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Health Survey for England

2006

Volume 1

Cardiovascular disease and risk factors in adults

A survey carried out on behalf of The Information Centre

Edited by Rachel Craig and Jennifer Mindell

Joint Health Surveys Unit

NatCen National Centre for Social Research

National Centre for Social Research

UCL

Department of Epidemiology and Public Health at the Royal Free and University College Medical School

FOR HEALTH AND SOCIAL CARE

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Ayesha Ali, Elizabeth Becker, Moushumi Chaudhury, Elizabeth Fuller, Jenny Harris, Frances Heeks, Vasant Hirani, Dhriti Jotangia, Soazig Nicholson, Sarah Pigott, Marilyn Roth, Shaun Scholes, Nicola Shelton, Hilde Stephansen, Kerina Tull and Heather Wardle.

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Foreword

This report presents the findings of the sixteenth annual survey of health in England. I am pleased to present this important research which has been undertaken on behalf of The Information Centre for health and social care.

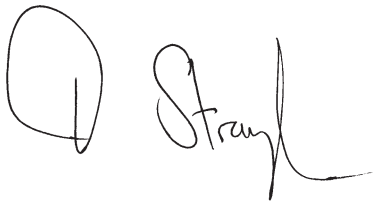
The Health Survey for England is conducted annually and collects information about a representative sample of the general population. It is vital to our understanding of the health situation and behaviours of the public in England and helps to ensure that policies are informed by these data.

The survey combines information gathered through interviewing the sampled respondents, including a wealth of socio-demographic variables, with objective measures of health, such as blood pressure measurements, and analyses of blood samples. Thus we can study the inter-relationship of the characteristics and circumstances of adults and their children, with their health situation.

The primary focus of the 2006 HSE report is cardiovascular disease and associated risk factors such as high blood pressure, diabetes and obesity. In 2000 the National Service Framework (NSF) for Coronary Heart Disease set out 12 standards for improved prevention, diagnosis and treatment of CHD over a 10-year period. Although death rates for CVD are falling, it remains the leading cause of death in England. The report investigates associated lifestyle factors such as physical activity, diet, smoking and drinking, and also focuses on inequalities. The 2006 HSE had a secondary focus of childhood obesity and other health risk factors for children, including diet, physical activity and smoking. Childhood obesity is associated with many illnesses, and in adulthood is linked to increased mortality and reduced life expectancy.

I am honoured to welcome this valuable report and to thank all my colleagues in the

Information Centre and our counterparts in the Joint Health Surveys Unit for their work. Surveys of this complexity are a team effort. The dedication of the skilled interviewing force is especially noteworthy. May I also thank the anonymous respondents across England who gave up their time to take part in the survey and who were willing to submit to various health tests. Without their help we would lose a public tool of enormous potential to benefit and protect the health of every one of us.



Tim Straughan

Chief Executive

The Information Centre for health and social care

Editors' acknowledgements

We wish to thank, first of all, all those who gave up their time to be interviewed and who welcomed interviewers and nurses into their homes. We would also like to acknowledge the debt the survey's success owes to the commitment and professionalism of the interviewers and nurses who worked on the survey throughout the year.

We would like to thank all those colleagues who contributed to the survey and this report. In particular we would like to thank:

- The authors of all the chapters: Ayesha Ali, Elizabeth Becker, Moushumi Chaudhury, Elizabeth Fuller, Jenny Harris, Frances Heeks, Vasant Hirani, Dhriti Jotangia, Soazig Nicholson, Sarah Pigott, Marilyn Roth, Shaun Scholes, Nicola Shelton, Hilde Stephansen, Kerina Tull and Heather Wardle.
- Kelly Ward and Claire Deverill, whose hard work and support have been crucial in putting this report together.
- Other research colleagues, especially Shaun Scholes, Kevin Pickering, Sarah Tipping and Danielle Whitehurst.
- Operations staff, especially Lesley Mullender, Sue Roche and the Area Managers at NatCen and Barbara Carter-Szatynska at UCL.
- The principal programmers, Jo Periam, Sven Sjodin and Colin Micelli.
- All the field interviewers and nurses who worked on the project.

We would also like to express our thanks to Professor Ian Gibb and his staff at the Department of Clinical Biochemistry at the Royal Victoria Infirmary in Newcastle upon Tyne, and to Dr Colin Feyerabend and his staff at ABS Laboratories, London, for their helpfulness and efficiency.

Last, but certainly not least, we wish to express our appreciation of the work of the staff at the Information Centre for health and social care at all stages of the project, and in particular the contribution made by Andy Sutherland, Alison Crawford, Bethan Thomas, Alyson Whitmarsh, Katie Barnes and Nicola Dawes.

Rachel Craig and Jennifer Mindell

Notes

1. The data used in the report have been weighted. The weighting is described in Chapter 7, in Volume 3 of this report. Both unweighted and weighted sample sizes are shown at the foot of each table. The weighted numbers reflect the relative size of each group in the population, not numbers of interviews made, which are shown by the unweighted bases.
2. Children's data each year have been weighted to adjust for the probability of selection, since a maximum of two children are selected in each household. This ensures that children from larger households are not under-represented. Since 2003, as for adults, non-response weighting has also been applied.
3. In this report, in trend tables that show years with and without non-response weighting, data for the first year where non-reponse weighting was applied are shown in two rows or columns, one showing unweighted results and the other weighted results.
4. Three different non-response weights have been used: one for non-response at the interview stage, one for non-response to the nurse visit, and one for non-response to the blood sample.
5. The following conventions have been used in tables:

   - no observations (zero value)

   0 non-zero values of less than 0.5% and thus rounded to zero

   [ ] used to warn of small sample bases, if the unweighted base is less than 50. If a group's unweighted base is less than 30, data are normally not shown for that group.
6. Because of rounding, row or column percentages may not add exactly to 100%.
7. A percentage may be quoted in the text for a single category that aggregates two or more of the percentages shown in a table. The percentage for the single category may, because of rounding, differ by one percentage point from the sum of the percentages in the table.
8. Values for means, medians, percentiles and standard errors are shown to an appropriate number of decimal places. Standard Error may sometimes be abbreviated to SE for space reasons.
9. 'Missing values' occur for several reasons, including refusal or inability to answer a particular question; refusal to co-operate in an entire section of the survey (such as the nurse visit or a self-completion questionnaire); and cases where the question is not applicable to the informant. In general, missing values have been omitted from all tables and analyses.
10. The group to whom each table refers is stated at the upper left corner of the table.
11. The term 'significant' refers to statistical significance (at the 95% level) and is not intended to imply substantive importance.

Introduction

1

1.1 The Health Survey for England series

The Health Survey for England (HSE) comprises a series of annual surveys, of which the 2006 survey is the sixteenth. All surveys have covered the adult population aged 16 and over living in private households in England. Since 1995, the surveys have also covered children aged two to 15 living in households selected for the survey, and since 2001 infants aged under two have been included as well as older children.

The Health Survey for England (HSE) is part of a programme of surveys currently commissioned by the Information Centre for health and social care, and before April 2005 commissioned by the Department of Health. The surveys provide 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 series of Health Surveys for England was designed to:

1. Provide annual data from nationally representative samples to monitor trends in the nation's health;
2. Estimate the proportion of people in England who have specified health conditions;
3. Estimate the prevalence of certain risk factors associated with these conditions;
4. Examine differences between subgroups of the population (by age, sex or income) in their likelihood of having specified conditions or risk factors;
5. Assess the frequency with which particular combinations of risk factors are found, and in which groups these combinations most commonly occur;
6. Monitor progress towards selected health targets;
7. (Since 1995) measure the height of children at different ages, replacing the National Study of Health and Growth; and
8. (Since 1995) monitor the prevalence of overweight and obesity in children.

Each survey in the series includes core questions and measurements such as blood pressure, anthropometric measurements and analysis of 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 2006, children.

The Health Survey for England has been designed 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 Royal Free and University College Medical School (UCL).

1.2 The 2006 survey

The primary focus of the Health Survey for England in 2006 was cardiovascular disease (CVD). CVD is disease which involves the blood circulatory system: the heart, blood vessels and the consequences of impaired blood supply to the heart or brain. The two most

common types of CVD are ischaemic heart disease (IHD), also called coronary heart disease (CHD) or coronary artery disease (CAD), and stroke. In 2000 the National Service Framework (NSF) for Coronary Heart Disease set out 12 standards for improved prevention, diagnosis and treatment of CHD over a 10-year period.[1] Although death rates for CVD are falling, it remains the leading cause of death in England.[2] In 2005/06 CVD caused 184,000 deaths in England and Wales, and 28% of premature deaths.[2] In addition, there were 312,164 hospital admissions for IHD and 178,321 admissions for stroke.[2]

The Health Survey for England 2006 had a secondary focus of childhood obesity and other health risk factors for children, including diet, physical activity and smoking. Childhood obesity is associated with many illnesses, and in adulthood is linked to increased mortality and reduced life expectancy. Data from the HSE has demonstrated that levels of obesity among children are increasing, and the Government has responded to the increase in obesity/overweight by publishing a Public Service Agreement (PSA) to *'Reduce the proportion of overweight and obese children to 2000 levels by 2020 in the context of tackling obesity across the population'*.[3]

A total of 14,142 adults and 7,257 children were interviewed, with 3,491 children from the core sample and 3,766 from the boost.

Data collection involved an interview, followed by a visit from a specially trained nurse for all in those in the core sample who agreed. The nurse visit included measurements and collection of blood, urine and saliva samples, as well as additional questioning.

1.3 Ethical approval

Ethical approval for the 2006 survey was obtained from the London Multi-centre Research Ethics Committee (MREC).

1.4 2006 survey design

1.4.1 Introduction

The survey was designed to yield a representative sample of the general population of any age, and a boost sample of children aged 2-15, living in private households in England. More detailed information about survey design is presented in Chapters 2-7, Volume 3 of this report.

People living in institutions, who are likely to be older and, on average, in poorer health than those in private households, were not covered. This should be borne in mind when considering the Health Survey's account of the population's health.

1.4.2 The core general population sample

A random sample of 14,400 addresses was selected from the Postcode Address File (PAF), using a multi-stage sample design with appropriate stratification. This was to ensure that households were sampled proportionately across the nine Government Office regions of England. 720 postcode sectors were selected, and 20 addresses selected within each sector. Where an address was found to have multiple dwelling units, one was selected at random. Where there were multiple households at a dwelling unit, up to three households were included, and if there were more than three, a random selection was made.

Each individual within a selected household was eligible for inclusion. Where there were more than two children in a household, two were randomly selected for inclusion, to limit the burden on any household.

A total of 14,142 adults and 3,491 children were interviewed in the core sample.

1.4.3 The child boost sample

To increase the number of children in the sample, a boost sample was used. The boost sample of was obtained by randomly selecting 16,848 addresses in an additional 468 postcode sectors to supplement the sample obtained in the core sectors. As for the core sample, where there were three or more children in a household, two of the children were selected at random to limit the respondent burden for parents.

An additional 3,766 children were interviewed in the boost sample, giving a total child sample of 7,257.

1.4.4 Fieldwork

Interview

A letter stating the purpose of the survey was sent to each sampled address before the interviewer visited. The interviewer sought the permission of each eligible selected adult in the household to be interviewed, and parents' and children's consent to interview selected children aged up to 15.

Computer-assisted interviews were conducted. The content of the interview is detailed in Volume 3, Chapter 1; full documentation is provided in the Appendices to Volume 3.

The 2006 survey for adults focused on cardiovascular disease and its risk factors. Adults were asked modules of questions on general health, cardiovascular disease (including the Rose Angina Questionnaire), physical activity, alcohol consumption, smoking, and fruit and vegetable consumption. To avoid an overlong interview for older informants, those aged 65 and over were allocated at random to one of two questionnaire versions. This included either the CVD and short physical activity modules, or the long physical activity module but not the CVD module. Adults aged 16-64 completed both the CVD and long physical activity modules.

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 physical activity, eating habits (fat and sugar consumption) and fruit and vegetable consumption. Parents were normally present when older children were interviewed.

Height and weight measurements were taken at the end of the interview.

Nurse visit

Informants in the core sample were offered a nurse visit. Questions were asked about prescribed medication, vitamin supplements and nicotine replacement treatments. For infants, additional information was collected on immunisations and measurements at birth. Nurses measured infant length (for those aged six weeks to under two years). The nurse also took the blood pressure of those aged five and over, and took waist and hip measurements for those aged 11 and over. Demi-span measurements (the length between the sternal notch and the end of the outstretched arm) were taken for informants aged 65 and over.

With written agreement, a small (non-fasting) sample of blood was taken by venepuncture from those aged 16 and over. The blood sample was analysed for total and HDL cholesterol, ferritin, haemoglobin, glycated haemoglobin, fibrinogen, and C-reactive protein. Nurses also sought written agreement for the storage of a small sample of blood for possible future analysis.

Spot urine samples were taken from informants aged 16 and over and samples of saliva (for the analysis of cotinine, a derivative of nicotine) were taken from children aged 4-15. Written consent was obtained for these samples.

Nurses administered a self-completion booklet about eating habits to those aged 16 and over.

1.5 Survey response

Interviews were held in 8,614 households with 14,142 adults aged 16 or over, and 3,491 children from the general population. The boost sample resulted in an additional 3,766 children aged 2-15 being interviewed, giving a total child sample of 7,257. Among the general population sample, 10,489 adults and 2,574 children had a nurse visit. More detailed information on survey response can be found in Volume 3, Chapter 6.

Response to the survey can be calculated in two ways: at a household level and at an individual level. Interviews were carried out at 68% of sampled eligible households in the general population (after removing vacant addresses etc.), and at 73% of known eligible boost sample households. Within the general population sample, interviews were obtained with 88% of adults and 94% of (sampled) children in interviewed ('co-operating') households.

Assuming that households where the number of adults and children was not known contained, on average, the same number of adults and children as households where it was known, the individual response rate for the general population sample, based on all eligible households, was estimated to be 61% among adults and 66% among (sampled) children.

Table 1A below shows individual response rates to the different stages of the survey for adults in the general population sample. The first column gives the individual response rates for adults in all eligible households, and the second column gives individual response rates for adults in co-operating households.

Table 1B below shows a summary of responses obtained to each component of the survey among the total sample of children (from the core and boost sample) in co-operating households.

Table 1A

Individual response: adults in the general population sample

	Adults in all eligible house-holds	Adults in co-operating house-holds
	%	%
Interviewed	61	88
Height measured	55	80
Weight measured	53	77
Saw nurse	45	66
Waist and hip measured	43	64
Blood pressure measured	44	64
Blood sample obtained	33	48
Urine sample obtained	38	56

Table 1B

Individual response: children in core and boost samples

	Children aged 0-15 in co-operating households
	%
Interviewed	94
Height measured	80
Weight measured	78
Saw nurse	69
Infant length measured	52
Waist and hip measured	64
Blood pressure measured	63
Saliva sample obtained	59

1.6 Data analysis

1.6.1 Introduction

As a cross-sectional survey, the Health Survey for England gives information on the proportions of the population with certain characteristics. It also examines associations between various health states, personal characteristics and behaviours but cannot comment on whether these are causal. In particular, associations between current health states and current behaviour need careful interpretation, as current health may reflect past, rather than present, behaviour.

1.6.2 Weighting the samples

The general population sample

For the general population sample, weights were calculated at the household level and at the individual informant level. The household weight corrected for the probability of selection where additional dwelling units or households were identified at a selected address. Calibration weighting was also used for adults to reduce non-response bias resulting from differential non-response at the household level, based on the age and sex profile of the residents and the region in which the household was situated. 88% of adults in participating households were interviewed, and weights were therefore also calculated at an individual level to correct for non-response within participating households.

The sample of children

The sample of children comprised all those aged 0-15 from either the core or boost sample. The weights for the child sample include selection weights for the dwelling unit/household, selection weights for the children in the household, and calibration weighting to adjust the sex and age profile of the achieved sample.

Non-response weighting for the nurse visit and blood samples

Two further weights were calculated for the core sample, as well as weights to allow for non-response at the interview stage. One was to adjust for non-response to the nurse visit, and the second to adjust for non-response for obtaining a blood sample. Further details on the weighting procedures are given in Volume 3, Chapter 7.

1.6.3 Weighted and unweighted data and bases in the report

All 2006 data in this report are weighted. Both weighted and unweighted bases are given in each table. 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 English population, so that data from different columns can be combined in their correct proportions.

Non-response weighting was introduced to the HSE in 2003, and has been used in all subsequent years. In this report, in trend tables that show years with and without non-response weighting, data for the first year where non-response weighting was applied are shown in two rows or columns, one showing unweighted results and the other weighted results. For tables showing trends in children's data, results for years up to 2002 have selection weighting only, and results for 2003-2006 have selection and non-response weighting.

1.6.4 Age as an analysis variable

Age is a continuous variable but results are presented in the report by age groups. Age in Health Survey for England reports always refers to age at last birthday.

1.6.5 Age standardisation

Adult data have been age-standardised throughout the 2006 report to allow comparisons between groups after adjusting for the effects of any differences in their age distributions. When different sub-groups are compared in respect of a variable on which age has an important influence, any differences in age distributions between these sub-groups are likely to affect the observed differences in the proportions of interest.

All results are presented separately for men and women. Age standardisation used the direct standardisation methodology, and was based on the mid-year 2005 population estimates for England, with men standardised to the male population and women to the female population.

1.6.6 Standard analysis breakdowns

For most tables in this report, two standard analysis breakdowns have been used as well as age. The first of these is Government Office Region (GOR) and Strategic Health Authority SHA), and the second is equivalised household income .

Government Office/ Strategic Health Authority

Government Office Region (GOR) is the key classification system used for regional statistics. There are nine Government Office Regions in England: North East, North West, Yorkshire and the Humber, East Midlands, West Midlands, East of England, London, South East and South West. The nine-category system has been used since 1998, although GOR boundaries may change from year to year as they reflect administrative boundaries.

From July 2006 a new configuration of Strategic Health Authorities (SHAs) was introduced in England, reducing the number from 28 to 10 SHAs. The boundaries are the same as those of the Government Office Regions with the exception of the South East, which has been divided into South East Coast SHA and South Central SHA. Tables in the report show the nine GORs to the left of the table, and the final two right hand columns show the South East Coast SHA and South Central SHA.

Both observed and age standardised data are provided by GOR and SHA in the tables. Observed data can be used to examine actual prevalence or mean values within a region; age-standardised data are required for comparisons between areas to exclude age-related effects, and may be discussed in the report text. It should be noted that base sizes for GORs are often relatively small, and caution should be exercised in examining regional differences.

Equivalised household income

The second standard breakdown looks at equivalised household income. Household income was established by means of a show-card (see Volume 3, Appendix A) on which banded incomes were presented. This can be used as an analysis variable, but there has been increasing interest recently in using measures of equivalised income that adjust income to take account of the number of persons in the household. To derive this, each household member is given a score depending, for adults, on the number of adults apart from the household reference person, and, for dependent children, on their age. The total household income is divided by the sum of the scores to provide the measure of equivalised household income. All individuals in each household were allocated to the equivalised household income quintile to which their household had been allocated.

1.6.7 Logistic regression analysis

Logistic regression modelling has been used in a number of chapters to examine the factors associated with selected outcome variables, after adjusting for other predictors. For instance in Volume 1, Chapter 5, regression analyses have been performed to examine the association between having a raised waist circumference (the outcome variable), and a variety of predictor variables including age, physical activity and income. Forward stepwise models have been used for men and women separately. A wide range of possible predictor variables were tested in each model, and any that were significant among men or women were included in the final model in both sexes, as is customary practice in HSE reports. This gives an estimate of the independent effect of each predictor variable on the outcome when all the other independent variables were included in the model.

The results of the regression analyses are presented in tables showing odds ratios for the final models, together with the probability that the association is statistically significant. The predictor variable is significantly associated with the outcome variable if $p<0.05$. The models show the odds of being in the particular category of the outcome variable (e.g. having a raised waist circumference) for each category of the independent variable (e.g. quintiles of equivalised household income). Odds are expressed relative to a reference category, which has a given value of 1. Odds ratios greater than 1 indicate higher odds, and odds ratios less than 1 indicate lower odds. For instance, looking at risk factors associated

with a raised waist circumference, women in the lowest income quintile had an odds ratio of 1.9, and were therefore almost twice as likely to have a raised waist circumference as women in the highest quintile (the reference category). Also shown are the 95% confidence intervals for the odds ratios. Where the interval does not include 1, this category is significantly different from the reference category. Missing values were included in the analyses, that is, people were included even if they did not have a valid answer, score or classification in one or more of the explanatory variables. Where this was a large number of people, the missing values were included as a separate category (e.g. income), and where there were few records with a missing value, these individuals were included with the category containing the largest number of informants (e.g. smoking).

