Health Survey for England 2010

Respiratory health

Summary of key findings

A survey carried out on behalf of The NHS Information Centre

Edited by Rachel Craig and Jennifer Mindell

Joint Health Surveys Unit

NatCen
National Centre for Social Research

Department of Epidemiology and Public Health, UCL Medical School
# Health Survey for England 2010

# Respiratory health

## Summary of key findings

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Introduction

The Health Survey for England (HSE) is part of a programme of surveys commissioned by The NHS Information Centre for health and social care (NHS IC), and carried out since 1994 by the Joint Health Surveys Unit of the National Centre for Social Research (NatCen) and the Department of Epidemiology and Public Health at the UCL Medical School. The study provides regular information that cannot be obtained from other sources on a range of aspects concerning the public’s health and many of the factors that affect health. The Health Survey for England series was designed to monitor trends in the nation’s health, to estimate the proportion of people in England who have specified health conditions, and to estimate the prevalence of certain risk factors and combinations of risk factors associated with these conditions. The survey is also used to monitor progress towards selected health targets.

Each survey in the series includes core questions and measurements (such as blood pressure, anthropometric measurements and analysis of blood, saliva and urine samples), as well as modules of questions on specific issues that vary from year to year. In recent years, the core sample has also been augmented by an additional boosted sample from a specific population subgroup, such as minority ethnic groups, older people or, as in this year’s survey, children.

This is the twentieth annual Health Survey for England. All surveys have covered the adult population aged 16 and over living in private households in England. Since 1995, the surveys have included children who live in households selected for the survey; children aged 2-15 were included from 1995, and infants under two years old were added in 2001. Those living in institutions were outside the scope of the survey. This should be borne in mind when considering survey findings since the institutional population is likely to be older and, on average, less healthy than those living in private households.

The HSE in 2010 included a general population sample of adults and children, representative of the whole population at both national and regional level, and a boost sample of children aged 2-15. For the general population sample, 8,736 addresses were randomly selected in 672 postcode sectors, issued over twelve months from January to December 2010. Where an address was found to have multiple dwelling units, a random selection was made and a single dwelling unit was included. Where there were multiple households at a dwelling unit, again one was selected at random.

All adults and children in selected households were eligible for inclusion in the survey. Where there were three or more children aged 0-15 in a household, two of the children were selected at random to limit the respondent burden for parents. A nurse visit was arranged for all participants who consented.

In addition to the core general population sample, a boost sample of children aged 2-15 was selected using 17,136 addresses. These were drawn from the 672 core sampling points and an additional 168 boost only sampling points. As for the core sample, where there were three or more children in a household, two of the children were selected at random. There was no nurse follow up for this child boost sample.

A total of 8,420 adults and 5,692 children were interviewed in 2010, with 2,074 children from the core sample and 3,618 from the boost. A household response rate of 66% was achieved for the core sample, and 70% for the boost sample. Among the general population sample, 5,587 adults and 1,327 children had a nurse visit.
## Health Survey for England 2010: Contents

### Household data
- Household size, composition and relationships
- Accommodation tenure and number of bedrooms
- Mould and damp, cooking appliances, pets
- Economic status/occupation of Household Reference Person
- Household income
- Type of dwelling and area
- Smoking in household
- Car ownership

### Individual level information

#### Age

<table>
<thead>
<tr>
<th>0-1</th>
<th>2-3</th>
<th>4</th>
<th>5-7</th>
<th>8-10</th>
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<th>13-15</th>
<th>16+</th>
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#### Interviewer visit
- General health, longstanding illness, limiting longstanding illness, acute sickness
- Personal care plans
- Respiratory health
- Doctor-diagnosed hypertension and diabetes
- Kidney disease
- Dental health
- Fruit and vegetable consumption
- Smoking
- Drinking (seven day period)
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- Ethnic origin
- Height measurement
- Weight measurement
- Reported birth weight
- Consent to linkage to NHS Central Register/Hospital Episodes Statistics

#### Self completion
- Warwick-Edinburgh mental well-being scale
- GHQ12
- EQ-5D
- Contraception, sexual health
- Perception of weight
- Strengths and difficulties

