More publications based on research in this area can be found by searching the CLS bibliographic database ([www.cls.ioe.ac.uk/bibliography](http://www.cls.ioe.ac.uk/bibliography)).

*The information in this briefing paper was sourced and edited by Jessica Henniker-Major, CLS Marketing and Communications Manager ([j.henniker-major@ioe.ac.uk](mailto:j.henniker-major@ioe.ac.uk)).*

## A selection of questions on obesity, diet and exercise that were asked of cohort members and their families in the three cohort studies

This list, together with variable names, is available at [www.cls.ioe.ac.uk/briefingsappendices](http://www.cls.ioe.ac.uk/briefingsappendices)

### 1958 National Child Development Study

QUESTION	AGE
What is the weight of the cohort member?	0, 7, 11, 16, 23, 33, 42
What is the height of the cohort member?	7, 11, 16, 23, 33, 42
What is the mother's / father's weight?	0, 11 / 11
What is the mother's / father's height?	0, 11 / 11
How often does the cohort member watch TV?	16
Does the cohort member take regular exercise?	33, 42
What sort of bread does the cohort member usually eat / how often do they eat wholemeal or granary bread?	33 / 42
How often does the cohort member eat fried food / chips?	33, 42 / 33, 42
How often does the cohort member eat fresh fruit / cooked vegetables?	42 / 42
Has the cohort member ever suffered from diabetes?	33, 42
What type of diabetes does the cohort member have?	42

### 1970 British Cohort Study

QUESTION	AGE
What is the weight of the cohort member?	0, 10, 16, 30
What is the height of the cohort member?	5, 10, 16, 26, 30
What is the mother's / father's weight?	10 / 10
What is the mother's / father's height?	0, 10 / 10
What is the average number of hours that the cohort member watches TV Mon-Fri / at weekends?	5
What kind of build does the cohort member have?	10, 16
How often in the past year has the cohort member undertaken exercise in school / out of school?	16 / 16
How often does the cohort member eat wholemeal or granary bread? / chips? / fresh fruit? / fried food? / cooked vegetables?	16, 30 / 16, 30 / 16, 30 / 30 / 30
Has the cohort member ever suffered from diabetes?	30
What type of diabetes did the cohort member have?	30

### Millennium Cohort Study

QUESTION	AGE
What was the cohort member's birth weight?	9-10 months
What was the cohort member's most recent weight?	9-10 months
What was the mother's weight before pregnancy?	9-10 months
What is the mother's current weight?	9-10 months
What is the mother's height?	9-10 months
What was the partner's weight before pregnancy?	9-10 months
What is the partner's current weight?	9-10 months
What is the partner's height?	9-10 months

#### Centre for Longitudinal Studies

Institute of Education, University of London,  
20 Bedford Way, London, WC1H 0AL  
tel: +44 (0)20 7612 6875 fax: +44 (0)20 7612 6880  
email: [cls@ioe.ac.uk](mailto:cls@ioe.ac.uk) web: [www.cls.ioe.ac.uk](http://www.cls.ioe.ac.uk)



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