1.6.8 Presentation of results

Commentary in the report highlights differences that are statistically significant at the 95% level. It should be noted that statistical significance is not intended to imply substantive importance.

Key findings from the tables are presented at the beginning of each chapter. Following the chapter introduction and details of methods and definitions, a results section highlights findings of particular interest or from complex analyses, and a discussion section at the end of the chapter makes comparisons with other data sources and trend data, and sets the results in a broader context.

1.6.9 Availability of unpublished data

As with the previous surveys, an anonymised copy of the 2006 Health Survey for England data will be deposited at The Data Archive at the University of Essex. Copies of the data files can be obtained for specific research projects from the Archive: www.data-archive.ac.uk

1.7 Content of this report

This volume is one of two topic reports on the 2006 survey, published as a set as *'The Health Survey for England 2006'*. The published set is presented in three volumes:

1. Cardiovascular disease and risk factors in adults[4]

2. Obesity and other risk factors in children[5]

3. Methodology and Documentation[6]

Volume 3 gives full details of the survey methodology and documentation. This includes a description of the survey design and response rates; sampling errors; analysis of non-response; description of weighting procedures; and information on laboratory techniques and quality control of blood analytes and salivary cotinine. Appendices to Volume 3 are as follows:

Appendix A: Questions asked by interviewers and nurses and copies of other key fieldwork documents

Appendix B: Protocols for measurements

Appendix C: Glossary and definitions

This first volume examines cardiovascular disease among adults in Chapter 2, and subsequent chapters look at associated risk factors: hypertension, diabetes, obesity, physical activity, diet, smoking and drinking.

References and notes

1 Department of Health. *National Service Framework for Coronary Heart Disease. Modern Standards & Service Model*. DH, London, 2000.

2 National Statistics. *Mortality statistics: cause. Review of the Registrar General on deaths by cause, sex and age, in England and Wales, 2005. Series DH2 no. 32*. Office for National Statistics, London, 2007. www.statistics.gov.uk/downloads/theme_health/Dh2_32/DH2_No32_2005.pdf

3 *2007 Pre-budget report and Comprehensive Spending Review*. The Stationery Office, London. October 2007

4 Craig R and Mindell J (eds). *Health Survey for England 2006. Volume 1: Cardiovascular disease and risk factors in adults*. The Information Centre, Leeds, 2008.

5 Craig R and Mindell J (eds). *Health Survey for England 2006. Volume 2: Obesity and other risk factors in children*. The Information Centre, Leeds, 2008.

6 Craig R and Mindell J (eds). *Health Survey for England 2006. Volume 3: Methodology and documentation*. The Information Centre, Leeds, 2008.

Cardiovascular disease

2

Marilyn Roth, Jennifer Mindell

Key findings

- This chapter examines the prevalence of, trends in, and factors associated with cardiovascular diseases (CVD), including ischaemic heart disease (IHD), stroke, and other heart conditions. The use of drugs for primary and secondary prevention is also explored.
- 13.6% of men and 13.0% of women reported having been diagnosed with a cardiovascular condition. The prevalence of IHD or stroke was higher among men than women, with 8.1% of men and 5.6% of women suffering from either or both conditions. The difference between the sexes was most marked among those aged 65 and over, with the prevalence of CVD being approximately twice as high among men as women in the 65-74 age group.
- The prevalence of CVD conditions increased with age for both men and women. The rate of doctor-diagnosed CVD rose sharply for men aged 65 and over (34.1% aged 65-74, 44.4% aged 75 and over) and for women aged 75 and over (36.9%).
- For men and women aged 35 and over, the prevalence of CVD varied by income. Men in the lowest two quintiles of equivalised household income had higher rates of CVD than those in the highest three quintiles, while women in the highest quintile and the lowest two quintiles had higher rates of CVD than those in the second and third quintiles.
- The overall prevalence of grade 1 and grade 2 angina were very similar for both men and women; however, women in younger age groups had higher rates of grade 1 angina than men. There was a higher prevalence of symptoms of possible myocardial infarction among men than women.
- Trends indicate that the prevalence of grade 1 angina fell slightly for both men and women from 1998 to 2006.
- Since 1994, the rate of stroke has increased in both men (1.8% to 2.4%) and women (1.6% to 2.2%), with the majority of this change being attributed to those aged 75 and over. There has also been a substantial increase in IHD or stroke among men (27.7% to 36.9%) and women (20.2% to 27.9%) aged 75 and over.
- 74% of men and 60% of women aged 35 and over who had ever had IHD or stroke took low-dose aspirin. Similarly, 73% of men and 65% of women aged 35 and over who had ever had IHD or stroke took lipid-lowering drugs. These treatment rates were much higher than those among people who had hypertension and/or diabetes but no IHD/stroke, as well as among people who did not suffer from any of these diseases.
- Both men and women with total cholesterol levels below 5 mmol/L had significantly higher rates of CVD, IHD and stroke compared with those with a total cholesterol level 5 mmol/L or more.
- 21% of men and women with diabetes also reported ever having been diagnosed with a CVD condition, compared with 13% of both men and women who did not have diabetes. Rates of IHD and stroke were also significantly higher for men with diabetes, and IHD was higher for women with diabetes.

2.1 Introduction

This chapter introduces the spectrum of diseases that constitute most cardiovascular (also called circulatory) disease (CVD), providing information on the disease burden in England and relevant national policies to address this. Sex-specific prevalence of self-reported doctor-diagnosed common CVD conditions is provided by age, region and income. These are supplemented by prevalence of undiagnosed heart disease as identified by additional questions. As well as examining trends in these over time, the chapter also includes analyses of the use of medication for primary and secondary prevention of CVD. It concludes with a discussion of selected results, comparing them with other sources of data.

CVD is one of the leading contributors to the global disease burden. The single most common cardiovascular disease is ischaemic heart disease (IHD, also called coronary heart disease (CHD) or coronary artery disease (CAD)). IHD includes myocardial infarction (MI, heart attacks) and angina (chest pain on exertion due to inadequate blood flow to the heart muscle). The vast majority of CVD in England is caused by atherosclerosis ('furring' of the arteries). This is not only the case for IHD and for stroke, the two main diseases, but also for aortic aneurysm and peripheral vascular disease, with impaired blood flow to the limbs, as well as for diseases affecting the heart valves (which can also be congenital or caused by rheumatic fever) and abnormal heart rhythms.

CVD death rates in England have been falling but CVD remains the main cause of death, causing 184,000 deaths (up to 88,000 IHD and up to 50,000 stroke deaths) in England and Wales in 2005.[1] CVD also caused 28% of premature deaths (deaths in people under 75) in 2005.[1] The National Service Framework (NSF) for Coronary Heart Disease, launched in 2000, set 12 standards for improved prevention, diagnosis and treatment, and goals to secure fair access to high quality services which were to be implemented over a 10-year period.[2] The government target is to reduce the death rate from CVD in people under 75 by at least 40% from the 1995-97 baseline to 2010 (to 83.8 deaths per 100,000 population).[3] By 2003-05, it had fallen by 35.9%.[4] Progress has also been made on reducing inequalities in mortality over that period, with a 26.4% absolute reduction in the difference between the higher mortality in Spearhead PCTs[5] and the average for England.[4]

In 2005/06, there were 312,164 hospital admissions for IHD, comprising 428,262 hospital episodes[6] (285,358 in people aged under 75),and 99,667 admissions (178,321 episodes) for stroke,[7] with stroke patients occupying 20% of acute and 25% of long-term hospital beds.[8] Each year in England there are 110,000 strokes,[8] of which over 80% occur in people aged 65 and over; about 40% are recurrent strokes.[9] The National Service Framework for Older People has as one of its aims 'to reduce the incidence of stroke in the population and ensure that those who have had a stroke have prompt access to integrated stroke care services'.[10]

Many risk factors for IHD, stroke, and other cardiovascular diseases are known. Information on the prevalence of some of these that can be modified by lifestyle changes, with or without drug treatment, are covered in other chapters in this volume: smoking (chapter 8), insufficient physical activity (chapter 6), a diet low in fruit and vegetables and high in fat and salt (chapter 7), alcohol consumption (chapter 9), obesity (chapter 5), raised blood pressure (chapter 3) or cholesterol (chapter 10), and diabetes (chapter 4). Other risk factors are markers for CVD risk but as yet are not modifiable, for example blood levels of C-reactive protein (CRP, chapter 10). Mortality and morbidity from CVD continues to fall in England year on year, due both to falling incidence (new cases) and reduced case-fatality rates (the proportion of people with a disease who die): it is estimated that 58% of the fall in mortality in England and Wales has been due to reductions in levels of risk factors, while 42% was due to advances in medical care.[11]

Risk factors for stroke are similar to those for IHD[9], though raised blood pressure is more, and smoking and raised cholesterol are less closely associated with stroke, with atrial fibrillation (abnormal heart rhythm) an additional important risk factor for stroke.[9] Intracerebral haemorrhage, which is less common (7%[12]–13% of strokes[13,14]) but more frequently fatal, has different risk factors, although hypertension is again important.

2.2 Methods and definitions

2.2.1 Self-reported doctor-diagnosed disease

Informants were asked whether they suffered from any of the following conditions: angina, heart attack, stroke, heart murmur, abnormal heart rhythm, and (if they responded affirmatively) whether they had even been told they had the condition by a doctor. For the purpose of this report, informants were classified as having a particular condition only if they reported that the diagnosis was confirmed by a doctor. Those informants who reported having a particular condition were also asked if symptoms of the condition had occurred within the past 12 months.

It is also important to note that no attempt was made to verify these self-reported diagnoses objectively. Therefore, the possibility that some misclassification may have occurred exists because some informants may not have remembered (or not remembered correctly) the diagnosis made by their doctor.

2.2.2 Rose Angina Questionnaire

In addition to the self-reported doctor-diagnosed prevalence of angina and heart attack, the Rose Angina Questionnaire was used as an alternative means of estimating the prevalence of angina and heart attack. The Rose Angina Questionnaire was originally developed to identify the characteristic symptom complex known as angina in a standard way, irrespective of medical diagnosis.[15] Its validity has been established predominantly by studies comparing the questionnaire with clinical diagnosis.[16,17]

2.2.3 Weighting

To avoid an over-long interview for informants aged 65 and over, only half of these older people were asked the CVD module. The weighting used in the analyses in this chapter takes this into account (see volume 3, Methodology and documentation, for further details of weighting).

Trends in prevalence of CVD were examined by comparing results from HSE 1994, 1998, and 2003, the other years in which the CVD module was asked of the general population. HSE data in all years have been weighted to adjust for selection probabilities, and since 2003, HSE data have also been weighted for non-response. Results for 2003 have therefore been shown both with selection weighting only (for comparison with earlier years) and with non-response weighting, to permit comparison with results from HSE 2006.

2.2.4 Definitions

Based on the previously mentioned conditions and additional assessment tool (the Rose Angina Questionnaire), the following definitions were used:

Any CVD condition

Informants were classified as having any CVD condition if they reported ever having any of the following conditions confirmed by a doctor: angina, heart attack, stroke, heart murmur, or irregular heart rhythm.

Ischaemic heart disease (IHD)

Informants were classified as having IHD if they reported having angina or a heart attack confirmed by a doctor.

Angina identified by Rose Angina Questionnaire

From the Rose Angina Questionnaire, informants were classified as ever having had angina symptoms based on standard criteria.[18] Angina was then classified as grade 1 or grade 2, grade 2 being more severe.

Possible myocardial infarction identified by Rose Angina Questionnaire

Based on the Rose Angina Questionnaire, informants were classified as having had a possible myocardial infarction (heart attack) if they reported having ever had an attack of severe pain across the front of the chest, lasting for half an hour or more. This is referred to in this report as 'possible myocardial infarction' (irrespective of medical diagnosis).

All tables refer to **ever** having the condition unless otherwise noted.

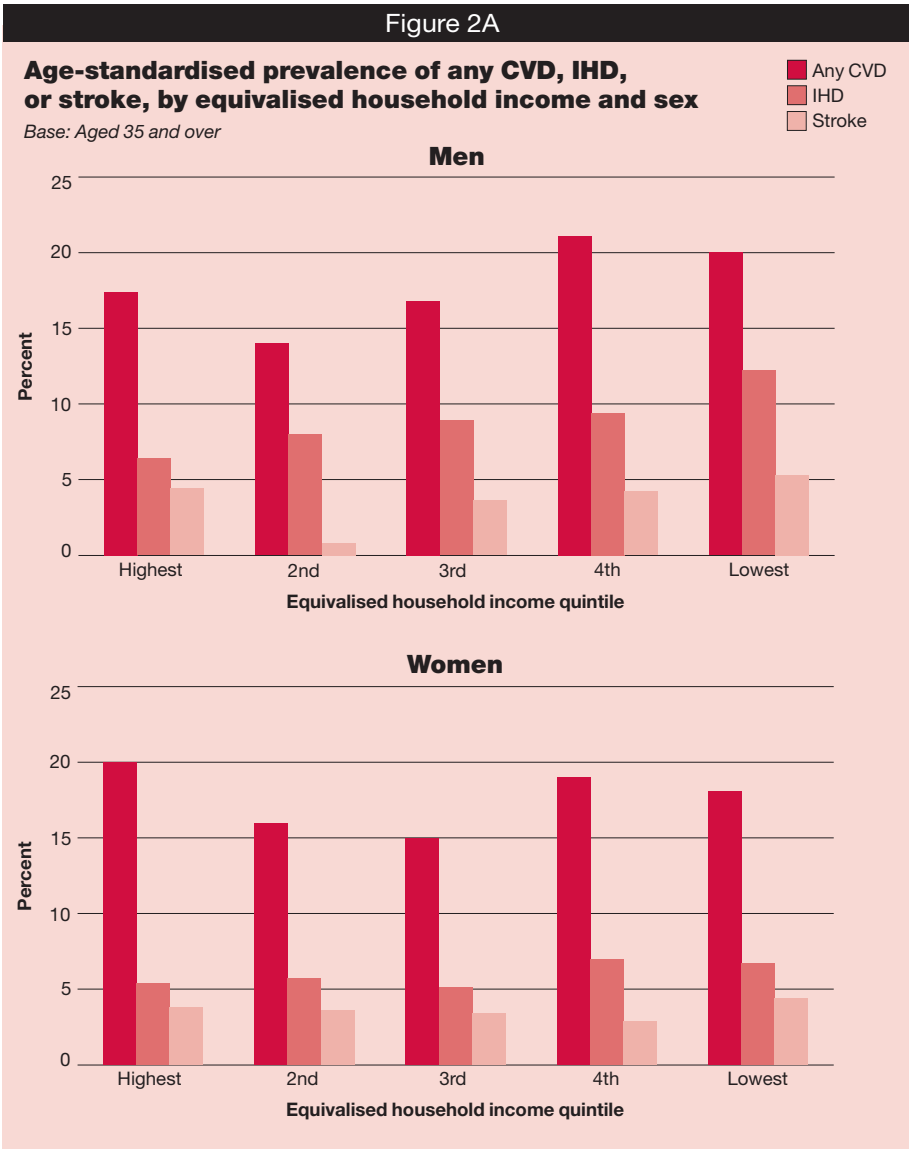
2.3 Results

2.3.1 Doctor-diagnosed CVD

Tables 2.1-2.4 display the prevalence of doctor-diagnosed CVD conditions by age, sex, Government Office Region/Strategic Health Authority, and equivalised household income. The tables indicate that CVD conditions vary by age and sex. Furthermore, the prevalence of any CVD was significantly associated with equivalised household income, as men in the lowest two quintiles had substantially higher rates of CVD compared with those in the top three income quintiles. Among women, those in the highest quintile and the lowest two quintiles had higher rates of CVD than those in the second and third quintiles.

Tables 2.1-2.4, Figure 2A

Figure 2A



2.3.2 Comparison of diagnosed and undiagnosed IHD

Table 2A compares the prevalence of self-reported doctor-diagnosed angina (Table 2.1) with the prevalence of angina from the Rose Angina Questionnaire (Table 2.6). The prevalence of grade 1 angina is significantly higher than the prevalence of self-reported doctor-diagnosed angina for women aged 16-44. However, the prevalence of all angina symptoms (grade 1 plus grade 2) is considerably lower than the prevalence of diagnosed angina in men aged 55 and over and in women aged 65 and over.

Table 2A

Prevalence of angina, by age and sex

Aged 16 and over *2006*

Angina	Age							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Self-reported doctor diagnosis								
Ever	0.1	0.1	0.3	2.4	8.0	14.2	22.7	4.8
In the past 12 months	-	0.1	0.2	1.2	4.4	7.3	8.5	2.3
Rose Angina Questionnaire								
Grade 1 angina	0.5	0.5	0.4	0.7	2.1	2.9	5.4	1.4
Grade 2 angina	-	0.1	0.2	0.7	1.6	2.0	1.6	0.7
All angina symptoms	0.5	0.5	0.7	1.4	3.6	4.9	7.0	2.1
Women								
Self-reported doctor diagnosis								
Ever	0.1	0.1	0.2	1.2	3.2	8.3	15.9	3.3
In the past 12 months	-	0.1	0.1	0.5	2.0	3.9	8.3	1.7
Rose Angina Questionnaire								
Grade 1 angina	1.0	0.6	0.9	1.5	2.7	3.6	1.5	1.6
Grade 2 angina	0.3	0.2	0.4	0.4	0.6	1.5	1.8	0.6
All angina symptoms	1.3	0.8	1.2	1.9	3.3	5.0	3.3	2.2

Table 2B compares the prevalence of self-reported doctor-diagnosed myocardial infarction (Table 2.1) with the prevalence of possible myocardial infarction from the Rose Angina Questionnaire (Table 2.6). Men aged 16-64 and women aged 16-74 have a significantly higher prevalence of possible MI using the estimates from the Rose Angina Questionnaire compared with the self-reported doctor-diagnosed estimates.

Table 2B

Prevalence of myocardial infarction, by age and sex

Aged 16 and over *2006*

Myocardial infarction	Age							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Self-reported doctor diagnosis								
Ever	-	0.2	0.6	2.1	6.3	14.4	16.6	4.1
In the past 12 months	-	-	-	0.2	0.5	1.2	0.6	0.3
Rose Angina Questionnaire								
Symptoms of possible MI	1.5	4.6	6.3	9.0	11.2	13.6	15.9	7.9
Women								
Self-reported doctor diagnosis								
Ever	-	-	0.1	0.7	1.6	3.3	9.1	1.7
In the past 12 months	-	-	0.1	0.3	0.3	-	1.0	0.2
Rose angina Questionnaire								
Symptoms of possible MI	2.6	3.4	4.2	5.1	6.5	7.5	9.2	5.2

Tables 2.1, 2.6

2.3.3 Time trends in IHD, stroke, IHD or stroke, and Rose Angina Questionnaire

The prevalence of stroke in women increased from 1.6% in 1994 to 2.2% in 2006; similarly, the overall rate of stroke in men has risen from 1.8% to 2.4%. Most of this change is accounted for by increases among those aged 75 and over. For men up to the age of 74, the prevalence of IHD, stroke, and IHD or stroke has remained relatively unchanged since 1994, while the respective prevalence rates among men aged 75 and over have risen markedly (stroke 8.6% to 13.1% from 1994 to 2006, and IHD or stroke 27.7% to 36.9%). The same is true for the prevalence of IHD or stroke among women aged 75 and over, which has risen from 20.2% to 27.9%. **Table 2.5, Figure 2B**

Overall trends in grade 2 angina and myocardial infarction identified in the Rose Angina Questionnaire have remained relatively unchanged across all age groups between 1998 and 2006. The only significant change is a decrease in grade 1 angina for both men and women. For men, the prevalence of grade 1 angina has decreased from 1.9% in 1998 to 1.4% in 2006, whereas for women it has decreased from 2.4% to 1.6%. **Table 2.7**

2.3.4 Use of lipid-lowering drugs and aspirin

This section looks at the use of drugs with a strong evidence base for indications in primary and secondary prevention in certain groups. The use of lipid-lowering drugs and of aspirin (taken for its anti-platelet properties, not as an analgesic or anti-inflammatory drug) was examined in three groups of informants:

- Those reporting IHD or stroke;
- Those with survey-defined hypertension or reporting diabetes mellitus but not reporting IHD or stroke; and
- Those with none of these.