#### Nurse visit
- Immunisations
- Prescribed medicines and vitamin supplements
- Nicotine replacements
- Waist and hip circumference
- Blood pressure
- Lung function
- Saliva sample (cotinine)
- Blood sample
- Urine sample

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a This module was administered by self-completion.
b This module was administered by self-completion for those aged 16-17 and some aged 18-24.
c This module was administered to adults aged 16-69.
d This questionnaire was administered by self-completion to parents of children aged 4-15.
e Lung function was measured in children aged 7 and over.
Topic coverage is shown in Figure 1. Adults were asked core modules of questions on general health, alcohol consumption, smoking and fruit and vegetable consumption, and were also asked about respiratory health, kidney disease and dental health. Self-completion booklets covered mental health and well-being, contraception and sexual health (for adults aged under 70).

Children aged 13-15 were interviewed themselves, and parents of children aged 0-12 were asked about their children, with the interview including questions on respiratory health, general health and fruit and vegetable consumption. For children aged 8-15 and some young adults details of drinking and smoking were also collected by self-completion.

Height was measured for participants aged 2 and over, and weight was measured for all participants. Nurses measured waist and hip circumference among those aged 11 and over and blood pressure among those aged 5 and over. Non-fasting blood samples and urine samples were collected from adults aged 16 and over, and saliva samples for cotinine analysis from adults aged 16 and over and children aged 4-15. Nurses obtained written consent before taking samples from adults, and parents gave written consent for their children’s samples. Consent was also obtained to send results to their GPs if participants wished.

This booklet presents findings for adults and children from the 2010 Health Survey for England. All 2010 data in this report are weighted. Data for adults in the general population have been weighted to allow for non-response, and data for children (combining core and boost samples) have been weighted for selection differences and non-response. Both weighted and unweighted bases are given in each table in the main report. The unweighted bases show the number of participants involved. The weighted bases show the relative sizes of the various sample elements after weighting, reflecting their proportions in the population in England.

The full report consists of two volumes, published as a set as ‘The Health Survey for England 2010’:

Volume 1: Respiratory health
Volume 2: Methods and documentation.

The second volume, Methods and documentation, provides details of the survey design, methods and response.
Respiratory health and lung function

Introduction

Normal lung function changes over time, being dependent on age and height, as well as sex and ethnicity. After growth during childhood and adolescence, peak lung function is attained during early adulthood. There is then a steady age-related decline. Impaired airway function is a major clinical indicator of mortality risk.

Respiratory symptoms, such as wheezing, coughing, and shortness of breath, are very common among adults in England. The two most common respiratory diseases are asthma, particularly among younger adults, and chronic obstructive pulmonary disease (COPD) which is more common in older people.

Asthma is an inflammatory disease of the airways leading to short term and sometimes very marked variations in airflow. Symptoms of wheezing, coughing, and shortness of breath occur. The prevalence of asthma has changed over the last century, and is now more common in children and young adults than in older adults. The prevalence of asthma in England and the UK is among the highest in the world with about 6% being recorded as having asthma by their GP. Direct healthcare costs associated with asthma are estimated as £1 billion per year; GP prescriptions alone were estimated at £600 million per year in 2002. Asthma causes around 1,000 deaths and at least 12.7 million lost working days per year.

Chronic obstructive pulmonary disease (COPD) is a lung disease characterised by chronic obstruction of lung airflow that interferes with normal breathing and is not fully reversible. It is a progressive systemic disease that results in debility over time. Around three million people in the UK are estimated to have COPD (sometimes called chronic bronchitis or emphysema), of whom less than one third have been diagnosed. COPD is the fifth most common cause of death in England, killing more than 25,000 people annually, and is the second most common cause of emergency hospital admission in the UK. COPD accounts for 24 million working days in sick leave and £3.8 billion in direct costs from lost productivity in England per year.

The National Institute for Health and Clinical excellence (NICE) issued updated guidance on management of COPD in 2010 and the Department of Health published an Outcomes Strategy for people with COPD and asthma in England in 2011, with the aim of improving outcomes for COPD and asthma through high-quality prevention, detection and treatment and care services. The HSE 2010 data provide a baseline against which future progress can be measured.

The 2010 survey included questions for adults and children about respiratory conditions, and in the nurse visit spirometry (measurement of lung function) was performed with children aged 7-15 and with adults.