Use of lipid-lowering drugs was highest for men and women with self-reported doctor-diagnosed IHD or stroke (73% of men, 65% of women with IHD or stroke, compared with 38% of men, 29% of women with hypertension and/or diabetes mellitus but no IHD or stroke, and 11% of men, 8% of women with none of these diseases). Similarly, men and women with IHD or stroke were also the most likely to be taking low-dose aspirin.

Tables 2.8, 2.9, Figure 2C

Figure 2B

Trends in stroke prevalence, 1994-2006, by age

Base: Aged 16 and over

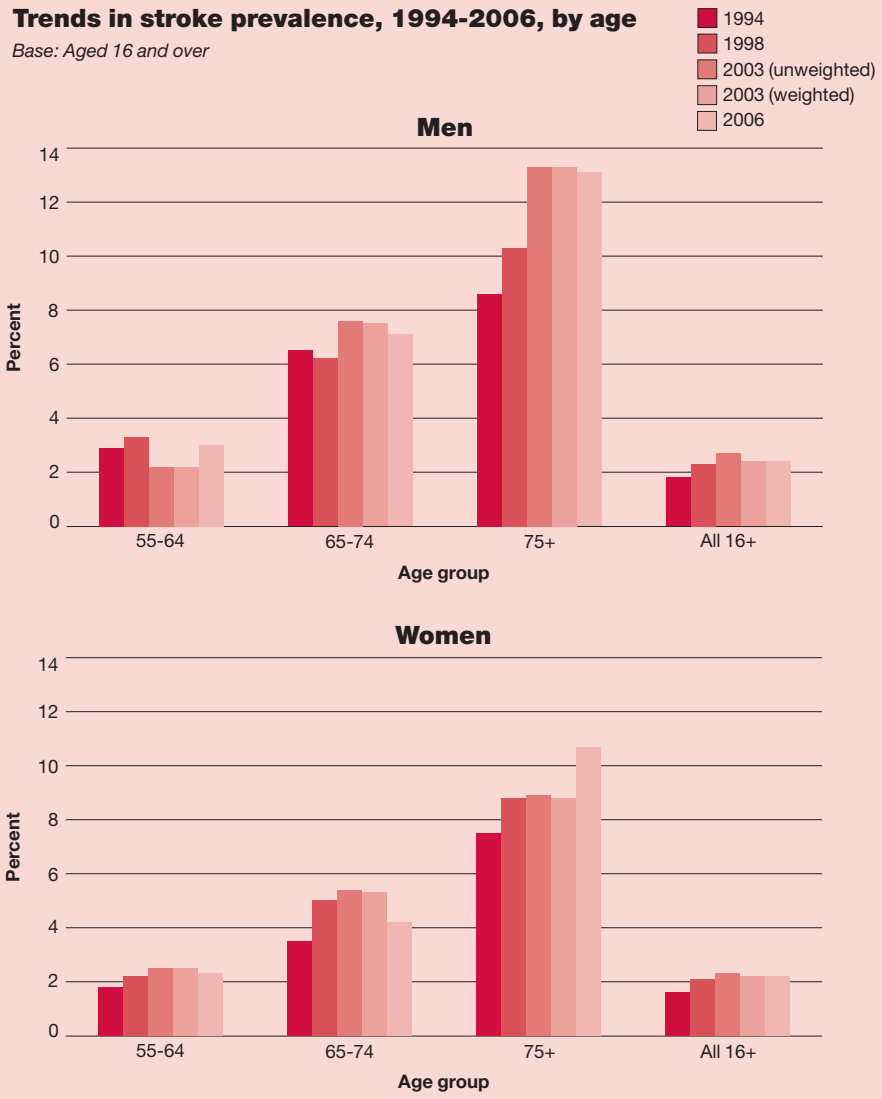


Figure 2C

Prevalence of the use of lipid-lipid lowering drugs and low-dose aspirin, by disease category and sex

Base: Aged 35 and over with a nurse visit

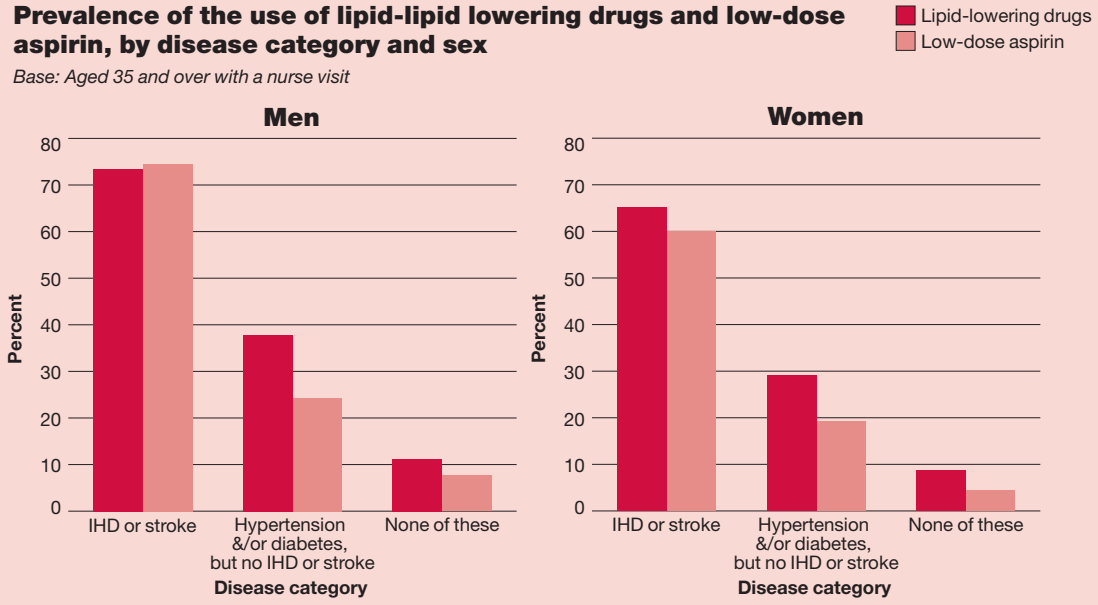
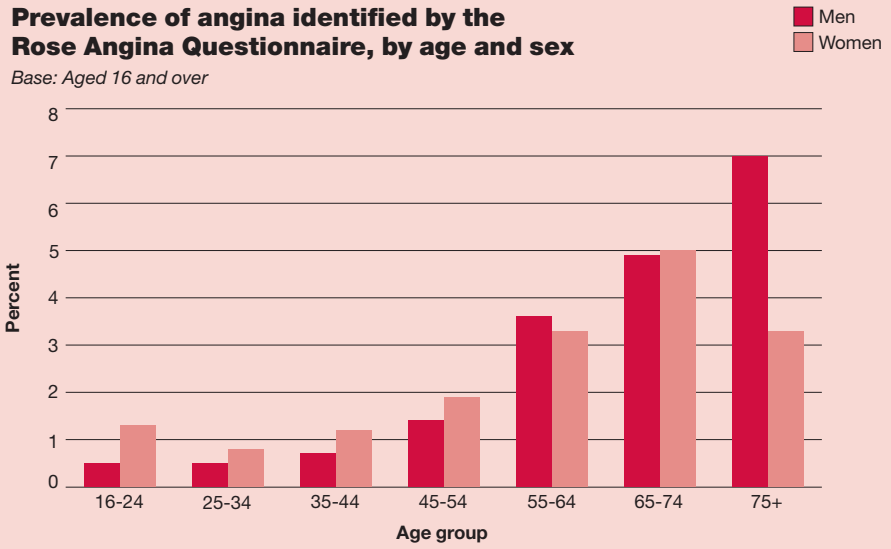


Figure 2D

Prevalence of angina identified by the Rose Angina Questionnaire, by age and sex

Base: Aged 16 and over



2.4 Discussion

2.4.1 Comparison of self-reported doctor-diagnosed CVD with Rose Angina Questionnaire results

It is difficult to estimate the prevalence of undiagnosed angina by comparing the figures in Table 2A. While the prevalence of symptoms identified by the Rose Angina Questionnaire is higher than doctor-diagnosed angina for younger women, prevalences are similar for men up to the age of 54 and women aged 45-64, and levels of doctor-diagnosed disease are considerably higher above these ages. The most likely explanations of the relative deficit in prevalence of angina symptoms from the Rose Angina Questionnaire compared with the rates of diagnosed angina in older middle-age adults are that those reporting doctor-diagnosed angina may no longer have symptoms. This may be either because they have had sufficient medical or surgical treatment to prevent symptoms or because they have modified their lifestyle to avoid provoking symptoms of angina. Using 'ever' diagnosed angina is therefore less relevant to a comparison of current symptoms. However, using 'occurring within the last 12 months' ignores those with angina diagnosed earlier but who have ongoing symptoms.

As with all CVD, men are diagnosed at an earlier age than women. With diminishing differences in smoking rates between men and women, and increasing obesity, especially in women, the higher rates of angina symptoms in younger women may reflect an increasing rate of CVD risk factors in this age group. Identifying distinctions between changes in rates of symptoms and delayed diagnosis because of preconceptions about gender-specific disease rates[19,20] is beyond the scope of this report or these data.

Likewise, it is difficult to estimate the prevalence of undiagnosed myocardial infarction by comparing the figures in Table 2B for reasons similar to those discussed above. **Figure 2D**

2.4.2 Time trends in prevalence of IHD and stroke

For men, the age-specific prevalence of ever having IHD, stroke, and IHD or stroke has remained relatively unchanged since 1994 with the exception of rates among those aged 75 and over. Since 1994, the rates of stroke and of IHD or stroke among both men and women aged 75 years and over have all risen significantly. The overall prevalence of stroke in men and in women and of stroke or IHD in men has risen by a small but significant amount.

2.4.3 Time trends in incidence of IHD and stroke

The National Audit Office reports that incidence of stroke has been falling,[8] although that is not reflected in HSE results (Table 2C). Increases in incidence of stroke in the past 12 months probably therefore reflect increased survival, although case-fatality rates were reported to be unchanged in a recent report.[8]

Table 2C

Trends in incidence of stroke in the past 12 months, 1994-2006, by age and sex

Aged 16 and over *1994-2006*

Self-reported doctor-diagnosed stroke in the past 12 months	Age							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
1994[a]	-	-	-	-	0.5	2.2	2.7	0.5
1998[a]	-	-	-	0.2	0.8	1.4	3.4	0.6
2003[b]	0.1	0.1	-	0.3	0.4	0.4	2.7	0.4
2006[b]	-	-	0.2	0.2	0.4	2.1	3.9	0.6
Women								
1994[a]	-	0.1	-	0.1	0.3	0.4	1.8	0.3
1998[a]	-	0.1	-	0.1	0.7	0.5	1.7	0.4
2003[b]	0.1	-	0.3	0.2	0.2	1.0	1.6	0.4
2006[b]	-	0.1	0.1	0.1	0.5	0.6	2.1	0.4

[a] Selection weighting only.

[b] Weighted for selection and non-response.

2.4.4 Comparison with data from other sources

Primary care (GP) practices have been submitting data to the Quality Management Analysis System (QMAS) since April 2004. These data are used to calculate individual practices' Quality and Outcomes Framework (QOF) achievement to support practice payment processes. Prevalence in 11 disease areas is also available, and for the third year of the QOF (April 2006 to March 2007) used data from 8,372 practices, covering 99.8% of registered patients in England.[21,22]

According to QOF data, the prevalence of CHD (the same as IHD) in England is 3.5% and of stroke is 1.6%.[21] This is lower than the figures from HSE 2006 (5.3% and 2.3% respectively). It should be noted that the prevalence quoted in this HSE report is based on adults aged 16 and over whereas the prevalence in the QOF report is based on all registered patients (of any age). Adjusted QOF rates (assuming that 80% of the population is aged 16 and over and that the number of children with IHD or a stroke is negligible) are 4.4% for IHD and 2.0% for stroke. However, the completeness of the recording of cases for QOF is uncertain. An audit in an Inner London PCT found that 31% of residents aged up to 75 who died of CVD and who were registered with a GP within the PCT had no electronic record of a diagnosis of CVD, diabetes or hypertension, despite 8% having received at least one CVD drug and/or having had a secondary care diagnosis of CVD, and an additional 3% having had probable symptomatic CVD. An additional 4% of the residents who had died prematurely were not registered with a GP.[23]

A recent analysis of the equivalent survey in the USA, NHANES, from 1999-2004, showed a higher prevalence of stroke than in HSE for men aged 35-44 and women aged 35-64 and a higher prevalence among middle-aged women than men (see table 2D below). This has not been found in HSE, but as the American study suggests waist circumference as a factor possibly contributing to this phenomenon, the increasing prevalence of central obesity in England could result in a similar increase in stroke in middle-aged women in England.

Table 2D

Comparison of prevalence of self-reported stroke in England and the USA

Survey and year	Men			Women		
	35-44	45-54	55-64	35-44	45-54	55-64
	%	%	%	%	%	%
NHANES 1999-2004[24]	1.0	1.0	3.0	1.2	2.5	3.4
HSE 2003	0.3	1.2	2.2	0.6	0.9	2.5
HSE 2006	0.5	1.2	3.0	0.4	0.9	2.3

2.4.5 Use of lipid-lowering drugs and aspirin

A sequence of English guidelines since 1987 have reduced the level of total cholesterol defined as 'high', have given more stringent targets to aim for as primary and secondary prevention of CVD, and have extended the range of individuals to be targeted for lipid-lowering therapy.[25,26,27,28,29,30] The most recent recommendation is for people with IHD, stroke, hypertension and diabetes mellitus to have a total cholesterol level below 4.0mmol/l or for it to be reduced by 25%, whichever is lower.[29] This would require virtually all those with these diseases to be taking statins, except for those with other life-threatening diseases or contraindications to these drugs. The guidance is currently being reviewed.[31]

In this chapter, the prevalence of CVD is presented by category of total cholesterol level and the use of lipid-lowering drugs is reported by disease category. Chapter 10 reports on related analyses. Table 10.7 shows cholesterol levels by disease category and age for informants including and excluding those on lipid-lowering treatment. These results support each other. Cholesterol levels have been falling over time. Levels have fallen most markedly among those taking lipid-lowering drugs, primarily those with existing CVD, and to a lesser extent, those at high risk because of existing diabetes or hypertension,[32,33,34] although Table 2.8 shows that substantial numbers in these two categories are still not taking statins.

In the twelve months to March 2007, 41 million prescriptions were issued In England for statins (the most effective and most-used lipid-lowering drugs), costing the NHS £550million. The volume of prescriptions had increased by 16% over the preceding 12 months but the costs increased by only 2%, due to a continuing switch by prescribers to lower cost formulations. The number of prescriptions in 2006 was 36% higher than in 2004 and 24 times as high as in 1994. These 41million prescriptions equate to about 4.2 million individuals in England taking a statin prescribed by their GP for 2 months.[35] The counter-intuitive finding of higher CVD rates among those informants with lower cholesterol is a case of reverse causality. Two-thirds of informants with CVD were taking statins, compared with only one in ten without CVD, hypertension, or diabetes. People with CVD are therefore more likely to have a lower measured blood cholesterol, but this is the result of secondary prevention treatment for their disease. This is analogous to the finding that ex-smokers are more likely to have CVD than current smokers: the former group includes many who stopped smoking because of developing CVD, while the latter group includes those who will not develop CVD despite smoking.

England continues to exceed targets for prescribing secondary prevention medications for patients who have suffered a heart attack. A recent report from the Royal College of Physicians stated that 97% of patients are prescribed aspirin and 96% are prescribed statins.[36] These figures refer to prescription rates on discharge from hospital after an acute MI. As might be expected, the figures for HSE 2006 informants in the community are lower, particularly for women: 74% of men and 60% of women with IHD or stroke report taking aspirin, while for lipid-lowering drugs the figures are 73% and 65% respectively.

References and notes

1 National Statistics. *Mortality statistics: cause. Review of the Registrar General on deaths by cause, sex and age, in England and Wales, 2005. Series DH2 no. 32*. Office for National Statistics, London, 2007. www.statistics.gov.uk/downloads/theme_health/Dh2_32/DH2_No32_2005.pdf

2 Department of Health. *National Service Framework for Coronary Heart Disease. Modern Standards & Service Model*. DH, London, 2000. www.dh.gov.uk/en/Policyandguidance/Healthandsocialcaretopics/Coronaryheartdisease/DH_4108602

3 Department of Health. *Saving Lives: Our Healthier Nation*. The Stationery Office, London, 1999.

4 Department of Health. *Shaping the future progress report 2006. The Coronary Heart Disease National Framework*. DH, London, 2007.

5 Spearhead Primary Care Trusts (PCTs) and non-Spearhead PCTs have been identified as the most health deprived areas in England based on indices of multiple deprivation, mortality from cardiovascular disease and cancer, and life expectancy.

6 An *episode* ('finished consultant episode' or FCE) is defined as a period of admitted patient care under one consultant within one healthcare provider. The figures do not represent the number of patients, as a person may have more than one episode of care within the year.

7 Hospital Episodes Statistics. *DiagnosisS_0506*. Information Centre, Leeds, 2007. www.hesonline.org.uk/Ease/servlet/ContentServer?siteID=1937&categoryID=202 Operations www.hesonline.org.uk/Ease/servlet/ContentServer?siteID=1937&categoryID=210

8 National Audit Office. *Reducing brain damage: Faster access to better stroke care*. HC 452. Department of Health, London, 2005. www.nao.org.uk/publications/nao_reports/05-06/0506452.pdf

9 Carroll K, Murad S, Eliahu J, et al. *Stroke incidence and risk factors in a population-based cohort study*. Office of National Statistics Health Quarterly (12) Winter 2001, 18-26. www.statistics.gov.uk/downloads/theme_health/HSQ12_v2.pdf

10 Department of Health. *National Service Framework for Older People*. DH, London, 2001. www.dh.gov.uk/assetRoot/04/07/12/83/04071283.pdf

11 Unal B, Critchley JA, Capewell S. *Explaining the decline in coronary heart disease mortality in England and Wales between 1981 and 2000*. Circulation. 2004;**109**:1101-7.

12 Rothwell PM, Coull AJ, Silver LE et al for the Oxford Vascular Study. *Population-based study of event-rate, incidence, case fatality, and mortality for all acute vascular events in all arterial territories (Oxford Vascular Study)*. Lancet. 2005; **366**:1773-83.

13 Intercollegiate Stroke Working Party. *National clinical guidelines for stroke. 2nd edition*. Royal College of Physicians, London, 2004. www.rcplondon.ac.uk/pubs/books/stroke/stroke_guidelines_2ed.pdf

14 Wolfe C, Rudd AG, Howard R et al. *Incidence and case fatality rates of stroke subtypes in a multiethnic population: the South London Stroke Register*. J Neurol, Neurosurg, Psych. 2002; **72**:211-6.

15 Rose GA, Blackburn H. *Cardiovascular survey methods*. World Health Organization Monograph 1986; **56**:1-188.

16 Bass EB, Follansbee WP, Orchard TJ. *Comparison of supplemented Rose Angina Questionnaire to exercise tallium testing in men and in women*. J Clin Epidemiol. 1981; **42**: 385-94.

17 Blackwalder WC, Kagan A, Gordon T, Rhoads GG. *Comparisons of methods for diagnosing angina pectoris: the Honolulu heart study*. Int J Epidemiol. 1981; **10**:211-15.

18 Rose defined angina as a chest pain or discomfort with the following characteristics:

1. The site must include *either* the sternum (any level) *or* the left arm and left anterior chest (defined as the anterior chest wall between the levels of clavicle and lower end sternum);
2. It must be provoked by either hurrying or walking uphill (or by walking on the level, for those who never attempt more);
3. When it occurs on walking it must make the subject either stop or slacken pace, unless nitroglycerin is taken;
4. It must disappear on a majority of occasions in 10 minutes or less from the time when the subject stands still.

Grade 1 angina occurs when the subject only experiences the chest pain when walking uphill or hurrying.

Grade 2 angina occurs when the subject experiences the chest pain even when walking at an ordinary pace on the level.