Spirometry in 2010

New spirometers and a different protocol for measuring lung function were used in the HSE 2010, so no direct comparison is possible with earlier HSE measurements. Results are shown for three parameters of lung function, described in Table 1.

The 2009 updated Stanojevic All Age equations have been used to provide predicted values for lung function. Because the all-ages reference equations used have not yet been published for non-white ethnic groups, the results in this report are limited to HSE participants from white ethnic groups. Results are presented in terms of the percentage of...
Spirometry among adults

FEV₁ was at or above the 5th centile in 85% of men and 84% of women in white ethnic groups. The equivalent figures for FVC were 88% in men and 91% in women, and for FEV₁/FVC were 92% in both men and women. Mean FEV₁, FVC, and FEV₁/FVC as a percentage of the predicted value were each lower in the older age groups, and the proportion below the lower limit of normal (5th centile) was higher in the older age groups. For example, 8% of men and women aged 16-24 fell below the 5th centile for FEV₁.

Respiratory conditions among adults

The prevalence of lifetime doctor-diagnosed asthma was 16% among men and 17% among women, and decreased with age for both sexes. 9% of men and 10% of women currently had asthma, having experienced symptoms of asthma, or with their symptoms controlled by medication, in the last 12 months. Unlike lifetime asthma, the proportion with asthma in the last 12 months did not vary by age group in either sex. 30% of men and 39% of women with doctor-diagnosed asthma had experienced an asthma attack in the last 12 months.

Both the prevalence of lifetime doctor-diagnosed asthma, and the prevalence of current asthma, varied by equivalised household income, with prevalence in each case highest in the lowest quintiles.

4% of men and 5% of women had ever been told by a doctor that they had chronic bronchitis, emphysema, or COPD. Prevalence increased with age for both sexes, from 1% of men (and no women recorded in the survey) aged 16-24, to 11% of men and 10% of women aged 65-74; the proportion dropped back slightly in the oldest age group. A small group was identified that did not have a doctor diagnosis, but reported symptoms of possible COPD (regular cough with phlegm); prevalence of this group was low at 1% of both sexes, but increased with age to 4% of men and 3% of women aged 75 and over.

As with asthma, the prevalence of doctor-diagnosed COPD and symptoms of probable COPD varied by equivalised household income, increasing as income decreased, as shown in Figure 2. Current or ex-smokers were more likely than those who had never smoked regularly to have doctor-diagnosed COPD, or the symptoms of probable COPD.

Table 1

<table>
<thead>
<tr>
<th>Test</th>
<th>Abbreviation</th>
<th>Measurement unit</th>
<th>Definition</th>
<th>Lay explanation</th>
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<tr>
<td>Forced Vital Capacity</td>
<td>FVC</td>
<td>Litres</td>
<td>The total volume of air that can forcibly be blown out after a full inspiration</td>
<td>This indicates the ‘size’ of the lungs.</td>
</tr>
<tr>
<td>Forced Expiratory Volume in 1 Second</td>
<td>FEV₁</td>
<td>Litres</td>
<td>The volume of air that can be blown out in one second during a forced manoeuvre</td>
<td>This measures how easily an individual can breathe out. It depends on how wide (dilated) the airways are.</td>
</tr>
<tr>
<td>FEV₁ as a proportion of FVC</td>
<td>FEV₁/FVC</td>
<td>Proportion or ratio</td>
<td>The ratio of FEV₁ to FVC.</td>
<td>This measures the proportion of the air in the lungs that an individual can breathe out in the first second.</td>
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increasing to 19% – 24% of men and 20% – 34% of women aged 55 and over.

Both FEV₁ and the ratio FEV₁/FVC were inversely associated with income. The proportion with FEV₁/FVC below the 5th centile ranged from 4% of men in the highest income households to 14% of men in the lowest income households. Among women, it ranged from 5% in the highest income quintile to 9%-10% in the lowest three income quintiles.

The mean percentage of predicted lung function was lower and the prevalence of abnormal lung function was much higher in men and women reporting current asthma (symptoms within the past 12 months or currently taking medication for asthma) or COPD than among those who reported they had never had these conditions.