19 Mikhail, GW. *Coronary heart disease in women is underdiagnosed, undertreated, and under-researched*. BMJ. 2005; **331**:467-468.

20 Lawler, DA, Ebrahim, S, Davey Smith, G. *Sex matters: secular and geographical trends in sex differences in coronary heart disease mortality*. BMJ. 2001; **323**:541-545.

21 The Information Centre Prescribing Support Unit. *National Quality and Outcomes Framework Achievement Data for England 2006-07*. The Information Centre, 2007 www.ic.nhs.uk/statistics-and-data-collections/audits-and-performance/qof/qof-2006-07

22 Figures published by the Information Centre are derived from the Quality Management Analysis System (QMAS), a national system developed by NHS Connecting for Health. QMAS uses data from general practices to calculate individual practices' QOF achievement. Users of data derived from QMAS should recognise that QMAS was established as a mechanism to support the calculation of practice QOF payments. It is not a comprehensive source of data on quality of care in general practice, but it is potentially a rich and valuable source of such information, providing that the limitations of the data are acknowledged.

The 2006/07 disease prevalence tables were based on prevalence submissions to QMAS at the end of the 2006/07 financial year. The disease prevalence figures are therefore based on 8,372 general practices. These practices covered 99.8% of registered patients in England (based on registration data from the Prescription Pricing Division of the NHS Business Services Authority for the quarter January to March 2007).

23 Zeuner D, Shaukat M, Kukanova M. *Have people who died from cardiovascular disease previously been recorded on practice disease registers? A retrospective death analysis in an Inner London PCT*. Oral presentation at the Faculty of Public Health Annual Scientific Meeting, Eastbourne, 25-27 June 2007.

24 Towfighi A, Saver JL, Engelhardt R, et al. *A midlife stroke surge among women in the United States*. Neurology. 2007; doi 10.1212/01.wnl.0000268491.89956.c2

25 Betteridge DJ, Dodson PM, Durrington PN, et al. *Management of hyperlipidaemia: guidelines of the British Hyperlipidaemia Association*. Postgrad.Med.J. 1993;**69**:359-369.

26 NHS Executive. *Standing medical advisory committee on use of statins*. London: DH, 1997.

27 British Cardiac Society, *British Hyperlipidaemia Association, British Hypertension Society. Joint British recommendations on prevention of coronary heart disease in clinical practice*. Heart. 1998;80(suppl 2) :S1-29.

28 Department of Health. *National Service Framework for Coronary Heart Disease – Modern Standards and Service Models*. TSO, London, 2000.

29 British Cardiac Society, British Hypertension Society, Diabetes UK, HEART UK, Primary Care Cardiovascular Society, The Stroke Association. JBS 2: *Joint British Societies' guidelines on prevention of cardiovascular disease in clinical practice*. Heart. 2005; **91** (Suppl V):v1-v52.

30 National Institute for Health and Clinical Excellence. *Statins for the prevention of cardiovascular events. Technical appraisal 094*. NICE, London, 2006.

31 National Institute for Health and Clinical Guidance. *Cardiovascular risk assessment: the modification of blood lipids for the primary and secondary prevention of cardiovascular disease. NICE guideline. Draft for consultation, June 2007*. NICE, London, 2007.

32 Colhoun H, Prescott-Clarke P (eds). *Health Survey for England 1994*. London: DH, 1995.

33 Erens B, Primatesta P (eds). *Health Survey for England 1998*. London: TSO, 1999.

34 Primatesta P, Poulter N. *Levels of dyslipidaemia and improvement in its management in England: results from the Health Survey for England 2003.* Clin.Endocrin. 2006;**64**:292-298.

35 National Institute for Health and Clinical Excellence. *NICE implementation uptake report: statins*. London: The Information Centre, 2007.

36 Royal College of Physicians. *Healthier hearts, longer lives*. RCP, London 2007. http://rcplondon.ac.uk/news/news.asp?PR_id=360

Tables

2.1 Prevalence of heart conditions (ever and in the past 12 months), by age and sex

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Table 2.1

Prevalence of heart conditions (ever and in the past 12 months), by age and sex

Aged 16 and over[a] *2006*

CVD conditions	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Angina								
Ever	0.1	0.1	0.3	2.4	8.0	14.2	22.7	4.8
In the past 12 months	-	0.1	0.2	1.2	4.4	7.3	8.5	2.3
Heart attack								
Ever	-	0.2	0.6	2.1	6.3	14.4	16.6	4.1
In the past 12 months	-	-	-	0.2	0.5	1.2	0.6	0.3
Heart murmur								
Ever	2.5	2.3	2.0	2.6	2.5	4.3	6.5	2.8
In the past 12 months	0.4	0.6	0.4	1.1	1.0	2.1	2.5	1.0
Abnormal heart rhythm								
Ever	1.1	2.7	3.1	5.7	6.3	9.8	15.5	5.2
In the past 12 months	0.7	1.2	1.6	2.7	2.7	6.3	7.9	2.7
Stroke								
Ever	-	-	0.5	1.2	3.0	7.1	13.1	2.4
In the past 12 months	-	-	0.2	0.2	0.4	2.1	3.9	0.6
Women								
Angina								
Ever	0.1	0.1	0.2	1.2	3.2	8.3	15.9	3.3
In the past 12 months	-	0.1	0.1	0.5	2.0	3.9	8.3	1.7
Heart attack								
Ever	-	-	0.1	0.7	1.6	3.3	9.1	1.7
In the past 12 months	-	-	0.1	0.3	0.3	-	1.0	0.2
Heart murmur								
Ever	2.7	2.7	3.1	3.3	4.6	5.8	6.4	3.9
In the past 12 months	0.5	0.9	0.9	1.3	2.2	1.8	3.2	1.4
Abnormal heart rhythm								
Ever	2.2	2.6	4.1	5.7	7.3	8.3	13.5	5.8
In the past 12 months	1.1	1.4	1.9	3.2	4.0	4.6	7.5	3.1
Stroke								
Ever	0.2	0.1	0.4	0.9	2.3	4.2	10.7	2.2
In the past 12 months	-	0.1	0.1	0.1	0.5	0.6	2.1	0.4
Bases (unweighted)[b]								
Men	*650*	*862*	*1183*	*1050*	*1126*	*437*	*317*	*5625*
Women	*794*	*1148*	*1494*	*1279*	*1269*	*470*	*471*	*6925*
Bases (weighted)[b]								
Men	*1041*	*1129*	*1356*	*1123*	*1015*	*694*	*496*	*6854*
Women	*1014*	*1160*	*1379*	*1141*	*1050*	*768*	*798*	*7310*

[a] To avoid an over-long interview for informants aged 65 and over, only half of these older people (but all aged 16-64) were asked the CVD module. The weighting used in the analyses in this chapter takes this into account.

[b] Bases shown are for the overall sample. Bases for individual conditions vary but are of a similar magnitude.

Table 2.2

Prevalence of any CVD, IHD[a], stroke, and IHD or stroke, by age and sex

Aged 16 and over[b] — *2006*

Any CVD/IHD/IHD or stroke	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Any CVD	3.2	4.7	5.6	10.9	18.5	34.1	44.4	13.6
IHD	0.1	0.2	0.6	3.6	10.6	20.8	28.6	6.5
Stroke	-	-	0.5	1.2	3.0	7.1	13.1	2.4
IHD or stroke	0.1	0.2	1.0	4.6	12.5	25.1	37.1	8.1
Women								
Any CVD	4.5	5.7	7.8	10.3	15.2	21.2	36.9	13.0
IHD	0.1	0.1	0.3	1.3	3.5	10.0	19.3	4.0
Stroke	0.2	0.1	0.4	0.9	2.3	4.2	10.7	2.2
IHD or stroke	0.3	0.3	0.6	2.1	5.0	12.6	27.9	5.6
Bases (unweighted)[c]								
Men	*650*	*862*	*1183*	*1050*	*1126*	*437*	*317*	*5625*
Women	*794*	*1148*	*1494*	*1279*	*1269*	*470*	*471*	*6925*
Bases (weighted)[c]								
Men	*1041*	*1129*	*1356*	*1123*	*1015*	*694*	*496*	*6854*
Women	*1014*	*1160*	*1379*	*1141*	*1050*	*768*	*798*	*7310*

[a] IHD: Ischaemic heart disease, reported as doctor-diagnosed heart attack or angina.

[b] To avoid an over-long interview for informants aged 65 and over, only half of these older people (but all aged 16-64) were asked the CVD module. The weighting used in the analyses in this chapter takes this into account.

[c] Bases shown are for the overall sample. Bases for individual conditions vary but are of a similar magnitude.

Table 2.3

Prevalence of any CVD, IHD, or stroke, (observed and age-standardised), by Government Office Region/Strategic Health Authority[a] and sex

Aged 35 and over[b] *2006*

Any CVD/IHD/stroke	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
	%	%	%	%	%	%	%	%	%	%	%
Men											
Observed											
Any CVD	26	19	20	15	18	19	16	18	17	16	17
IHD	16	10	10	8	9	10	10	6	9	8	9
Stroke	4	4	4	3	3	3	2	4	4	3	4
Standardised											
Any CVD	24	18	22	15	18	19	19	16	16	16	16
IHD	15	10	12	7	9	10	13	5	8	8	9
Stroke	4	4	5	3	4	3	3	3	4	3	4
Women											
Observed											
Any CVD	20	18	20	15	17	17	11	17	15	15	15
IHD	10	6	8	4	5	6	4	4	5	4	5
Stroke	4	4	4	2	4	3	1	2	4	2	5
Standardised											
Any CVD	20	17	20	15	16	17	13	16	15	15	16
IHD	10	6	7	4	5	6	5	4	5	5	6
Stroke	4	4	4	2	3	4	2	2	4	2	5
Bases (unweighted)[c]											
Men	*209*	*635*	*409*	*398*	*422*	*482*	*421*	*407*	*730*	*355*	*375*
Women	*277*	*747*	*504*	*521*	*539*	*542*	*483*	*522*	*847*	*436*	*411*
Bases (weighted)[c]											
Men	*232*	*665*	*438*	*403*	*485*	*545*	*581*	*507*	*825*	*401*	*424*
Women	*277*	*736*	*508*	*486*	*555*	*566*	*584*	*572*	*843*	*437*	*406*

[a] This table provides data for regional analysis both by Government Office Region (GOR) and the new configuration of Strategic Health Authorities (SHAs) in place from July 2006. The first eight columns represent GORs and SHAs of the same name, while the South East GOR (column nine) is divided into South East Coast SHA and South Central SHA, shown in the final two columns.

[b] To avoid an over-long interview for informants aged 65 and over, only half of these older people (but all aged 16-64) were asked the CVD module. The weighting used in the analyses in this chapter takes this into account.

[c] Bases shown are for the overall sample. Bases for individual conditions vary but are of a similar magnitude.

Table 2.4

Prevalence of any CVD, IHD, or stroke (age-standardised), by equivalised household income and sex

Aged 35 and over[a] *2006*

Any CVD/IHD/stroke	Equivalised household income quintile				
	Highest	2nd	3rd	4th	Lowest
	%	%	%	%	%
Men					
Any CVD	17	14	17	21	20
IHD	6	8	9	9	12
Stroke	4	1	4	4	5
Women					
Any CVD	20	16	15	19	18
IHD	5	6	5	7	7
Stroke	4	4	3	3	4
Bases (unweighted)[b]					
Men	*845*	*782*	*695*	*592*	*470*
Women	*848*	*858*	*841*	*857*	*620*
Bases (weighted)[b]					
Men	*900*	*836*	*800*	*722*	*546*
Women	*788*	*790*	*846*	*998*	*645*

[a] To avoid an over-long interview for informants aged 65 and over, only half of these older people (but all aged 16-64) were asked the CVD module. The weighting used in the analyses in this chapter takes this into account.

[b] Bases shown are for the overall sample. Bases for individual conditions vary but are of a similar magnitude.

Table 2.5

Trends in IHD, stroke, and IHD or stroke, 1994-2006, by age and sex

Aged 16 and over[a] *1994-2006*

Ever had IHD/Stroke/IHD or stroke	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
IHD								
1994	-	0.3	0.5	3.0	10.3	21.0	22.7	6.0
1998	0.1	0.4	0.9	4.3	13.6	20.2	23.4	7.1
2003[b]	-	-	0.9	3.5	11.1	21.5	26.4	7.4
2003[b]	-	-	1.0	3.4	11.1	21.6	26.5	6.4
2006	0.1	0.2	0.6	3.6	10.6	20.8	28.6	6.5
Stroke								
1994	-	0.1	0.1	0.3	2.9	6.5	8.6	1.8
1998	0.1	-	0.4	1.2	3.3	6.2	10.3	2.3
2003[b]	0.1	0.4	0.3	1.2	2.2	7.6	13.3	2.7
2003[b]	0.1	0.4	0.3	1.2	2.2	7.5	13.3	2.4
2006	-	-	0.5	1.2	3.0	7.1	13.1	2.4
IHD or stroke								
1994	-	0.3	0.6	3.2	12.3	25.0	27.7	7.1
1998	0.2	0.4	1.3	5.1	15.4	24.2	29.9	8.5
2003 [b]	0.1	0.4	1.2	4.2	12.6	25.7	34.0	9.1
2003[b]	0.1	0.4	1.3	4.2	12.7	25.8	34.1	7.9
2006	0.1	0.2	1.0	4.6	12.5	25.1	37.1	8.1
Women								
IHD								
1994	0.2	0.1	0.3	2.3	5.9	10.5	15.9	4.1
1998	-	0.3	0.6	1.8	6.3	12.5	18.4	4.6
2003[b]	0.2	-	0.4	2.0	5.9	9.7	18.4	4.5
2003[b]	0.3	-	0.5	1.9	5.8	9.7	18.1	4.1
2006	0.1	0.1	0.3	1.3	3.5	10.0	19.3	4.0
Stroke								
1994	-	0.2	0.3	0.6	1.8	3.5	7.5	1.6
1998	0.4	0.4	0.6	0.7	2.2	5.0	8.8	2.1
2003[b]	0.2	0.3	0.6	0.9	2.5	5.4	8.9	2.3
2003[b]	0.2	0.3	0.6	0.9	2.5	5.3	8.8	2.2
2006	0.2	0.1	0.4	0.9	2.3	4.2	10.7	2.2
IHD or stroke								
1994	0.2	0.3	0.5	2.8	7.5	13.4	20.2	5.2
1998	0.4	0.7	1.2	2.6	8.1	15.6	24.7	6.2
2003[b]	0.4	0.3	0.9	2.9	7.8	13.9	25.0	6.3
2003[b]	0.5	0.3	0.9	2.7	7.7	13.8	24.7	5.8
2006	0.3	0.3	0.6	2.1	5.0	12.6	27.9	5.6
Bases (unweighted)[b,c]								
Men 1994	*968*	*1434*	*1329*	*1127*	*1001*	*877*	*441*	*7177*
Men 1998	*875*	*1338*	*1305*	*1289*	*987*	*837*	*562*	*7193*
Men 2003	*746*	*1025*	*1263*	*1101*	*1103*	*807*	*557*	*6602*
Men 2006	*650*	*862*	*1183*	*1050*	*1126*	*437*	*317*	*5625*
Women 1994	*1080*	*1723*	*1520*	*1300*	*1059*	*1120*	*825*	*8627*
Women 1998	*1006*	*1630*	*1573*	*1484*	*1148*	*967*	*907*	*8715*
Women 2003	*890*	*1285*	*1618*	*1279*	*1307*	*952*	*903*	*8234*
Women 2006	*794*	*1148*	*1494*	*1279*	*1269*	*470*	*471*	*6925*
Bases (weighted)[b]								
Men 2003	*1047*	*1274*	*1416*	*1185*	*1043*	*731*	*507*	*7202*
Men 2006	*1041*	*1129*	*1356*	*1123*	*1015*	*694*	*496*	*6854*
Women 2003	*1034*	*1285*	*1440*	*1200*	*1074*	*816*	*785*	*7634*
Women 2006	*1014*	*1160*	*1379*	*1141*	*1050*	*768*	*798*	*7310*

[a] To avoid an over-long interview for informants aged 65 and over, only half of these older people (but all aged 16-64) were asked the CVD module. The weighting used in the analyses in this chapter takes this into account.

[b] Data for 1994 and 1998 are unweighted. From 2003 data have been weighted for non-response. For 2003, two rows of data are shown: one unweighted, and one with non-response weighting (shaded).

[c] Bases shown are for the overall sample. Bases for individual conditions vary but are of a similar magnitude.

Table 2.6

Prevalence of angina and myocardial infarction symptoms (using the Rose Angina Questionnaire), by age and sex

Aged 16 and over[a] *2006*

Angina or myocardial infarction (MI) symptoms	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Grade 1 angina	0.5	0.5	0.4	0.7	2.1	2.9	5.4	1.4
Grade 2 angina	-	0.1	0.2	0.7	1.6	2.0	1.6	0.7
All angina symptoms	0.5	0.5	0.7	1.4	3.6	4.9	7.0	2.1
Symptoms of possible MI	1.5	4.6	6.3	9.0	11.2	13.6	15.9	7.9
Women								
Grade 1 angina	1.0	0.6	0.9	1.5	2.7	3.6	1.5	1.6
Grade 2 angina	0.3	0.2	0.4	0.4	0.6	1.5	1.8	0.6
All angina symptoms	1.3	0.8	1.2	1.9	3.3	5.0	3.3	2.2
Symptoms of possible MI	2.6	3.4	4.2	5.1	6.5	7.5	9.2	5.2
Bases (unweighted)								
Men	*650*	*862*	*1183*	*1050*	*1126*	*437*	*317*	*5625*
Women	*794*	*1148*	*1494*	*1279*	*1269*	*470*	*471*	*6925*
Bases (weighted)								
Men	*1041*	*1129*	*1356*	*1122*	*1015*	*694*	*496*	*6854*
Women	*1014*	*1160*	*1379*	*1141*	*1050*	*768*	*798*	*7310*

[a] To avoid an over-long interview for informants aged 65 and over, only half of these older people (but all aged 16-64) were asked the CVD module. The weighting used in the analyses in this chapter takes this into account.

Table 2.7

Trends in angina and MI (using the Rose Angina Questionnaire), 1998-2006, by age and sex

Aged 16 and over[a] *1998, 2003, 2006*

Angina or myocardial infarction (MI) symptoms	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Grade 1 angina								
1998	0.7	0.6	0.8	1.6	2.3	4.1	5.9	1.9
2003[b]	0.8	0.3	1.1	0.8	2.6	3.5	3.1	1.6
2003[b]	0.7	0.3	1.2	0.7	2.6	3.4	3.1	1.5
2006	0.5	0.5	0.4	0.7	2.1	2.9	5.4	1.4
Grade 2 angina								
1998	0.1	-	0.3	0.9	1.5	1.2	1.4	0.7
2003[b]	-	-	0.2	0.6	1.7	1.1	2.0	0.7
2003[b]	-	-	0.3	0.7	1.7	1.1	1.9	0.7
2006	-	0.1	0.2	0.7	1.6	2.0	1.6	0.7
Symptoms of possible MI								
1998	3.2	5.2	6.9	8.5	13.9	14.2	11.9	8.6
2003[b]	2.4	4.2	5.1	8.8	10.5	13.0	16.3	8.1
2003[b]	2.3	4.0	5.2	8.7	10.5	12.8	16.4	7.5
2006	1.5	4.6	6.3	9.0	11.2	13.6	15.9	7.9
Women								
Grade 1 angina								
1998	0.8	1.8	1.3	2.4	3.1	5.1	3.9	2.4
2003[b]	1.0	0.8	0.9	1.6	2.1	3.2	3.8	1.8
2003[b]	1.0	0.8	0.8	1.5	2.0	3.2	3.8	1.7
2006	1.0	0.6	0.9	1.5	2.7	3.6	1.5	1.6
Grade 2 angina								
1998	0.1	0.2	0.3	0.2	1.7	1.7	2.0	0.7
2003[b]	0.1	0.1	0.4	0.5	1.5	0.8	1.4	0.7
2003[b]	0.1	0.1	0.4	0.5	1.5	0.8	1.4	0.6
2006	0.3	0.2	0.4	0.4	0.6	1.5	1.8	0.6
Symptoms of possible MI								
1998	2.9	3.3	4.6	5.5	7.9	7.7	9.6	5.6
2003[b]	3.5	2.8	4.5	3.8	6.8	6.7	8.6	5.1
2003[b]	3.7	2.7	4.5	3.8	6.8	6.7	8.5	5.0
2006	2.6	3.4	4.2	5.1	6.5	7.5	9.2	5.2
Bases (unweighted)								
Men 1998	*874*	*1337*	*1303*	*1283*	*984*	*837*	*562*	*7180*
Men 2003	*746*	*1025*	*1263*	*1101*	*1103*	*807*	*557*	*6602*
Men 2006	*650*	*862*	*1183*	*1050*	*1126*	*437*	*317*	*5625*
Women 1998	*1006*	*1628*	*1571*	*1481*	*1147*	*967*	*904*	*8704*
Women 2003	*890*	*1285*	*1618*	*1279*	*1307*	*952*	*903*	*8234*
Women 2006	*794*	*1148*	*1494*	*1279*	*1269*	*470*	*471*	*6925*
Bases (weighted)								
Men 2003	*1047*	*1274*	*1416*	*1185*	*1043*	*731*	*507*	*7202*
Men 2006	*1041*	*1129*	*1356*	*1122*	*1015*	*694*	*496*	*6854*
Women 2003	*1034*	*1285*	*1440*	*1200*	*1074*	*816*	*785*	*7634*
Women 2006	*1014*	*1160*	*1379*	*1141*	*1050*	*768*	*798*	*7310*

[a] To avoid an over-long interview for informants aged 65 and over, only half of these older people (but all aged 16-64) were asked the CVD module. The weighting used in the analyses in this chapter takes this into account.