Lung function was considerably worse in current smokers than in people who had never smoked cigarettes regularly; results for ex-smokers were between these groups, as shown in Figure 3.
More boys than girls aged 0-15 had ever had any wheezing or whistling in the chest (30% and 23% respectively), although just under half of these children only had wheezing when they had a cold (13% of boys and 10% of girls). The proportion experiencing wheezing when they did not have a cold increased with age. 17% of boys and 13% of girls had experienced wheezing or whistling in the chest in the last 12 months. Younger children were more likely than older children to report this.

The prevalence of lifetime doctor-diagnosed asthma was 17% among boys and 12% among girls. Current asthma, defined as symptoms in the last 12 months or symptoms controlled by medication for asthma in the last 12 months, was reported by 11% of boys and 8% of girls. Both lifetime and current asthma prevalence increased with age for both sexes.

There was significant variation by equivalised household income in the prevalence of both lifetime doctor-diagnosed asthma and those experiencing symptoms of asthma in the last 12 months. Those living in households with lower income were more likely to report lifetime asthma (as shown in Figure 4) or current symptoms.
47% of boys and 48% of girls with doctor-diagnosed asthma had experienced an asthma attack in the last 12 months. The most frequently reported impact of asthma during the last week was experiencing symptoms during the day, with 30% of both boys and girls who had symptoms in the last year reporting this at least one day in the last week. Around one fifth of boys and girls with symptoms said that their asthma had interfered with their usual activities in the last week, and a fifth said that they had had problems with sleeping because of their asthma in the last week.

There was a small number of children aged 7-15 with valid spirometry, and analysis therefore combines boys and girls to maintain an adequate sample size in the results. FEV\textsubscript{1} was below the 5th centile in 10% of children; the equivalent figures for FVC and FEV\textsubscript{1}/FVC ratio were 7% and 9% of children respectively. Figure 5 shows the frequency distribution of FEV\textsubscript{1} measurements as a percentage of the predicted value, and there is a normal distribution, with the highest frequency at 90-95% of the predicted value for FEV\textsubscript{1}.

Mean FEV\textsubscript{1} as a percentage of the predicted value varied with age, being lowest for children aged 10-12, but there was no variation for FVC and the FEV\textsubscript{1}/FVC ratio.

The prevalence of FEV\textsubscript{1} below the 5th centile and of FEV\textsubscript{1}/FVC below the 5th centile was higher in children whose mother smoked (19% for FEV\textsubscript{1}, 18% for FEV\textsubscript{1}/FVC) than in other children (8% and 7% respectively). The HSE results did not show any variation in the prevalence of lung function below the 5th centile for any of the three parameters by passive smoking status (based on salivary cotinine levels).
A number of further topics were covered by the HSE in 2010, including contraception and sexual health, well-being, kidney disease, dental health and obesity. Key results on these topics are summarised here.

Poor sexual health is responsible for important levels of morbidity and mortality within the population and requires appropriate resources and funding for diagnostic, treatment and prevention services. Public health policy for sexual health has prioritised two major areas: effective contraceptive choice to avert unintended or early pregnancy; and the prevention of sexually transmitted infections (STIs) including HIV. The HSE 2010 provides data about reported sexual behaviour and access to services for the diagnosis and treatment of STIs, information which is vital for the evaluation and development of public health interventions for the prevention and control of STIs.

92% of men and 94% of women aged 16-69 reported that they had ever had sexual intercourse with someone of the opposite sex. Fewer participants in the youngest age group, 16-24, reported that they had ever had sexual intercourse (68% of men and 74% of women), whereas 95% or more in all other age groups reported doing so. 3% of both men and women aged 16-69 reported that they had ever had sex with someone of the same sex, and 2% reported that they had done so in the last five years.

Just under a fifth of all women aged 16-54 reported that they were not currently having sexual relations with someone of the opposite sex (18%). Around two thirds of all women reported that they were using some method of contraception (68%), including 49% reporting non-surgical methods and 19% surgical methods. 14% of women said that they were not using any method of contraception.

Among those aged 16-54 who were currently having sexual relations, 83% of women reported using at least one method of contraception. Use of contraception was lower among those aged 25-34 (78%) – the age group most likely to be pregnant or seeking to become pregnant, and those aged 45 and over (82%) – most likely to be menopausal. The proportion of women reporting surgical options increased with age.

The most commonly reported methods of contraception were the male condom and the contraceptive pill, each mentioned by 22% of women currently having sexual relations. 7% of women said they used long acting reversible contraception. Reported use of all these methods was highest among those aged 16-24, and declined with age, as shown in Figure 6.

Most women who were having heterosexual sex and were not using contraception indicated that this was because of pregnancy, wanting to become pregnant, the menopause or possible infertility. However, among women aged 16-54 currently having sexual relations, 3.2% were at risk of unplanned pregnancy.

Of those aged 16-69 who reported ever having heterosexual or homosexual sex, women were more likely than men to report a doctor-diagnosed STI\(^2\) (12% and 9% respectively). However, similar proportions of men and women reported having had more than one STI (2% of each sex).

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\(^2\)Excluding vaginal candidiasis or “thrush” for women.
Younger participants were more likely than older groups to report having been tested for chlamydia (27% of men and 44% of women aged 16-24 compared with 6% of men and 12% of women aged 45-54).

In recent years well-being has been a topic of interest in the light of public policy concerns with sustainable economic growth and economic well-being. There is a desire to utilise measures beyond GDP\(^3\) such as well-being measures, for designing and evaluating policies. A substantial body of research shows that paid work and job quality affect health and well-being.

The Warwick-Edinburgh Mental Well-being Scale (WEMWBS) was used in the HSE 2010. This measure was developed to capture a broad concept of positive mental well-being, including psychological functioning, cognitive-evaluative dimensions and affective-emotional aspects of well-being. The scale is based on 14 statements, for each of which participants are asked to tick the box that best describes their experience over the previous two weeks. Responses are aggregated to form the Well-being Index, which ranges from 14 (those who answer ‘rarely’ on every statement) to 70 (those who answer ‘All of the time’ to all statements).

There was considerable variation in the experience of subjective well-being as measured by the Warwick-Edinburgh Mental Well-being Scale (WEMWBS). Scores covered the entire range of 14 to 70, with a median score of 52.0. Overall the mean score for the population was 51.0, with similar scores for men and women. 11% of the population had a score of 39 or less, while most scores (77%) were in the 40-62 range. There was a U-shape in the relationship between age and well-being. The lowest scores for both men and women were in the middle age groups (49.9 for men aged 35-44, 49.7 for women aged 45-54), while scores were highest in the 65-74 age group (53.3 and 52.4 respectively).

There was a very strong association between WEMWBS scores and self-reported general health. Those who rated their health as very good had a mean WEMWBS score of 54, while those who rated their health as bad had a mean of 41 (with the small numbers who rated their health very bad even lower than this).

There was an association between the WEMWBS score and being in work, as shown in Figure 7. Among men the mean score was 51.6 for employees and the self-employed, but for the unemployed it was only 47.9 and for those otherwise economically inactive (non-retired men without jobs who were not seeking paid work) it was only 48.6. Similarly among women, the unemployed had a score of 49.7 and the economically inactive 48.6, compared

\(^{3}\)Gross Domestic Product.
with 51.5 for employees and 52.4 for the self-employed. The positive association between paid work and WEMWBS remained when controlling for age and region.

There is much evidence that there is a robust and substantive relationship between the quality of a job and the job-holder’s subjective well-being and health. The HSE results show that there was a clear relationship between the WEMWBS score and autonomy, support, security and control in an individual’s job. This relationship was apparent when controlling for age and region.

Chronic kidney disease (CKD) is recognised as a global public health problem. Studies in Australia, USA, and Europe have found an overall prevalence of 10–16% in adults. Some key factors associated with moderate CKD are increasing age, female sex, lower socio-economic status, hypertension (both cause and consequence), and diabetes. Key factors associated with progression include proteinuria (protein, including albumin, in the urine), and higher blood pressure levels.

The main absolute risk associated with CKD is cardiovascular morbidity and mortality. Obesity and metabolic syndrome are also associated with CKD by a variety of mechanisms and not just through Type 2 diabetes and hypertension. Some patients have progressive loss of kidney function and may develop symptoms due to complications such as anaemia; those who develop severe CKD may require renal replacement therapy (RRT) by dialysis or transplantation. In England in 2009, the rate of people starting RRT was 109 per million population (pmp) and the prevalence of RRT was 794 pmp. Such treatments are costly, with the annual cost of haemodialysis being over £20,000 per person.