[b] Data for 1998 are weighted. From 2003 data have been unweighted for non-response. For 2003, two rows of data are shown: one unweighted, and one with non-response weighting (shaded).

Table 2.8

Prevalence of the use of lipid-lowering drugs, by disease category, age and sex

Aged 35 and over with a nurse visit by disease category[a] *2006*

Use of lipid-lowering drugs by disease category	Age group				Total
	35-54	55-64	65-74	75+	
	%	%	%	%	%
Men					
Use of lipid-lowering drugs					
IHD[b] or stroke	[53]	80	82	66	73
HT[c] and/or DM[d] but no IHD/stroke	30	38	41	44	38
None of these	7	12	23	[10]	11
Women					
Use of lipid-lowering drugs					
IHD[b] or stroke	e	[72]	[73]	63	65
HT[c] and/or DM[d] but no IHD/stroke	15	34	35	29	29
None of these	2	11	15	[29]	8
Bases (unweighted)					
Men (IHD or stroke)	*40*	*111*	*80*	*81*	*312*
Men (HT/DM, no IHD/stroke)	*192*	*223*	*125*	*92*	*632*
Men (None of these)	*251*	*137*	*56*	*30*	*474*
Women (IHD or stroke)	*24*	*49*	*44*	*89*	*206*
Women (HT/DM, no IHD/stroke)	*209*	*269*	*155*	*132*	*765*
Women (None of these)	*577*	*261*	*61*	*42*	*941*
Bases (weighted)					
Men (IHD or stroke)	*39*	*94*	*123*	*126*	*382*
Men (HT/DM, no IHD/stroke)	*207*	*191*	*197*	*143*	*737*
Men (None of these)	*265*	*119*	*87*	*46*	*517*
Women (IHD or stroke)	*22*	*38*	*68*	*168*	*296*
Women (HT/DM, no IHD/stroke)	*186*	*208*	*253*	*256*	*903*
Women (None of these)	*500*	*203*	*99*	*79*	*881*

[a] To avoid an over-long interview for informants aged 65 and over, only half of these older people (but all aged 16-64) were asked the CVD module. The weighting used in the analyses in this chapter takes this into account.

[b] IHD: Ischaemic heart disease.

[c] HT: Hypertension, defined as SBP≥ 140 mmHg or DBP≥ 90 mmHg or on medication to reduce blood pressure.

[d] DM: Self-reported doctor-diagnosed diabetes.

[e] Results not shown due to small base.

Table 2.9

Prevalence of the use of low-dose aspirin, by disease category, age and sex

Aged 35 and over with a nurse visit by disease category[a] *2006*

Use of low-dose aspirin by disease category	Age group				Total
	35-54	55-64	65-74	75+	
	%	%	%	%	%
Men					
Use low-dose aspirin					
IHD[b] or stroke	[70]	74	82	69	74
HT[c] and/or DM[d] but no IHD/stroke	19	22	25	34	24
None of these	2	7	19	[20]	8
Women					
Use low-dose aspirin					
IHD[b] or stroke	e	[60]	[62]	63	60
HT[c] and/or DM[d] but no IHD/stroke	9	15	21	29	19
None of these	1	5	10	[22]	5
Bases (unweighted)					
Men (IHD or stroke)	*40*	*111*	*80*	*81*	*312*
Men (HT/DM, no IHD/stroke)	*192*	*223*	*125*	*92*	*632*
Men (None of these)	*251*	*137*	*56*	*30*	*474*
Women (IHD or stroke)	*24*	*49*	*44*	*89*	*206*
Women (HT/DM, no IHD/stroke)	*209*	*269*	*155*	*132*	*765*
Women (None of these)	*577*	*261*	*61*	*42*	*941*
Bases (weighted)					
Men (IHD or stroke)	*39*	*94*	*123*	*126*	*382*
Men (HT/DM, no IHD/stroke)	*207*	*191*	*197*	*143*	*737*
Men (None of these)	*265*	*119*	*87*	*46*	*517*
Women (IHD or stroke)	*22*	*38*	*68*	*168*	*296*
Women (HT/DM, no IHD/stroke)	*186*	*208*	*253*	*256*	*903*
Women (None of these)	*500*	*203*	*99*	*79*	*881*

[a] To avoid an over-long interview for informants aged 65 and over, only half of these older people (but all aged 16-64) were asked the CVD module. The weighting used in the analyses in this chapter takes this into account.

[b] IHD: Ischaemic heart disease.

[c] HT: Hypertension, defined as SBP≥ 140 mmHg or DBP≥ 90 mmHg or on medication to reduce blood pressure.

[d] DM: Self-reported doctor-diagnosed diabetes.

[e] Results not shown due to small base.

Table 2.10

Prevalence of CVD, IHD, or stroke (observed and age-standardised), by hypertension and sex

Aged 16 and over with three valid BP measurements[a] *2006*

Any CVD/IHD or stroke	Hypertensive[b]			
	Men		Women	
	No	Yes	No	Yes
Observed				
Any CVD	10	23	10	23
IHD	4	12	2	10
Stroke	1	5	1	5
Standardised				
Any CVD	13	15	12	17
IHD	6	6	4	4
Stroke	2	3	2	2
Bases (unweighted)	*2327*	*1111*	*3201*	*1055*
Bases (weighted)	*2885*	*1300*	*3264*	*1238*

[a] To avoid an over-long interview for informants aged 65 and over, only half of these older people (but all aged 16-64) were asked the CVD module. The weighting used in the analyses in this chapter takes this into account.

[b] Survey-defined hypertension: SBP ≥ 140 mmHg or DBP ≥ 90 mmHg or on medication to reduce blood pressure.

Table 2.11

Prevalence of CVD, IHD, or stroke (observed and age-standardised), by diabetes and sex

Aged 16 and over[a] *2006*

Any CVD/IHD or stroke	Diabetes			
	Men		Women	
	No	Yes	No	Yes
Observed				
Any CVD	12	36	12	30
IHD	6	22	3	18
Stroke	2	9	2	4
Standardised				
Any CVD	13	21	13	21
IHD	6	12	4	10
Stroke	2	5	2	2
Bases (unweighted)	*5318*	*307*	*6667*	*255*
Bases (weighted)	*6471*	*384*	*6997*	*308*

[a] To avoid an over-long interview for informants aged 65 and over, only half of these older people (but all aged 16-64) were asked the CVD module. The weighting used in the analyses in this chapter takes this into account.

Table 2.12

Prevalence of CVD, IHD, or stroke (observed and age-standardised), by cholesterol levels and sex

Aged 16 and over with a valid blood cholesterol measurement[a] *2006*

Any CVD/IHD or stroke	Total cholesterol levels			
	Men		Women	
	<5.0 mmol/l	≥5.0 mmol/l	<5.0 mmol/l	≥5.0 mmol/l
	%	%	%	%
Observed				
Any CVD	16	10	13	12
IHD	11	2	5	3
Stroke	3	1	2	2
Standardised				
Any CVD	16	10	17	11
IHD	11	2	7	3
Stroke	3	1	3	1
Bases (unweighted)	*1135*	*1883*	*1254*	*2337*
Bases (weighted)	*1565*	*2047*	*1486*	*2368*

[a] To avoid an over-long interview for informants aged 65 and over, only half of these older people (but all aged 16-64) were asked the CVD module. The weighting used in the analyses in this chapter takes this into account.

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Hypertension

3

Moushumi Chaudhury

Key findings

- This chapter looks at the prevalence of hypertension in English adults aged 16 and over. Detection, treatment and control rates are also reported.
- In 2001 the NHS funded 90 million prescription drugs to treat people with high blood pressure. This accounted for almost 15% of the total annual cost of all drugs prescribed in primary care. NICE has estimated that 40% of adults in England and Wales are hypertensive; this increases with age. It has been estimated that a small drop in mean population systolic blood pressure of 2 mmHg could save up to 14,000 lives in the UK per year.
- Overall, the prevalence of survey-defined hypertension (at least 140 mmHg systolic and/or at least 90 mmHg diastolic blood pressure or on treatment for hypertension) in HSE 2006 was 31% in men and 28% in women. It increased substantially with age for both men and women. Prevalence was higher among men than women up to age 64.
- The age-standardised prevalence of hypertension was significantly inversely related to quintile of equivalised household income among women. Hypertension was not related to income in men.
- Compared with 2003, the proportion of those in the general population in 2006 with hypertension decreased for both sexes (32% to 31% among men and 30% to 28% among women). Similarly, the proportion of people with untreated hypertension decreased from 2003 to 2006 for both sexes (20% to 18% among men and 16% to 13% among women). Concomitantly, the proportion of men and women with controlled hypertension increased since 2003 (5% to 7% in men and 6% to 8% in women).
- Over half of men and two-thirds of women with survey-defined hypertension (55% and 66% respectively) reported doctor-diagnosed hypertension. Treatment rates were estimated by examining the proportion of those defined as having hypertension who were on treatment at the time of the survey. 42% of men and 54% of women who had survey-defined hypertension were on treatment to reduce their blood pressure.
- Half of those treated for hypertension had a measured BP below 140/90mmHg (52% for both sexes), indicating control of the blood pressure.
- A higher proportion of men with controlled hypertension were taking two or more drugs (64%) than the proportion of men with uncontrolled hypertension (54%). This was not found in women.
- The class of antihypertensive medication used did not vary significantly between those with controlled or uncontrolled hypertension, except that more men with controlled blood pressure were taking a diuretic.

3.1 Introduction

This chapter reports on the prevalence of hypertension (high blood pressure) in the adult English population aged 16 and over. Variations in adults' hypertension rates are analysed in relation to socio-demographic characteristics, and additional analysis reports the detection, treatment and control of hypertension and the use of antihypertensive drugs in HSE 2006 participants. Prevalence of hypertension in HSE 2006 was compared with adult hypertension rates in HSE 2003 and with clinical data routinely collected in the UK.

There is a range of reasons that cause hypertension, including age, family history, race, tobacco use, excessive alcohol consumption, physical inactivity, and increased levels of stress. Hypertension is defined as sustained raised blood pressure and it should be noted that in the Health Survey for England (HSE), measurements of blood pressure are only taken at one point in time.

Hypertension is estimated to cause 11% of loss of healthy life, and is the second most important preventable cause of premature death in economically developed countries.[1] Hypertension plays a primary role in the development of cerebrovasular disease, ischaemic heart disease and renal disease.[1] NICE has estimated that 40% of adults in England and Wales have hypertension, using the threshold of 140/90 mmHg, and this proportion increases with age.[2] It has been estimated that a slight reduction in adults' systolic blood pressure (SBP), 2 mmHg, would save more than 14,000 UK lives per year.[3] An overview of randomised control trials showed that a reduction of 5-6 mmHg in blood pressure sustained over a five year period reduced coronary events by 20-25% and strokes by 35-40% in patients with ischaemic heart disease in five years.[4]

The detailed 2004 guidelines from the British Hypertension Society still stand as the UK guidelines for detection and treatment of hypertension. They state that antihypertensive therapy should be initiated in people with sustained levels of SBP at or greater than 160 mmHg or diastolic blood pressure (DBP) at or greater than 100 mmHg. In people with SBP levels of between 140 and 159 mmHg and/or DBP between 90 and 99 mmHg, drug treatment should be decided on the basis of presence or absence of CVD or diabetes, other target organ damage (e.g. kidney) or an estimated CVD risk of 20% or more over 10 years.[5] The guidance recommends the use of more than one drug if blood pressure is otherwise not well controlled, and advises on choice of drug(s) by age and ethnicity.[6] The guidance was updated in 2006, jointly by the British Hypertension Society and NICE, to reduce the use of beta-blockers because of the risk of precipitating diabetes.[2]

Guidelines for defining and treating hypertension vary internationally.[7,8,9] For example in the US, irrespective of risk status, people with a SBP of 140 mmHg or DBP 90 mmHg or greater are currently regarded as candidates for treatment. Patients with renal disease, diabetes and CVD are recommended treatment if their BP exceeds 130/85 mmHg. Guidelines set in Canada in the 1990s recommended treatment at 160/100 mmHg in 'low-risk' individuals, decreasing to 140/90 mmHg in patients with diabetes and renal disease,[10] very similar to current British guidance. A number of European guidelines have been promulgated, broadly consistent with the World Health Organization/International Society for Hypertension. This sets 150/95 mmHg as the threshold for treating low risk individuals, decreasing to 130/85 mmHg in those with diabetes and renal disease.

3.2 Methods and definitions

3.2.1 Measurements

In HSE 2003 a new oscillometric automated device, the Omron HEM 907, was introduced to measure blood pressure in the HSE, as a replacement for the Dinamap 8100, which had become obsolete. Use of the Omron continues in this year's survey.

The definition of hypertension used in the HSE, based on blood pressure levels and medication, has also changed. Prior to HSE 2003, taking any medication which *may affect*

blood pressure was used in the definition, whereas from HSE 2003 onwards, taking medication *for* high blood pressure has been used in the definition (see section 3.2.2 below). Comparisons over time are therefore made only with results from HSE 2003.

The protocol for the measurement of blood pressure has remained unchanged. As in previous years, three blood pressure readings were taken, at one-minute intervals, using an appropriately sized cuff on the right arm, with the informant in a seated position after five minutes' rest. Systolic and diastolic pressures were displayed on the Omron from each measurement. As in 2003, informants were excluded if they were pregnant.

The blood pressure variables used in this chapter are the means of the second and third measurements obtained from the informants in whom three readings were successfully obtained, excluding those who had eaten, drunk alcohol, exercised, or smoked in the 30 minutes before the measurement was taken.

3.2.2 Classification of blood pressure levels

The levels of blood pressure used to define hypertension in HSE 2006 are in accordance with the latest guidelines on hypertension management.[2] Adult informants were classified in one of four groups on the basis of their SBP and DBP readings and their current use of anti-hypertensive medication.

Normotensive untreated	SBP<140 mmHg and DBP<90 mmHg , not currently taking medication specifically prescribed to treat high blood pressure
Hypertensive controlled	SBP<140 mmHg and DBP<90 mmHg, currently taking medication specifically prescribed to treat their high blood pressure
Hypertensive uncontrolled	SBP≥140 mmHg or DBP≥90 mmHg, currently taking medication specifically prescribed to treat their high blood pressure
Hypertensive untreated	SBP≥140 mmHg or DBP≥90 mmHg, not currently taking medication specifically prescribed to treat their high blood pressure

The last three categories together are considered as 'hypertensive' for the purpose of this report.

The threshold of 140/90 mmHg used in Heath Survey for England (HSE) is in accordance with the guidelines on hypertension management.[2,5]

An additional more severe category of 'hypertensive untreated (160/100)' has also been defined and is used in the report, as treatment is always indicated for persistent hypertension at this level (as explained above in section 3.1).

3.2.3 Definitions of detection, treatment, and control

The definition of hypertension described so far is based on the measurements taken during the HSE nurse visit. In addition, informants with self-reported doctor-diagnosed hypertension were defined as those who said during the interview that they had been told by a doctor or nurse that they had high blood pressure. This was asked in the CVD module of questions. To avoid an over-long interview for informants aged 65 and over in 2006, the CVD module was asked of only half of this age group, but all aged 16–64, and the results were weighted accordingly.

The detection of hypertension was estimated by examining the proportion reporting doctor-diagnosed hypertension, among those with hypertension according to the survey definition (at least 140/90 mmHg or on treatment for hypertension).

Treatment rates were estimated by examining the proportion of all those defined as having hypertension who were on treatment for this at the time of the survey.

The control of hypertension was estimated by calculating, among those on treatment for hypertension at the time of the survey, the proportion with measured BP below 140/90 mmHg.

3.3 Results

3.3.1 Prevalence of hypertension by sex and age

Prevalence of survey-defined hypertension increased with age in men and women. Prevalence was higher among men than women up to age 64. Figure 3A shows the proportion of men and women in each age-group whose hypertension was treated and controlled, treated but not controlled, or untreated. This last group was the largest in each age and sex group. **Table 3.2, Figure 3A**

Figure 3A

3.3.2 Prevalence of hypertension by equivalised household income

Table 3.4 shows the age standardised prevalence of hypertension by equivalised household income among men and women. Prevalence of hypertension varied significantly between the highest and bottom two equivalised income quintiles among women but not among men. **Table 3.4**

3.3.3 Prevalence, detection, and treatment of hypertension

Table 3.6 compares the population prevalence of self-reported doctor-diagnosed hypertension with survey-defined hypertension in all HSE 2006 informants. Prevalence of survey-defined hypertension was higher than self-reported hypertension. **Table 3.6**

Table 3.7 shows the detection rate of hypertension, i.e. the proportion with self-reported doctor-diagnosed hypertension among informants with survey-defined hypertension. The detection rate among men increased significantly with age from under a quarter aged 16-34 to half aged 35-54 and three-fifths of those aged 55 and over. Hypertension was rare among women aged under 35 but detection rates thereafter were a little higher in women than in men.

Figure 3B

Detection and treatment of hypertension among informants with survey-defined hypertension, by age and sex

Base: Aged 16 and over with survey-defined hypertension

Note: Data not shown for women aged 16-34 because of small base sizes.

The treatment rate (the proportion of informants with survey-defined hypertension who were on treatment) was significantly lower than the detection rate for men under 65 and women under 75. Overall among informants with survey-defined hypertension, 55% of men and 66% of women reported a diagnosis of hypertension and 42% of men and 54% of women were on medication. It should be noted that some informants reported doctor-diagnosed hypertension although they were not identified as hypertensive according to the survey definition; these individuals are not included in Table 3.7. **Table 3.7, Figure 3B**

Around half of men on anti-hypertensive medication had controlled blood pressure, regardless of age. Among women, however, the proportion with controlled blood pressure fell with age from 64% among those aged 35-54 to 42% in those aged 75 and over. **Table 3.8**

Among men on treatment for hypertension, those with controlled blood pressure were more likely to be on two or more drugs (64%) than were men with uncontrolled hypertension (54%). This pattern was not found in women. Comparing the class of anti-hypertensive medication used to treat hypertension between informants whose blood pressure was controlled or uncontrolled, there was no variation for ace inhibitors, beta blockers and calcium blockers. However more men with controlled blood pressure were taking diuretics.

Table 3.9

3.4 Discussion

3.4.1 Interpretation of results

The definition of hypertension used for clinical purpose is based on 'sustained' levels of high blood pressure. HSE measures blood pressure at one point in time only, since no repeated measurements are possible, and the survey definition of hypertension will include some whose BP may not be high when checked later by healthcare professionals. The HSE may therefore slightly overestimate the prevalence of hypertension. However, it may be more accurate than the prevalence of doctor-diagnosed high blood pressure reported by informants, which excludes those who have not had their BP measured by a doctor or nurse in recent years. This needs to be taken into account when interpreting the results.