Chronic kidney disease was covered in the HSE in both 2009 and 2010, so that a larger sample size was available for analysis. Results from the combined years of data are presented in the 2010 report.

In the HSE, renal (kidney) function was assessed in two ways. Serum creatinine levels were used to estimate glomerular filtration rate (eGFR); and albuminuria, the presence of albumin in the urine, was measured using the albumin:creatinine ratio.

7.6% of men and 7.9% of women reported having been tested for kidney disease, and 1.0% of men and 1.3% of women reported having doctor-diagnosed CKD. The prevalence of self-reported kidney disease increased with age, rising from less than 1% among those aged 16–44 to 2.7% in men aged 75 and over and 3.4% among women in that age group.

The prevalence of self-reported doctor-diagnosed kidney disease varied by equivalised

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Dental health

The dental health of adults in England has shown significant change in recent decades. In the first half of the twentieth century dental decay and sepsis were widespread and people had a high probability of having many or all of their teeth extracted. In the 1950s, the overall incidence of dental decay remained high, but there was a shift towards treating it by ‘drilling and filling’ teeth. As with the earlier generations, this group are likely to make continuing demands on resources to maintain and replace these dental restorations. In the 1980s, improved dental hygiene and the introduction of fluoride toothpastes led to significant reductions in levels of dental decay among children. As they grow older, this group continues to show a higher standard of oral health than their predecessors, with a consequent reduction over the same period in the proportions of adults with filled teeth and those reliant on dentures.

94% of men and 92% of women had retained some of their natural teeth. Younger adults were more likely to have retained some teeth, with between 97% and 99% of those aged below 55 having some, depending on the age group. Above the age of 55, the likelihood of having some natural teeth decreased steeply, from 95% of men and 93% of women aged 55-64 to 74% of men and 63% of women aged 75 and over. The prevalence of denture use

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**Figure 8**

Proportion with eGFR levels less than 60 ml/min/1.73m², by age and sex

Base: Aged 16 and over with a valid eGFR result

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Household income, and was highest among men and women in the lowest income quintile (1.8% and 1.9% respectively).

49% of men and 52% of women had abnormal kidney function, i.e. estimated glomerular filtration rate (eGFR) levels less than 90 ml/min/1.73m²; this included 6% of men and 7% of women who had levels less than 60 ml/min/1.73m². The proportion of both men and women with abnormal eGFR levels increased with age, as shown in Figure 8.

Urinary excretion of abnormal quantities of albumin was found in 9% of men and 8% of women, and in most cases this was micro-albuminuria (8% in each sex) rather than macro-albuminuria (1% or less). Prevalence of albuminuria was highest in older adults; it was generally around 5%–6% in younger age groups, rising to 26% of men and 19% of women aged 75 and over.

Overall, 6% of men and 7% of women had survey-defined stage 3-5 CKD, comparable with levels found in other international studies. There was strong variation by age, with fewer than 1% of men and women aged 16-24 at stage 3-5, but 29% of men and 35% of women aged 75 and over.

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*Abnormal levels of albumin are split into two groups: slightly raised excretion is micro-albuminuria, defined as more than 2.5 to 30 mg/mmol in men and more than 3.5 to 30 mg/mmol in women. Macro-albuminuria is defined as more than 30 mg/mmol (in either sex).*
was similar to the pattern of tooth loss, with women more likely than men to wear dentures (22% and 18% respectively).

Retention of 20 or more natural teeth – the level required for functional dentition – varied in a similar way to the retention of any natural teeth. 82% of men and 80% of women had at least 20 natural teeth; this was more likely among younger adults.

11% of men and women reported at least one dental problem. 8% of both men and women experienced difficulty with eating, while 3% of men and 4% of women reported embarrassment about showing their teeth, 2% of men and women reported difficulty speaking clearly and 1% of men and women said that they had problems with enjoying the company of other people. Among dentate adults (i.e. with some of their natural teeth), 27% of men and 31% of women with 19 or fewer teeth – less than needed for normal oral function without dentures – had experienced one of these problems, compared with 9% of those with 20 or more teeth. There was a similar, though less pronounced impact with denture wear, as shown in Figure 9.

Among dentate adults, 42% of men and 49% of women described their dental health as ‘excellent’ or ‘very good’. Just 5% of men and 4% women thought their dental health was ‘poor’.

Overweight or obesity occurs when energy intakes exceed energy expenditure (through metabolism and daily physical activity), and obesity represents a significant public health problem because it is a major risk factor for disease and mortality. A number of studies have established that overweight and obesity are associated with cardiovascular risk and cardiovascular-related mortality. Obesity is also associated with cancer, disability during older age and decreased life expectancy, as well as serious chronic conditions such as Type 2 diabetes, hypertension and hyperlipidaemia (high levels of fat in the blood that can lead to narrowing and blockages of blood vessels).

The prevalence of overweight and obesity is indicated by body mass index (BMI) as a measure of general obesity, and/or waist circumference as a measure of abdominal obesity. BMI, defined as weight in kilograms divided by the square of the height in metres (kg/m²) was calculated in order to group people into the following categories:

<table>
<thead>
<tr>
<th>BMI (kg/m²)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 18.5</td>
<td>Underweight</td>
</tr>
<tr>
<td>18.5 to less than 25</td>
<td>Normal</td>
</tr>
<tr>
<td>25 to less than 30</td>
<td>Overweight</td>
</tr>
<tr>
<td>30 or more</td>
<td>Obese</td>
</tr>
</tbody>
</table>
Mean BMI was similar in men and women, at 27.4kg/m² and 27.1kg/m² respectively. More than a quarter of adults were obese (26% of both sexes), and 68% of men and 58% of women were overweight or obese. Among both sexes, generally the prevalence of obesity and overweight increased with age up to the age of 74, but dropped back slightly among those aged 75 and over, as shown in Figure 10.

Levels of obesity have increased over the period measured by the HSE. Mean BMI increased in both sexes between 1993 and 2010. Mean BMI increased from 25.9kg/m² in 1993 to 27.4kg/m² in 2010 among men, and from 25.7kg/m² in 1993 to 27.1kg/m² in 2010 among women. The prevalence of obesity increased from 13% in 1993 to 26% in 2010 in men, and from 16% in 1993 to 26% in 2010 in women, as shown in Figure 11. While the rate of increase in obesity was slower in the second half of the period, in 2010 obesity was at its highest level since 1993, and in men the 2010 level was also significantly higher than in the period between 2000 and 2005.

A raised waist circumference is defined as greater than 102cm in men, and greater than 88cm in women. Mean waist circumference was 97.7cm in men and 88.3cm in women, and a higher proportion of women than men had a raised waist circumference (46% and 34% respectively). The prevalence of raised waist circumference increased with age between the age groups 16-24 and 65-74 in both sexes.

National Institute for Health and Clinical Excellence (NICE) guidelines recommend a combination of BMI and waist circumference to assess health risks from obesity. The guidelines define low, high and very high waist measurements for men and women. A high
or very high waist circumference is associated with increased health risks for those with a BMI below 35kg/m²; health risks are very high for those with a BMI of 35kg/m² or more regardless of waist circumference.

Most men and women who were overweight or obese tended also to have a high or very high waist circumference, and according to the NICE classification were therefore at increased health risk. Using combined categories of BMI and waist circumference, 22% of men were estimated to be at increased risk, 12% at high risk and 23% at very high risk. The equivalent proportions for women were 14% at increased risk, 19% at high risk and 25% at very high risk.
There is considerable evidence that childhood overweight and obesity can be linked with numerous long-term and immediate health risks. Childhood and adolescent obesity can persist into adulthood, where the direct health risks of obesity are severe and well established, and childhood and adolescent overweight/obesity have been linked directly to middle-age mortality and morbidity.

In addition to the increased risk for health problems in later life, children face immediate health consequences of obesity including increased risks for an abnormal lipids profile and elevated blood pressure. Associations between childhood obesity and increased asthma prevalence and the incidence of Type 2 diabetes have been reported. Being overweight or obese can also have psychological effects.

17% of boys and 15% of girls aged 2-15 were classed as obese, and 31% of boys and 29% of girls were classed as either overweight or obese. Children aged 11-15 were more likely than those aged 2-10 to be obese (20% of boys and 17% of girls aged 11-15, compared with 15% and 14% respectively aged 2-10).