3.4.2 Hypertension by equivalised household income

It is difficult to explain why age-standardised prevalence of hypertension was inversely related to equivalised household income quintile in women but not in men. One possibility is the inverse relationship between income and both central and generalised obesity (measured by waist circumference and BMI respectively) in women, with a less clear-cut pattern in men (see chapter 5 of this volume). It is of concern that the main difference by income was in the proportion of women with untreated hypertension, suggesting that the inverse care law is still operating (i.e. that those who most need care are the least likely to obtain it).[11]

3.4.3 Detection, treatment and control of hypertension

Very few men or women under 55 were being treated for hypertension: prevalence of doctor-diagnosed hypertension was low in these age groups and only a minority of those with the diagnosis were on medication. Detection of hypertension increased with age, peaking in those aged 65-74. Overall the detection rate was higher in women than men, possibly reflecting higher GP consultation rates among women, or measurement of blood pressure because of the use of hormonal contraception or replacement therapy.

It is to be expected that the proportion who were on anti-hypertensive treatment would be lower than the proportion reporting high blood pressure, as treatment of hypertension requires first that it be diagnosed and should then only be treated in those meeting the guidelines (as described in section 3.1). For example, some of those with survey-defined hypertension will not have sustained hypertension when repeated measurements are made; others who do will not require drug treatment if lifestyle changes maintain BP readings below 160/100 mmHg and there are no other indications for treatment. However, these reasons are insufficient to explain why one-third of women and nearly half of men with survey-defined hypertension do not report a diagnosis of hypertension and nearly half of women and over half of men with survey-defined hypertension are not taking anti-hypertensive medication.

Data from HSE 2006 suggest that overall, *'the rule of halves'*[12] still applies for detection, treatment, and control: only half of cases are diagnosed in men, fewer than half the survey-defined cases in men were being treated, and only half of treated cases were controlled in men and women. The difference, however, is that the 'goalposts' have moved: the original report[12] used age-related BP thresholds of at least 160/95 mmHg to define hypertension and control. In contrast, the proportion of HSE 2006 informants with survey-defined hypertension who had untreated BP of at least 160/100mmHg was less than 16%.

3.4.4 Comparison with results from Quality Outcomes Framework (QOF) and changes over time

Primary care (GP) practices have been submitting data to the Quality Management Analysis System (QMAS) since April 2004. These data are used to calculate individual practices' Quality and Outcomes Framework (QOF) achievement to support practice payment processes. Prevalence in 11 disease areas is also available, and for the third year of the QOF (April 2006 to March 2007) used data from 8,372 practices, covering 99.8% of registered patients in England.[13,14]

Using data from QOF, the national prevalence of hypertension was 12.5% in the whole population (equivalent to 16% among those aged 16 and over, who represent 80% of the population) in 2006/07 and 12% (equivalent to 15%) in 2005/06.[13] The estimated figure of 16% for adults aged 16 and over in 2006/07 is almost two thirds the rate of self-reported doctor-diagnosed hypertension among HSE informants, around half the prevalence of survey-defined hypertension, and less than half the NICE estimate of 40%.[6] This cites HSE 1998 data but prevalence of survey-defined hypertension in HSE 1998 was 41% in men and 33% in women.[15] It is impossible to ascertain from these data the extent to which individuals are over-reporting a diagnosis of hypertension at the HSE interview and/or the survey is over-estimating hypertension and to what extent GPs are under-reporting it in their QOF returns. It is encouraging, however, that the prevalence has risen between the first, second and third years of QOF, suggesting better reporting and/or better detection of hypertension.

Figure 3C

Hypertension in 2003 and 2006, by age and sex

Base: Aged 16 and over with three valid BP measurements

The latter is supported by comparison of HSE 2006 with HSE 2003 data (Figure 3C), which shows that the prevalence of untreated hypertension has fallen (from 20% in 2003 to 18% in 2006 among men and from 16% to 13% among women), while there has been a small but significant rise in the prevalence of controlled hypertension since 2003 (from 5% to 7% in men and 6% to 8% in women). At the same time, there has been a small but significant fall in the overall prevalence of hypertension among both men and women (from 32% to 31% among men and 30% to 28% among women). **Table 3.5, Figure 3C**

References and notes

1 World Health Organisation. *The world health report 2002: Reducing risks, promoting health life*. WHO, Geneva, 2002.

2 National Institute for Health and Clinical Excellence (NICE and British Hypertension Society). *Hypertension: Management of Hypertension in Adults in Primary Care: pharmacological update*. Royal College of Physicians, London, 2006. www.nice.org.uk/CG034

3 Critchley J, Capewell S. *Substantial potential for reduction in CHD mortality in the UK through changes in risk factors levels*. J Epidemiol Community Health. 2003; **57**: 243-247.

4 Collins R, Peto R, MacMahon S, et al. *Blood pressure, stroke, and coronary heart disease: Part 2, short-term reductions in blood pressure: overview of randomised drug trials in their epidemiological context*. Lancet. 1990; **335**:827-838.

5 Williams B, Poulter NR, Brown MJ, et al. *Guidelines for management of hypertension: report of the fourth working party of the British Hypertension Society, 2004-BHS IV*. J Hum Hypertens. 2004; **18**:139-85. www.bhsoc.org/Latest_BHS_management_Guidelines.stm

6 National Institute for Clinical Excellence (NICE). *Hypertension: Management of Hypertension in Adults in Primary Care: Clinical Guideline No.18*. NICE, London, 2004. http://guidance.nice.org.uk/page.aspx?o=cg018background

7 Wolf-Maier K, Cooper RS, Kramer H, et al. *Hypertension treatment and control in five European countries, Canada and the United States*. Hypertension 2004; **43**:10-17.

8 Chobanian A, Bakris GL, Black HR, et al. *The seventh report of the Joint National Committee on prevention, detection, evaluation, and treatment of high blood pressure*. The JNC7 report. JAMA 2003; **289**:2560-72.

9 Guidelines Subcommittee of the World Health Organisation-International Society of Hypertension (WHO/ISH) Mil Hypertension Liaison Committee. *1999 World Health Organisation-International Society of Hypertension guidelines for the management of hypertension*. J Hypertens 1999; **17**:151-183.

10 Campbell NR. The Canadian Hypertension Recommendations Working Group. *The 2001 Canadian Hypertension recommendations: what is new and what is old but still important*. Can J Cardiol. 2002; **18**:591-603.

11 Tudor H J. *The inverse care law*. Lancet. 1971; **1**:405-12.

12 Wilber JA, Barrow JG. *Hypertension – A community problem*. Am J Med. 1972; **52**: 653-63.

13 The Information Centre Prescribing Support Unit. *National Quality and Outcomes Framework Achievement Data for England 2006-07*. The Information Centre, Leeds, 2007 www.ic.nhs.uk/statistics-and-data-collections/audits-and-performance/qof/qof-2006-07

14 Figures published by the Information Centre are derived from the Quality Management Analysis System (QMAS), a national system developed by NHS Connecting for Health. QMAS uses data from general practices to calculate individual practices' QOF achievement. Users of data derived from QMAS should recognise that QMAS was established as a mechanism to support the calculation of practice QOF payments. It is not a comprehensive source of data on quality of care in general practice, but it is potentially a rich and valuable source of such information, providing that the limitations of the data are acknowledged.

The 2006/07 disease prevalence tables were based on prevalence submissions to QMAS at the end of the 2006/07 financial year. The disease prevalence figures are therefore based on 8,372 general practices. These practices covered 99.8% of registered patients in England (based on registration data from the Prescription Pricing Division of the NHS Business Services Authority for the quarter January to March 2007).

15 Boreham R, Erens B, Falaschetti E, Hirani V, Primatesta P. *Chapter 3. Risk factors for cardiovascular disease*. In Erens B, Primatesta P (eds). *Health Survey for England: Cardiovascular disease '98. Volume 1: Findings*. London: TSO, 1999.

Tables

3.1 Response to blood pressure measurement, by age and sex

3.2 Hypertension categories, by age and sex

3.3 Hypertension categories (observed and age-standardised), by Government Office Region/Strategic Health Authority and sex

3.4 Hypertension categories (age-standardised), by equivalised household income and sex

3.5 Hypertension categories, 2003 and 2006, by sex

3.6 Comparison of self-reported with survey-defined hypertension in the survey population, by age and sex

3.7 Detection and treatment of hypertension among informants with survey-defined hypertension, by age and sex

3.8 Control of hypertension, by age and sex

3.9 Use of antihypertensive medication, by control of blood pressure, age and sex

Table 3.1

Response to blood pressure measurement, by age and sex

Aged 16 and over with a nurse visit *2006*

Response for blood pressure	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Valid blood pressure measurement[a]	78	81	80	83	84	89	89	83
Ate, drank, smoked, exercised in previous half hour	19	17	18	15	13	10	6	14
Three valid readings not obtained	2	2	1	1	2	1	4	2
Refused, attempted but not obtained, not attempted	2	1	1	1	1	0	1	1
Women								
Valid blood pressure measurement[a]	77	75	83	83	87	89	90	84
Ate, drank, smoked, exercised in previous half hour	16	14	13	15	10	7	4	12
Three valid readings not obtained	2	2	1	1	1	3	5	2
Pregnant	4	8	2	-	-	-	-	2
Refused, attempted but not obtained, not attempted	1	1	1	1	1	1	1	1
Bases (unweighted)								
Men	*431*	*585*	*889*	*797*	*882*	*666*	*458*	*4708*
Women	*536*	*800*	*1158*	*972*	*996*	*717*	*602*	*5781*

[a] Three valid readings of systolic and diastolic blood pressure .

Table 3.2

Hypertension categories, by age and sex

Aged 16 and over with three valid BP measurements — *2006*

Hypertension levels	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Normotensive untreated[a]	94	84	84	66	53	40	34	69
Hypertensive controlled[a]	-	0	1	6	11	22	19	7
Hypertensive uncontrolled[a]	-	0	1	6	10	16	22	6
Hypertensive untreated[a]	6	16	14	22	26	23	26	18
All with hypertension	*6*	*16*	*16*	*34*	*47*	*60*	*66*	*31*
Hypertensive untreated (160/100)[b]	0	1	2	5	5	6	9	3
Women								
Normotensive untreated[a]	99	97	90	74	60	37	31	72
Hypertensive controlled[a]	1	1	2	6	12	20	20	8
Hypertensive uncontrolled[a]	0	-	1	3	8	17	27	7
Hypertensive untreated[a]	1	2	6	17	19	27	22	13
All with hypertension	*1*	*3*	*10*	*26*	*40*	*63*	*69*	*28*
Hypertensive untreated (160/100)[b]	-	0	1	4	5	8	8	4
Bases (unweighted)								
Men	*335*	*473*	*715*	*663*	*739*	*592*	*407*	*3924*
Women	*411*	*602*	*965*	*810*	*870*	*638*	*542*	*4838*
Bases (weighted)								
Men	*604*	*666*	*799*	*694*	*630*	*458*	*325*	*4175*
Women	*583*	*641*	*851*	*700*	*680*	*504*	*535*	*4492*

[a] Normotensive untreated: SBP <140mmHg and DBP <90mmHg and **not** taking medication prescribed for high blood pressure

Hypertensive controlled: SBP <140mmHg and DBP <90mmHg and taking medication prescribed for high blood pressure

Hypertensive uncontrolled: SBP ≥ 140mmHg or DBP ≥ 90mmHg and taking medication prescribed for high blood pressure

Hypertensive untreated: SBP ≥ 140mmHg or DBP ≥ 90mmHg and **not** taking medication prescribed for high blood pressure

All with hypertension *SBP ≥ 140mmHg or DBP ≥ 90mmHg or taking medication prescribed for high blood pressure.*

[b] Hypertensive untreated (160/100): SBP ≥ 160mmHg or DBP ≥ 100mmHg and **not** taking medication prescribed for high blood pressure; if this level of BP is sustained, it always warrants treatment, according to current guidelines.

Table 3.3

Hypertension categories (observed and age-standardised), by Government Office Region/Strategic Health Authority[a] and sex

Aged 16 and over with three valid BP measurements *2006*

Hypertension levels	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
	%	%	%	%	%	%	%	%	%	%	%
Men											
Observed											
Normotensive untreated[b]	64	66	69	67	66	70	73	65	72	70	74
Hypertensive controlled[b]	10	5	5	8	8	8	7	9	5	5	5
Hypertensive uncontrolled[b]	5	7	6	7	7	6	7	4	6	8	4
Hypertensive untreated[b]	21	22	19	18	19	16	13	22	17	17	17
All with hypertension	*36*	*34*	*31*	*33*	*34*	*30*	*27*	*35*	*28*	*30*	*26*
Hypertensive untreated (160/100)[c]	5	4	4	3	3	4	2	4	3	4	3
Standardised											
Normotensive untreated[b]	65	69	69	68	68	72	69	69	74	73	77
Hypertensive controlled[b]	9	4	5	8	7	7	9	8	4	5	4
Hypertensive uncontrolled[b]	5	6	7	7	6	5	9	3	5	7	4
Hypertensive untreated[b]	21	21	19	18	18	16	13	20	16	16	16
All with hypertension	*35*	*31*	*31*	*32*	*32*	*28*	*31*	*31*	*26*	*27*	*23*
Hypertensive untreated (160/100)[c]	5	3	4	3	3	4	2	4	3	3	3
Bases (unweighted)											
Men	*219*	*579*	*435*	*385*	*425*	*478*	*322*	*379*	*702*	*353*	*349*
Bases (weighted)											
Men	*211*	*547*	*427*	*367*	*454*	*500*	*577*	*402*	*692*	*351*	*341*

[a] This table provides data for regional analysis both by Government Office Region (GOR) and the new configuration of Strategic Health Authorities (SHAs) in place from July 2006. The first eight columns represent GORs and SHAs of the same name, while the South East GOR (column nine) is divided into South East Coast SHA and South Central SHA, shown in the final two columns.

[b] Normotensive untreated: SBP <140mmHg and DBP <90mmHg and **not** taking medication prescribed for high blood pressure

Hypertensive controlled: SBP <140mmHg and DBP <90mmHg and taking medication prescribed for high blood pressure

Hypertensive uncontrolled: SBP ≥ 140mmHg or DBP ≥ 90mmHg and taking medication prescribed for high blood pressure

Hypertensive untreated: SBP ≥ 140mmHg or DBP ≥ 90mmHg and **not** taking medication prescribed for high blood pressure

All with hypertension *SBP ≥ 140mmHg or DBP ≥ 90mmHg or taking medication prescribed for high blood pressure.*

[c] Hypertensive untreated (160/100): SBP ≥ 160mmHg or DBP ≥ 100mmHg and **not** taking medication prescribed for high blood pressure: if this level of BP is sustained, it always warrants treatment, according to current guidelines.

Continued…

Table 3.3 continued

Aged 16 and over with three valid BP measurements *2006*

Hypertension levels	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
	%	%	%	%	%	%	%	%	%	%	%
Women											
Observed											
Normotensive untreated[b]	68	71	71	66	73	75	79	70	73	75	70
Hypertensive controlled[b]	10	7	7	11	9	8	6	8	8	6	11
Hypertensive uncontrolled[b]	8	9	8	10	7	6	6	6	6	5	7
Hypertensive untreated[b]	14	14	14	13	11	11	9	16	13	14	11
All with hypertension	*32*	*29*	*29*	*34*	*27*	*25*	*21*	*30*	*27*	*25*	*30*
Hypertensive untreated (160/100)[c]	4	5	3	3	3	4	2	3	4	4	4
Standardised											
Normotensive untreated[b]	72	73	70	71	75	77	76	73	74	76	72
Hypertensive controlled[b]	8	6	7	9	8	7	6	7	8	6	10
Hypertensive uncontrolled[b]	7	8	8	9	6	6	7	5	6	4	7
Hypertensive untreated[b]	12	13	14	11	10	11	11	15	12	13	11
All with hypertension	*28*	*27*	*30*	*29*	*25*	*23*	*24*	*27*	*26*	*24*	*28*
Hypertensive untreated (160/100)[c]	4	5	4	2	3	4	2	3	4	4	3
Bases (unweighted)											
Women	*275*	*734*	*525*	*473*	*517*	*532*	*391*	*530*	*861*	*456*	*405*
Bases (weighted)											
Women	*225*	*637*	*447*	*370*	*479*	*496*	*582*	*498*	*758*	*405*	*353*

[a] This table provides data for regional analysis both by Government Office Region (GOR) and the new configuration of Strategic Health Authorities (SHAs) in place from July 2006. The first eight columns represent GORs and SHAs of the same name, while the South East GOR (column nine) is divided into South East Coast SHA and South Central SHA, shown in the final two columns.

[b] Normotensive untreated: SBP <140mmHg and DBP <90mmHg and **not** taking medication prescribed for high blood pressure

Hypertensive controlled: SBP <140mmHg and DBP <90mmHg and taking medication prescribed for high blood pressure

Hypertensive uncontrolled: SBP ≥ 140mmHg or DBP ≥ 90mmHg and taking medication prescribed for high blood pressure

Hypertensive untreated: SBP ≥ 140mmHg or DBP ≥ 90mmHg and **not** taking medication prescribed for high blood pressure

All with hypertension *SBP ≥ 140mmHg or DBP ≥ 90mmHg or taking medication prescribed for high blood pressure.*

[c] Hypertensive untreated (160/100): SBP ≥ 160mmHg or DBP ≥ 100mmHg and **not** taking medication prescribed for high blood pressure: if this level of BP is sustained, it always warrants treatment, according to current guidelines.

Table 3.4

Hypertension categories (age-standardised), by equivalised household income and sex

Aged 16 and over with three valid BP measurements — *2006*

Hypertension levels	Equivalised household income quintile				
	Highest	2nd	3rd	4th	Lowest
	%	%	%	%	%
Men					
Normotensive untreated[a]	70	72	68	70	69
Hypertensive controlled[a]	6	4	7	6	8
Hypertensive uncontrolled[a]	5	7	6	6	6
Hypertensive untreated[a]	18	17	18	17	17
All with hypertension	*30*	*28*	*32*	*30*	*31*
Hypertensive untreated (160/100)[b]	4	3	3	4	3
Women					
Normotensive untreated[a]	77	75	73	71	70
Hypertensive controlled[a]	8	6	7	9	9
Hypertensive uncontrolled[a]	5	6	7	8	6
Hypertensive untreated[a]	10	13	13	12	15
All with hypertension	*23*	*25*	*27*	*29*	*30*
Hypertensive untreated (160/100)[b]	2	3	4	4	3
Bases (unweighted)					
Men	*801*	*742*	*694*	*582*	*461*
Women	*791*	*854*	*873*	*855*	*650*
Bases (weighted)					
Men	*873*	*802*	*690*	*566*	*500*
Women	*732*	*786*	*794*	*775*	*607*

[a] Normotensive untreated: SBP <140mmHg and DBP <90mmHg and **not** taking medication prescribed for high blood pressure

Hypertensive controlled: SBP <140mmHg and DBP <90mmHg and taking medication prescribed for high blood pressure

Hypertensive uncontrolled: SBP ≥ 140mmHg or DBP ≥ 90mmHg and taking medication prescribed for high blood pressure

Hypertensive untreated: SBP ≥ 140mmHg or DBP ≥ 90mmHg and **not** taking medication prescribed for high blood pressure

All with hypertension *SBP ≥ 140mmHg or DBP ≥ 90mmHg or taking medication prescribed for high blood pressure.*

[b] Hypertensive untreated (160/100): SBP ≥ 160mmHg or DBP ≥ 100mmHg and **not** taking medication prescribed for high blood pressure: if this level of BP is sustained, it always warrants treatment, according to current guidelines.

Table 3.5

Hypertension categories, 2003 and 2006, by sex

Aged 16 and over with three valid BP measurements — *2003, 2006*

Hypertension levels	Survey Year			
	Men		Women	
	2003	2006	2003	2006
	%	%	%	%
Normotensive untreated[a]	68	69	71	72
Hypertensive controlled[a]	5	7	6	8
Hypertensive uncontrolled[a]	6	6	8	7
Hypertensive untreated[a]	20	18	16	13
All with hypertension	*32*	*31*	*30*	*28*
Unweighted Bases	*4108*	*3924*	*5075*	*4838*
Weighted Bases	*4420*	*4175*	*4702*	*4492*

[a] Normotensive untreated: SBP <140mmHg and DBP <90mmHg and **not** taking medication prescribed for high blood pressure

Hypertensive controlled: SBP <140mmHg and DBP <90mmHg and taking medication prescribed for high blood pressure

Hypertensive uncontrolled: SBP ≥ 140mmHg or DBP ≥90mmHg and taking medication prescribed for high blood pressure

Hypertensive untreated: SBP ≥ 140mmHg or DBP ≥90mmHg and **not** taking medication prescribed for high blood pressure

All with hypertension *SBP ≥ 140mmHg or DBP ≥90mmHg or taking medication prescribed for high blood pressure.*

Categories in 2003 use different category labels but definitions are identical to those used in 2006.