Among children aged 2-15, there was variation in the prevalence of obesity according to equivalised household income, with the proportion of children who were obese increasing as equivalised household income decreased. Children in the highest income quintiles were the least likely to be obese (14% in the highest two quintiles for boys and 12%-13% in the highest three quintiles for girls), and those in the lowest quintiles were the most likely to be obese (20% in the lowest quintile for boys and 17%-18% in the lowest quintiles for girls).

Overall, 61% of boys and 53% of girls aged 8-15 felt that they were about the right weight, while 9% of boys and 15% of girls felt that they were too heavy, and 8% of boys and 4% of girls thought they were too light (22% of boys and 27% of girls were not sure). The majority of children who thought themselves too heavy were obese (72% of boys and 55% of girls). Of those children who thought of themselves as about the right weight 27% of boys and 21% of girls were overweight or obese.

The majority of children aged 8-15 said that they were not trying to change their weight (69% of boys and 66% of girls), while 21% of boys and 29% of girls said they were trying to lose weight. Among those who said they were trying to lose weight 21% of boys and 26% of girls were overweight and 54% and 40% respectively were obese.

Among boys aged 2-15, mean BMI increased by 0.5kg/m² between 1995 and 2010, with fluctuations from year to year. However, among girls the mean BMI in 2010 was not significantly different from the level in 1995, although there were increases in the intervening period.

For the period from 1995 to 2010, the prevalence of obesity among boys aged 2-15 increased by 6 percentage points (from 11% to 17%), and the equivalent increase for girls was 3 percentage points (from 12% to 15%). However, the pattern has not been one of uniform increase over that period, as shown in Figure 12. The prevalence of obesity increased steadily in most years up to around 2004 and 2005, and since then the pattern has been slightly different for boys and girls. Among boys the proportion that was obese has remained between 16% and 19% since 2001. Among girls the pattern is slightly different; there was a significant decrease in obesity between 2005 and 2006, and levels have been similar between 2006 and 2010.
The lack of significant change in the last three to four years in the proportion of children that were obese suggests that the trend in obesity now appears to be flattening out. It will be important to continue to monitor the trends in future years to confirm that this is a continuing pattern, rather than a plateau within a longer term trend of more gradual increase.
This booklet is a summary of the findings from the 2010 Health Survey for England: Craig R, Mindell J (eds). Health Survey for England 2010.

Volume 1: Respiratory health.

Volume 2: Methods and documentation.


Full results are available in the survey report at www.ic.nhs.uk/pubs/hse10report, and also in an anonymised data file lodged with the Data Archive at the University of Essex. Reports and data files from earlier surveys are similarly available.

For the general population, tables showing selected trends from 1993 to 2010 will be found on The NHS Information Centre website at www.ic.nhs.uk/pubs/hse10trends or at the address below.

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The National Centre for Social Research is the largest independent social research institute in Britain, specialising in social survey and qualitative research for the development and evaluation of policy. NatCen specialises in research in public policy fields such as health, housing, employment, crime, education and political and social attitudes. Projects include ad hoc and continuous surveys, using face-to-face, telephone, online and postal methods; many use advanced applications of computer assisted interviewing. NatCen has approximately 275 staff, a national panel of over 1,000 interviewers, and 150 nurses who work on health-related surveys.

Research Department of Epidemiology and Public Health, UCL Medical School

The Research Department of Epidemiology and Public Health, chaired by Professor Richard Watt, is a leading centre for research into the social determinants of health. The Department has a strong interdisciplinary structure. The Department houses over 180 staff in 13 main research groups, including the Joint Health Surveys Unit, part of the Health and Social Surveys Research Group. Collaborative research is conducted through the International Institute for Society and Health and across the Division.

The Department’s research programme is concerned particularly with social factors in health and illness and inequalities in these, including national cross-sectional surveys of health and behaviour (such as diet), longitudinal studies of cardiovascular disease (Whitehall studies) and the English Longitudinal Study of Ageing (ELSA); international studies of cardiovascular disease and diabetes; socio-dental indicators of need; and the socio-economic and policy implications of an ageing population.