Table 3.6

Comparison of self-reported with survey-defined hypertension in the survey population, by age and sex

Aged 16 and over *2006*

Hypertension levels	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Self-reported doctor-diagnosed hypertension[a]	4	12	15	28	39	48	48	24
Survey-defined hypertension[b]	6	16	16	34	47	60	66	31
Women								
Self-reported doctor-diagnosed hypertension[a]	4	7	13	24	37	53	53	25
Survey-defined hypertension[b]	1	3	10	26	40	63	69	28
Self-reported doctor-diagnosed hypertension[a]:								
Bases (unweighted)								
Men	*650*	*862*	*1183*	*1050*	*1126*	*437*	*317*	*5625*
Women	*794*	*1148*	*1493*	*1278*	*1267*	*469*	*470*	*6919*
Bases (weighted)								
Men	*1041*	*1129*	*1356*	*1123*	*1015*	*694*	*496*	*6854*
Women	*1004*	*1160*	*1378*	*1140*	*1048*	*467*	*796*	*7303*
Survey-defined hypertension[b]:								
Bases (unweighted)								
Men	*335*	*473*	*715*	*663*	*739*	*592*	*407*	*3924*
Women	*411*	*602*	*965*	*810*	*870*	*638*	*542*	*4838*
Bases (weighted)								
Men	*604*	*666*	*799*	*694*	*630*	*458*	*325*	*4175*
Women	*583*	*641*	*851*	*700*	*680*	*504*	*535*	*4492*

[a] Bases for self-reported doctor-diagnosed hypertension: Aged 16 and over (excluding pregnant women).

[b] Bases for survey-defined hypertension: Aged 16 and over with three valid BP measurements.

Table 3.7

Detection and treatment of hypertension among informants with survey-defined hypertension, by age and sex

Aged 16 and over with survey-defined hypertension[a,b] *2006*

Detection and treatment levels	Age group					Total
	16-34	35-54	55-64	65-74	75+	
	%	%	%	%	%	
Men						
Detection rate (proportion with hypertension who reported doctor-diagnosed high blood pressure)	23	51	61	65	63	55
Treatment rate (proportion with hypertension who were on treatment)	3	28	45	62	61	42
Women						
Detection rate (proportion with hypertension who reported doctor-diagnosed high blood pressure)[c]	d	54	68	75	67	66
Treatment rate (proportion with hypertension who were on treatment)	d	35	53	58	68	54
With survey-defined hypertension and asked about doctor-diagnosed hypertension[b]:						
Bases (unweighted)						
Men	*100*	*347*	*349*	*176*	*139*	*1111*
Women	*25*	*297*	*347*	*193*	*190*	*1052*
Bases (weighted)						
Men	*146*	*366*	*298*	*274*	*216*	*1300*
Women	*27*	*263*	*268*	*310*	*366*	*1234*
With survey-defined hypertension:						
Bases (unweighted)						
Men	*100*	*347*	*349*	*357*	*270*	*1423*
Women	*25*	*298*	*348*	*405*	*376*	*1452*
Bases (weighted)						
Men	*146*	*366*	*298*	*277*	*215*	*1302*
Women	*27*	*263*	*269*	*319*	*371*	*1249*

[a] All with survey-defined hypertension:

SBP ≥ 140mmHg or DBP ≥ 90mmHg or taking medication prescribed for high blood pressure.

Note that some informants with self-reported doctor-diagnosed hypertension did not have survey-defined hypertension, and are therefore not included in this table.

[b] Two sets of bases are shown:

'Detection rate' based on informants who had a nurse visit and answered the CVD questionnaire. To avoid an overlong interview for informants aged 65 and over, only half of these older people (but all aged 16-64) were asked the CVD module. The weighting used in the analyses in this chapter takes this into account.

'Treatment rate' is based on all informants with survey-defined hypertension.

[c] Excludes hypertension in pregnancy.

[d] Results are not shown because of small bases.

Table 3.8

Control of hypertension, by age and sex

Aged 16 and over on treatment for hypertension *2006*

Detection and treatment levels	Age group					Total
	16-34	35-54	55-64	65-74	75+	
	%	%	%	%	%	
Men						
Hypertension controlled	a	50	51	58	47	52
Women						
Hypertension controlled	a	64	60	54	42	52
Bases (unweighted)						
Men	*3*	*96*	*155*	*220*	*165*	*639*
Women	*6*	*103*	*188*	*236*	*255*	*788*
Bases (weighted)						
Men	*4*	*104*	*133*	*173*	*132*	*546*
Women	*8*	*92*	*142*	*184*	*251*	*675*

[a] Results are not shown because of small bases.

Table 3.9

Use of antihypertensive medication, by control of blood pressure, age and sex

Aged 35 and over on treatment for hypertension *2006*

Detection and treatment levels	Age group				Total
	35-54	55-64	65-74	75+	
	%	%	%	%	%
Men					
BP<140/90 mmHg (Controlled)					
No. of antihypertensive drugs[a]					
1	[48]	43	31	29	36
2	[44]	33	41	50	42
3+	[8]	23	28	21	22
BP≥140/90 mmHg (Uncontrolled)					
No. of antihypertensive drugs[a]					
1	55	54	46	34	46
2	31	30	38	49	37
3+	15	16	16	18	16
BP<140/90 mmHg (Controlled)					
Class of antihypertensive drugs					
Ace inhibitors	[65]	69	59	48	60
Beta blockers	[30]	31	45	38	37
Calcium blockers	[31]	35	44	39	38
Diuretics	[33]	38	49	64	47
Other drugs affecting BP	[1]	14	10	10	9
BP≥140/90 mmHg (Uncontrolled)					
Class of antihypertensive drugs					
Ace inhibitors	61	64	51	52	57
Beta blockers	32	22	28	38	30
Calcium blockers	32	42	35	40	37
Diuretics	27	30	45	47	38
Other drugs affecting BP	15	12	14	16	14
Bases (unweighted)					
Men					
BP <140/90 mmHg	*45*	*79*	*128*	*76*	*328*
BP ≥140/90 mmHg	*51*	*76*	*92*	*89*	*308*
Bases (weighted)					
Men					
BP <140/90 mmHg	*52*	*68*	*100*	*61*	*282*
BP ≥140/90 mmHg	*52*	*65*	*73*	*70*	*260*

Continued…

Table 3.9 continued

Aged 35 and over on treatment for hypertension *2006*

Detection and treatment levels	Age group				Total
	35-54	55-64	65-74	75+	
	%	%	%	%	%
Women					
BP<140/90 mmHg (Controlled)					
No. of antihypertensive drugs[a]					
1	58	39	33	33	38
2	31	40	47	45	42
3+	10	21	20	22	19
BP≥140/90 mmHg (Uncontrolled)					
No. of antihypertensive drugsa					
1	[43]	47	44	24	36
2	[48]	38	35	50	44
3+	[9]	15	21	25	21
BP<140/90 mmHg (Controlled)					
Class of antihypertensive drugs					
Ace inhibitors	53	55	54	45	52
Beta blockers	46	40	37	33	38
Calcium blockers	19	33	30	41	32
Diuretics	34	54	66	70	59
Other drugs affecting BP	1	7	8	5	6
BP≥140/90 mmHg (Uncontrolled)					
Class of antihypertensive drugs					
Ace inhibitors	[53]	52	46	50	50
Beta blockers	[32]	31	36	38	36
Calcium blockers	[20]	28	37	46	38
Diuretics	[53]	50	55	62	57
Other drugs affecting BP	[9]	9	8	10	9
Bases (unweighted)					
Women					
BP <140/90 mmHg	*66*	*115*	*127*	*105*	*413*
BP ≥140/90 mmHg	*37*	*73*	*109*	*150*	*369*
Bases (weighted)					
Women					
BP <140/90 mmHg	*58*	*85*	*98*	*105*	*346*
BP ≥140/90 mmHg	*33*	*57*	*85*	*146*	*322*

[a] Some informants may have been on two different types of diuretic drugs. Therefore the number of classes of drugs taken is counted, not the number of individual drugs.

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Diabetes

4

Nicola Shelton

Key findings

- This chapter covers the prevalence of diabetes (types 1 and 2 combined and separately) by age in adults aged 16 and over, and risk factors for type 2 diabetes in adults aged 35 and over. It also examines glycated haemoglobin, which is a measure of average blood sugar levels.
- Diabetes substantially increases the risk of cardiovascular disease (CVD) and worsens the effect of other risk factors for CVD. Diabetes prevalence is increasing.
- The prevalence of doctor-diagnosed diabetes in HSE 2006 was higher in men (5.6%) than in women (4.2%).The prevalence increased with age from 0.8% in men aged 16-24 to 15.7% in men aged 65-74 and 13.5% in men aged 75 and over. In women the prevalence increased from 0.9% aged 16-24 to 10.6% aged 75 and over.
- Women in households within the highest income quintile had the lowest prevalence of doctor-diagnosed diabetes. The prevalence of doctor-diagnosed diabetes in men varied between income groups with the highest prevalences in the lowest and highest income groups.
- Doctor-diagnosed diabetes prevalence almost doubled between 1994 and 2003; the largest increases were in men and women aged 45 and over. There has been a further rise since 2003 from 4.3% to 5.6% in men and from 3.4% to 4.2% in women.
- Men aged 35 and over who were obese had higher prevalence of doctor-diagnosed diabetes than similar-aged men who were overweight, and in turn men who were overweight had higher prevalence than those not overweight. Similar results were found for women aged 25 and over.
- The prevalence of doctor-diagnosed diabetes was significantly higher in men aged 35 and over and women aged 45 and over with a raised waist circumference.
- The mean level of glycated haemoglobin was 5.5% in men and women. It increased slightly with age from 5.2% to 6.0% in men, and from 5.1% to 5.9% in women, aged 16-24 and 75 and over respectively.
- 3.9% of men and 2.4% of women had a glycated haemoglobin level of 7% or above (indicating undiagnosed or uncontrolled diabetes).This increased with age in both sexes.
- The combined prevalence of doctor-diagnosed diabetes and/or raised glycated haemoglobin was highest in the two lowest equivalised household income quintiles in both men and women.
- There has been an increase in the proportion of men with a glycated haemoglobin level at or above 7% between 2003 and 2006, but no significant increase in the mean level in men or women.
- Men and women aged 35 and over with doctor-diagnosed diabetes were much less likely to have glycated haemoglobin levels below 6.5% (indicative of good control of

blood glucose levels): 97% of men and 98% of women without doctor-diagnosed diabetes had levels below 6.5% compared with 26% and 36% of those with doctor-diagnosed diabetes. 40% of men and 32% of women with doctor-diagnosed diabetes had glycated haemoglobin levels of 7.5% or more (indicative of poor control).

- The proportions of men and women with glycated haemoglobin levels of 7% or above were higher in the obese than in informants in other weight categories and were also generally higher across age groups in the overweight than in those who were not overweight.
- The proportion of men and women with a glycated haemoglobin level of 7% or above was more than four times higher in those with raised waist circumference (8% of men, 4% of women) than those without (2% and 1% respectively).
- An analysis of risk factors showed that age, alcohol consumption below the recommended daily limits, being obese, raised waist circumference, were significantly associated with type 2 diabetes in both men and women.
- For men, low levels of physical activity and having survey-defined hypertension (systolic BP ≥140mmHg, diastolic BP ≥90mmHg and/or being on medication to reduce blood pressure) were additional factors associated with significantly higher odds of type 2 diabetes.
- For women, area level deprivation was associated with significantly higher odds of type 2 diabetes.

4.1 Introduction

This chapter covers the prevalence of diabetes (types 1 and 2 separately and combined) by age and sex for adults aged 16 and over, and trends over time. The chapter also reports on risk factors associated with type 2 diabetes and on glycated haemoglobin, a tool for monitoring longer-term blood glucose levels.

Diabetes is characterised by high blood glucose levels (hyperglycaemia). Untreated, hyperglycaemia is associated with damage and possible failure of many organs, especially the eyes, kidneys, nerves, heart, and blood vessels. Type 1 and 2 diabetes differ in that type 1 diabetes (commonly known as insulin-dependent or juvenile diabetes) is the result of an autoimmune destruction of the cells of the pancreas which produce insulin. Type 1 diabetes is treated with insulin injections. Type 2 diabetes (also known as non insulin-dependent or late-onset) is characterised by insulin resistance i.e. the inability of the body to respond to insulin and/or insufficient insulin secretion. Type 2 diabetes is controlled with diet and then drugs, and sometimes with insulin therapy (sometimes called insulin-treated, to distinguish it from insulin-dependent). Type 2 diabetes is more common, accounting for over 90% of all diabetes in the UK.[1]

Diabetes substantially increases the risk of cardiovascular disease (CVD). Men with type 2 diabetes have up to a fourfold greater annual risk of coronary heart disease, and there is an even greater risk (up to five times higher) in women.[2] Diabetes tends to worsen the effect of other risk factors for CVD such as dyslipidaemia (abnormal levels of blood fats), hypertension, smoking and obesity. Being overweight or having a raised waist measurement are risk factors for diabetes.[3,4]

In the Health Survey for England 2003, the prevalence of diabetes was 4.3% in men and 3.4% in women.[5] Diabetes prevalence increased in England between 1994 and 2003 and was rising at younger ages especially in men.[5] Projections estimate further increases in developed countries.[6,7] Diabetes mellitus (including types 1 and 2 and, among women, gestational diabetes) was ranked seventh in the leading causes of avoidable mortality in men and ranked ninth in women, with an estimated 4.2 years of life lost. Despite these rises in prevalence, death rates from diabetes mellitus fell between 1993 and 2005.[8]

The Department of Health National Service Framework for Diabetes published in 2003 sets out a ten-year programme of change to deliver world class care and support for people with diabetes.[9] This recommends an agreed care plan, a personal diabetes record and named contact within the local service to all people diagnosed with diabetes after April 2003, along with people with poor blood glucose control (glycated haemoglobin above 7.5%).

4.2 Methods and Definitions

4.2.1 Questions

Informants were asked in the interview whether they currently had or had ever had diabetes and, (if they responded positively), whether they had been told by a doctor that they had diabetes. Women were asked if they had been pregnant at the time and, if so, whether they had ever had diabetes other than when pregnant. During the interview, all informants with doctor-diagnosed diabetes were asked how old they were when diabetes was first diagnosed and whether they currently injected insulin and/or took any other medicines, treatment or advice for diabetes. Details of all prescribed medicines taken were collected in the nurse visit.

It should be stressed that no attempt was made to validate this self-reported data. There is therefore the possibility that some misclassification may have occurred, because some informants may not have remembered (or not remembered correctly) the diagnosis made by their doctor.

4.2.2 Definitions

Based on the conditions described earlier the following definitions were used:

Diabetes

Those informants who reported diabetes that was doctor-diagnosed, excluding women who had only had diabetes during pregnancy, were defined as having doctor-diagnosed diabetes.

The HSE interview makes no distinction between type 1 and type 2 diabetes. For classification purposes at the analysis stage, type 1 diabetes was defined in informants who reported having doctor-diagnosed diabetes that was diagnosed before the age of 35 *and* who were on insulin therapy at the time of the survey. All other informants with doctor-diagnosed diabetes were classified as having type 2 diabetes.

Controlled diabetes

Glycated haemoglobin (HbA1c), measured in the blood sample, is a validated tool for monitoring longer-term glycaemia (blood glucose levels). The percentage of HbA1c is the proportion of haemoglobin in the circulation to which glucose is bound. It reflects the prevailing level of blood glucose during the three months (approximately) preceding the measurement and has been suggested as a diagnostic or screening tool for diabetes.[10]

HbA1c below 7% in those informants with doctor-diagnosed diabetes was considered to be indicative of controlled diabetes.[11] (The range of control is set individually for diabetics between 6.5% and 7.5%.)[12] Elevated glycated haemoglobin in diabetic patients is associated with increased mortality following acute myocardial infarction.[13]

A raised glycated haemoglobin level in the general population is indicative of undiagnosed diabetes, but the threshold for its use as a screening test is not yet clear.[14] A raised glycated haemoglobin level in the general population is taken to be greater than 7% in this report.

4.2.3 Response

The response rates for the blood tests are found in Chapter 10.

4.3 Results

This section highlights the results of analyses that are new to the HSE report series.

4.3.1 Doctor-diagnosed diabetes by BMI status

The prevalence of doctor-diagnosed diabetes was examined separately among men and women by age groups within different body mass index categories (BMI, expressed as kg/m^2). The prevalence of doctor-diagnosed diabetes increased with increased BMI. 2.0% of men who were not overweight (BMI under 25) had doctor-diagnosed diabetes compared with 4.9% of overweight men (BMI 25 or more but less than 30) and 9.9% of obese men (BMI 30 or more). In women 1.6% of women who were not overweight had doctor-diagnosed diabetes compared with 3.4% of overweight women and 8.7% of obese women. Obese men aged 35 and over, and obese women aged 25 and over, had higher prevalence of doctor-diagnosed diabetes than men and women who were overweight and not overweight. In turn, overweight men aged 35 and over and overweight women aged 25 and over had higher prevalence of doctor-diagnosed diabetes than men and women of normal weight.

Table 4.5

4.3.2 Doctor-diagnosed diabetes by waist circumference

Raised waist circumference, indicating central or abdominal obesity, was defined as greater than 102cm for men and greater than 88cm for women using the US Adult Treatment Panel III guidelines.[15] The proportion of men with doctor-diagnosed diabetes was more than four times higher in men with a raised waist circumference (11.5%) than in those without (2.7%).

Similarly, the proportion of women with doctor-diagnosed diabetes was more than five times higher in those with a raised waist circumference (8.5%) than those without (1.5%). Among those with a raised waist circumference, there was a higher prevalence of doctor-diagnosed diabetes in men aged 35 and over and women aged 45 and over. **Table 4.6**

4.3.3 Glycated haemoglobin by doctor-diagnosed diabetes

The NICE guideline on management of blood glucose levels recommends a target glycated haemoglobin level of between 6.5% and 7.5% for type 2 diabetics. The proportions of men and women with glycated haemoglobin levels below 6.5% were much lower in those with doctor-diagnosed diabetes. Virtually all informants without doctor-diagnosed diabetes had glycated haemoglobin levels below 6.5% (97% of men and 98% of women) compared with only 26% of men and 36% of women with doctor-diagnosed diabetes. 40% of men and 32% of women with doctor-diagnosed diabetes had glycated haemoglobin levels of 7.5% or more indicating that their diabetes is not controlled. **Table 4.11**

4.3.4 Glycated haemoglobin by obesity

The proportion of men with glycated haemoglobin levels of 7% (indicative of diabetic control) or above was more than twice as high in those who were overweight (3.7%) and more than five times higher in those who were obese (7.3%) than in those with a BMI less than 25 kg/m^2 (1.4%). In women, the proportions were more than three times higher in the overweight (2.1%) and eight times higher in the obese (5.3%) compared with women with a BMI less than 25 kg/m^2 (0.6%). In general, the proportion of men and women with glycated haemoglobin levels increased with increased BMI, more so in younger age groups.

The proportion of men and women with a glycated haemoglobin level of 7% or above was more than four times higher in those with raised waist circumference (8.1% and 4.4%) than those without (2.0% and 1.0%) respectively for men and women. The proportion of men and women with raised glycated haemoglobin was higher in all age groups for those with raised waist circumference. This contrasts with raised BMI where in older age groups the proportion of men and women with raised glycated haemoglobin was not significantly higher. **Tables 4.12 and 4.13**

4.3.5 Doctor-diagnosed diabetes and glycated haemoglobin by equivalised household income

The prevalence of age-standardised doctor-diagnosed diabetes in men varied across income groups and was highest in the two lowest equivalised household income quintiles. The highest levels of glycated haemoglobin in men were found in the lowest income quintile. The highest prevalences of age-standardised doctor-diagnosed diabetes and raised glycated haemoglobin were found in the two lowest income quintiles in women. The combined prevalence of doctor-diagnosed diabetes and/or raised glycated haemoglobin was highest in the two lowest equivalised household income quintiles in both men and women (data not shown). **Table 4.3, 4.9 Figure 4A**

4.3.6 Risk factors associated with type 2 diabetes

This section presents the results of a logistic regression which examined the association between a number of risk factors (independent or predictor variables) and doctor-diagnosed type 2 diabetes (the dependent or outcome variable) among adults aged 35 and over. The analysis indicates the contribution of each factor once the other variables have been taken into account.

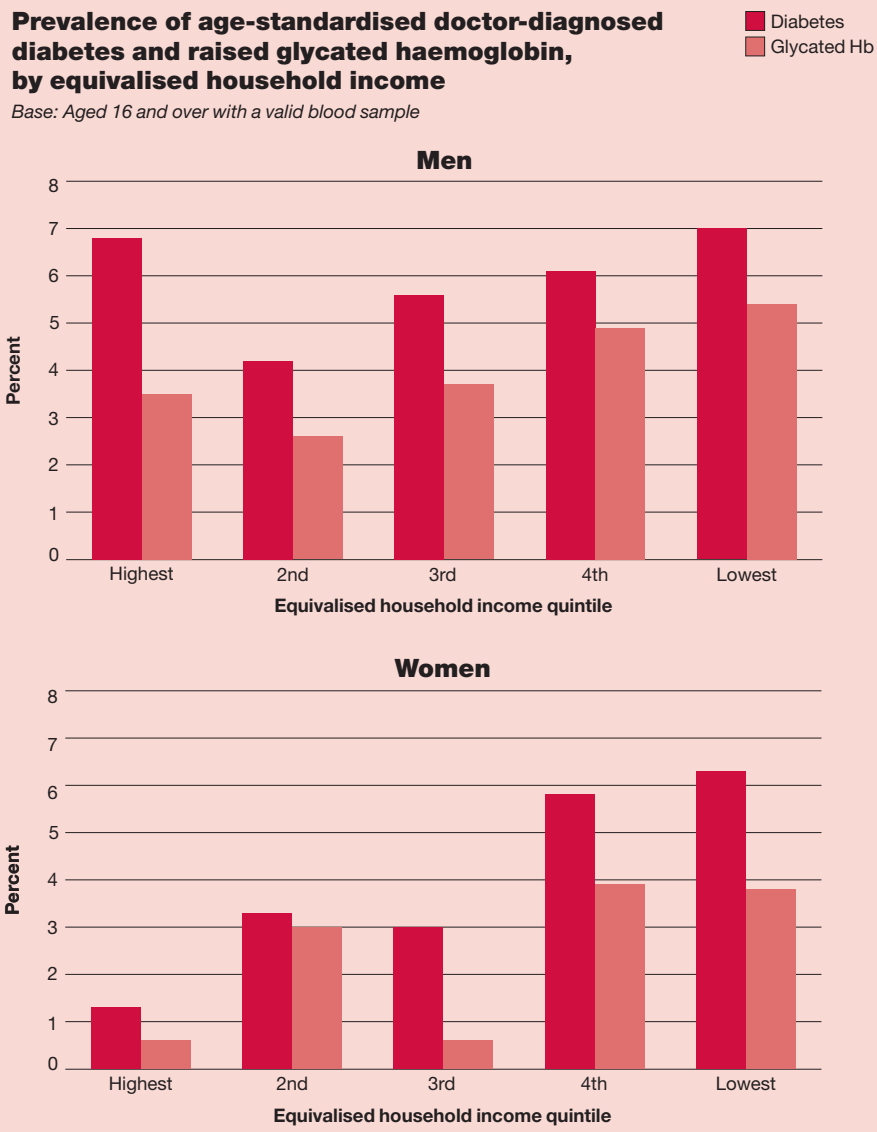
Odds ratios greater than 1 indicate higher odds of having type 2 diabetes, and odds ratios less than 1, indicate lower odds. The 95% confidence intervals are shown, and where the interval does not include 1, this category is significantly different from the reference category.

The factors considered in the logistic regression analysis were: age, cigarette smoking, alcohol consumption, physical activity, NS-SEC, Government Office Region, equivalised

Figure 4A

Prevalence of age-standardised doctor-diagnosed diabetes and raised glycated haemoglobin, by equivalised household income

Base: Aged 16 and over with a valid blood sample



household income, area level deprivation (IMD2004, the 2004 Index of Multiple Deprivation), BMI: overweight and obesity, based on data collected in the interview; and waist-hip ratio, waist circumference, and survey-defined hypertension, based on data collected in the nurse visit. Of these, age, alcohol consumption, BMI and waist circumference, were significantly associated with type 2 diabetes in both men and women. In addition, physical activity and survey-defined hypertension were significant in men only, and IMD2004 in women only. Table 4.14 presents the results of the logistic regression including all the risk factors that were significant for men or women.

For men the odds of having type 2 diabetes increased with age, such that in the 65-74 age group, the odds of having type 2 diabetes were almost five times greater than at ages 35-44. The odds of having type 2 diabetes also increased with age for women, and the gradient with age was more marked than for men, with women aged 65-74 having odds more than eight times higher than those aged 35-44.

Alcohol consumption both above and below recommended daily units on the heaviest drinking day in the last week was associated with lower odds of having type 2 diabetes in men and women compared to men and women who had not drunk any alcohol in the last 12 months. Reduced alcohol consumption is recommended for those with diabetes, so this is probably an example of 'reverse causality': people with doctor-diagnosed diabetes moderating their alcohol intake because of the diabetes and subsequent healthcare advice received. There is an additional effect of much lower alcohol consumption in older people, even taking into account that the model controls for age.

Men and women who were obese had around double the odds of having type 2 diabetes compared with those who were not obese. Similarly men with a raised waist circumference (greater than102cm) had more than double the odds of having type 2 diabetes compared with men whose waist measurement was 102cm or less. There were greater odds of having type 2 diabetes with raised waist circumference for women. Women with a raised waist circumference (greater than 88cm) had more than four times the odds of having type 2 diabetes compared with women whose waist measurement was 88cm or less.

Men who engaged in medium or high levels of physical activity had significantly lower odds of having type 2 diabetes (around half the odds) than those who engaged in low levels of physical activity. There were no significant differences for women.

Men who had hypertension according to the survey definition (see Chapter 3) were more likely to have type 2 diabetes than those who were not hypertensive.

Women who lived in the most deprived areas were more likely than those living in the least deprived areas to have type 2 diabetes. **Table 4.14**

4.3.7 Trends

There were continuing increases in the prevalence of diabetes. Overall the prevalence had almost doubled between 1994 and 2006 in men and more than doubled in women, with the largest increases in those aged 45 and over. There has also been an increase in the proportion of men with a glycated haemoglobin level at or above 7% between 2003 and 2006, but no significant increase in the mean level in men or women. **Table 4.4, 4.10**

4.4 Discussion

4.4.1 Trends in diabetes and obesity

Diabetes is significantly associated with BMI, obesity being an important modifiable risk factor for diabetes. Results for HSE 2006 have generally shown, as expected, that diabetes is more common in those with central or with generalised obesity, as measured by waist circumference and BMI respectively. Similarly, the prevalence of raised glycated haemoglobin levels confirm that blood glucose levels are higher in those with central or generalised obesity.

Both diabetes and obesity have been increasing, with increases in both from 1994 to 2006 (see also Chapter 5, Table 5.5). The increases in diagnosed diabetes were much greater proportionally than those in obesity over the same period. The prevalence of diagnosed diabetes has continued to increase between 2003 and 2006 despite only small increases in mean BMI over the period. Overall, the prevalence of diabetes almost doubled between 1994 and 2003 in men and women. Between 2003 and 2006 there were further significant increases in diabetes in men aged 25-34, 45-54 and aged 65 and over, and in women aged 45 and over, with the largest increases in both sexes among those aged 65 and over. The proportion of cases of diabetes that are diagnosed has been increasing over the past decade,[16] so this increase could be due to greater detection of diabetes or to a real increase in prevalence.

It would be expected that an increase in detection of diabetes, and therefore more individuals receiving advice and treatment, would lead to lower blood glucose levels in those individuals than if the diabetes had remained undiagnosed. Improved detection is likely to occur when there is a systematic approach to management of diabetes in the health service, as advocated in the National Service Framework9 accompanied by an improvement in quality of care. However, the rise in prevalence of self-reported doctor-diagnosed diabetes has also been accompanied by an increase since 2003 in the proportion of men with poor glycated haemoglobin control, which therefore makes rising prevalence a more likely explanation than improved detection.

4.4.2 Comparison with results from Quality Outcomes Framework (QOF)

Primary care (GP) practices have been submitting data to the Quality Management Analysis System (QMAS) since April 2004. These data are used to calculate individual practices' Quality and Outcomes Framework (QOF) achievement to support practice payment processes. Prevalence in 11 disease areas is also available, and for the third year of the QOF (April 2006 to March 2007) used data from 8,372 practices, covering 99.8% of registered patients in England.[17,18]

Doctor-diagnosed diabetes prevalence from the Health Survey for England increased between 2003 and 2006 in men from 4.3% to 5.6% and women from 3.4% to 4.2%. The national prevalence of diabetes as identified in National Quality and Outcomes Framework Statistics also showed a rise from 3.3% to 3.7% between 2004/05 and 2006/07. It should be noted that the QOF disease register counts for diabetes refer only to patients aged 17 and over. The published prevalence figure from QOF does therefore not measure true prevalence, since the denominator is all patients on the practice list, not patients aged 17 and over on the practice list (QMAS does not provide an age breakdown of the practice list). This underestimates the true prevalence as the level of diabetes in children is close to zero. Adjusting the QOF prevalence to consider only the population aged 16 and over (approximately 80% of the English population) in the denominator, the most recent QOF prevalence becomes 4.5%, closer to but still lower than the average for men and women in HSE 2006. This suggests that a higher proportion of adults who are either not registered with a GP, or not on the disease register with their GP, have diabetes than those registered as diabetics (see Chapter 6 for further discussion).

References and notes

1 Peterson S, Rayner M, Peto V. Chapter 12: Diabetes in *Coronary Heart Disease Statistics*. British Heart Foundation, London, 2003.

2 Garcia MJ, McNamara PM, Gordon T, Kannel WB. *Morbidity and mortality in the Framingham population. Sixteen year follow-up*. Diabetes 1974; 23:105-111.

3 Diabetes UK. *Measure Up. Are you at risk of diabetes?* www.diabetes.org.uk/Documents/Measure%20up/Measure_Up_leaflet.pdf (accessed 05/06/07)

4 Klein S, Allison DB, Heymsfield SB et al. *Waist circumference and cardiometabolic risk: a consensus statement from Shaping America's Health: Association for Weight Management and Obesity Prevention; NAASO, The Obesity Society; the American Society for Nutrition; and the American Diabetes Association*. Am J Clin Nutr. 2007;85:1197-202.

5 Shelton N. Chapter 8: Diabetes in Sproston K, Primatesta P (eds). *Health Survey for England 2003*. The Stationery Office, London, 2004.

6 Amos AF, McCarty DJ, Zimmet P. *The rising global burden of diabetes and its complications: estimates and projections to the years 2010*. Diabetic Medicine 1997; 14: S7-S85.

7 Bagust A, Hopkinson PK, Maslove L, Currie CJ. *The projected health care burden of type 2 diabetes in the UK from 2000 to 2060*. Diabetic Medicine 2002; 18: S4: 1-5.

8 Wheller L, Baker A, Griffiths C, Rooney C. *Trends in avoidable mortality in England and Wales, 1993–2005*. Health Statistics Quarterly. 2007; 34: www.statistics.gov.uk/cci/article.asp?id=1806 (accessed 05/06/2007)

9 Department of Health. *National Service Framework for Diabetes: Delivery Strategy 2003*. www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4003246 (accessed 05/06/07)

10 McCance DR, Hanson RL, Charles M-A et al. *Comparison of tests for glycated haemoglobin and fasting and two hour plasma glucose concentrations as diagnostic methods of diabetes*. BMJ. 1994; 308:1323-1328.

11 Department of Health *National service framework for diabetes: standards Supplementary Information* 2001. http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4002951 (accessed 02/10/2007)

12 McIntosh A, Hutchinson A, Home PD, et al. *Full guideline for Type 2 Diabetes - Management of blood glucose:* ScHARR, University of Sheffield, Sheffield, 2001. http://guidance.nice.org.uk/page.aspx?o=36737 (accessed 05/06/2007)

13 Chowdhury TA, Lasker SS. *Elevated glycated haemoglobin in non-diabetic patients is associated with an increased mortality in myocardial infarction*. Postgrad Med J. 1998; 74:480-1.

14 Waugh N, Scotland G, McNamee P, et al. *Screening for type 2 diabetes: literature review and economic modelling*. Health Technol Assess. 2007;11:iii-iv, ix-xi, 1-125.

15 National Institutes of Health. *Third report of the National Cholesterol Education Program Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III)*. National Institutes of Health , Publication 01-3670. NIH, Bethesda, Md, 2001.

16 Pierce M, Zaninotto P, Steel N, Mindell J. *Undiagnosed diabetes in England– becoming a thing of the past*. (Submitted to Diabetic Medicine)

17 The Information Centre Prescribing Support Unit. *National Quality and Outcomes Framework Achievement Data for England 2006-07*. The Information Centre, Leeds, 2007. http://www.ic.nhs.uk/webfiles/QOF/2006-07/QOF%202006-07%20Statistical%20Bulletin.pdf

18 Figures published by the Information Centre are derived from the Quality Management Analysis System (QMAS), a national system developed by NHS Connecting for Health. QMAS uses data from general practices to calculate individual practices' QOF achievement. Users of data derived from QMAS should recognise that QMAS was established as a mechanism to support the calculation of practice QOF payments. It is not a comprehensive source of data on quality of care in general practice, but it is potentially a rich and valuable source of such information, providing that the limitations of the data are acknowledged.

The 2006/07 disease prevalence tables were based on prevalence submissions to QMAS at the end of the 2006/07 financial year. For practices where year-end submissions were not available, the disease prevalence submissions received by QMAS closest to year end were taken. The disease prevalence figures are therefore based on 8,372 general practices. These practices covered 99.8% of registered patients in England (based on registration data from the Prescription Pricing Division of the NHS Business Services Authority for the quarter January to March 2007).

Tables

4.1 Prevalence of doctor-diagnosed diabetes, by age and sex

4.2 Prevalence of doctor-diagnosed diabetes (observed and age-standardised), by Government Office Region/Strategic Health Authority and sex

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4.4 Trends in prevalence of doctor-diagnosed diabetes, 1994-2006, by age and sex

4.5 Prevalence of doctor-diagnosed diabetes, by age within BMI status and sex

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4.9 Glycated haemoglobin (age-standardised), by equivalised household income and sex

4.10 Comparison of glycated haemoglobin, 2003 and 2006, by age and sex

4.11 Glycated haemoglobin levels, by doctor-diagnosed diabetes status, age and sex

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4.14 Estimated odds ratios for type 2 diabetes, by associated risk factors and sex

Table 4.1

Prevalence of doctor-diagnosed diabetes, by age and sex

Aged 16 and over *2006*

Doctor-diagnosed diabetes	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Type 1 Diabetes[a]	0.6	0.9	0.6	0.2	0.4	0.2	-	0.5
Type 2 Diabetes[a]	0.2	0.3	1.8	5.8	8.1	15.4	13.5	5.1
Types 1 and 2 combined	0.8	1.2	2.4	6.0	8.5	15.7	13.5	5.6
Women								
Type 1 Diabetes[a]	0.6	0.6	0.4	1.3	0.2	-	0.4	0.5
Type 2 Diabetes[a]	0.3	0.5	0.8	2.3	5.9	10.4	10.4	3.7
Types 1 and 2 combined	0.9	1.2	1.2	3.6	6.0	10.4	10.6	4.2
Bases (unweighted)								
Men	*650*	*862*	*1183*	*1050*	*1126*	*437*	*317*	*5625*
Women	794	1148	1494	1279	1268	470	470	6923
Bases (weighted)								
Men	*1041*	*1129*	*1356*	*1123*	*1015*	*694*	*496*	*6854*
Women	*1014*	*1160*	*1379*	*1141*	*1049*	*768*	*796*	*7307*

[a] Type 1 diabetes is defined as diagnosed aged <35 years and taking insulin. Other cases are taken to be type 2 diabetes.

Table 4.2

Prevalence of doctor-diagnosed diabetes, (observed and age-standardised), by Government Office Region/Strategic Health Authority[a] and sex

Aged 16 and over *2006*

Doctor-diagnosed diabetes	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
	%	%	%	%	%	%	%	%	%	%	%
Men											
Observed	5.2	7.1	5.9	4.7	5.9	5.8	4.6	5.9	5.2	5.7	4.8
Standardised	5.2	6.5	6.3	4.6	5.8	5.4	6.0	4.9	4.7	4.2	5.5
Women											
Observed	4.9	4.6	5.4	4.4	5.7	4.4	3.1	2.7	3.8	4.0	4.2
Standardised	4.8	4.3	5.4	4.1	5.4	4.2	4.3	2.6	3.9	3.9	4.0
Bases (unweighted)											
Men	*298*	*847*	*570*	*548*	*576*	*651*	*678*	*528*	*929*	*446*	*483*
Women	*389*	*1030*	*732*	*692*	*748*	*740*	*763*	*696*	*1135*	*591*	*544*
Bases (weighted)											
Men	*352*	*929*	*660*	*607*	*699*	*787*	*1031*	*687*	*1103*	*531*	*572*
Women	*398*	*1012*	*751*	*653*	*786*	*790*	*966*	*780*	*1175*	*618*	*557*

[a] This table provides data for regional analysis both by Government Office Region (GOR) and the new configuration of Strategic Health Authorities (SHAs) in place from July 2006. The first eight columns represent GORs and SHAs of the same name, while the South East GOR (column nine) is divided into South East Coast SHA and South Central SHA, shown in the final two columns.

Table 4.3

Prevalence of doctor-diagnosed diabetes (age-standardised), by equivalised household income and sex

Aged 16 and over *1994-2006*

Doctor-diagnosed diabetes	Equivalised household income quintile				
	Highest	2nd	3rd	4th	Lowest
	%	%	%	%	%
Men	6.8	4.2	5.6	6.1	7.0
Women	1.3	3.3	3.0	5.8	6.3
Bases (unweighted)					
Men	*1151*	*1084*	*912*	*758*	*672*
Women	*1179*	*1210*	*1148*	*1124*	*965*
Bases (weighted)					
Men	*1325*	*1263*	*1102*	*948*	*823*
Women	*1166*	*1196*	*1185*	*1279*	*996*

Table 4.4

Trends in prevalence of doctor-diagnosed diabetes, 1994-2006, by age and sex

Aged 16 and over *1994-2006*

Doctor-diagnosed diabetes	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
1994	0.8	0.8	1.0	2.5	6.4	5.8	7.5	2.9
1998	0.1	0.7	1.6	2.9	5.8	7.0	8.7	3.3
2003	0.4	0.4	2.6	3.5	8.0	11.8	9.9	4.8
2003[a]	0.4	0.3	2.8	3.6	8.1	11.9	10.0	4.3
2006[a]	0.8	1.2	2.4	6.0	8.5	15.7	13.5	5.6
Women								
1994	0.6	0.3	0.9	1.5	2.5	4.8	5.2	1.9
1998	0.8	0.7	0.9	1.6	3.1	6.6	6.6	2.5
2003	0.8	0.9	1.5	2.5	4.7	8.3	8.9	3.6
2003[a]	0.9	0.9	1.5	2.6	4.7	8.4	8.9	3.4
2006[a]	0.9	1.2	1.2	3.6	6.0	10.4	10.6	4.2
Bases (unweighted)								
Men 1994	*968*	*1434*	*1329*	*1127*	*1001*	*877*	*441*	*7177*
Men 1988	*875*	*1338*	*1305*	*1289*	*987*	*837*	*562*	*7193*
Men 2003	*746*	*1025*	*1263*	*1101*	*1103*	*807*	*557*	*6602*
Men 2006	*650*	*862*	*1183*	*1050*	*1126*	*437*	*317*	*5625*
Women 1994	*1080*	*1723*	*1520*	*1300*	*1059*	*1120*	*825*	*8627*
Women 1998	*1006*	*1630*	*1573*	*1484*	*1148*	*967*	*907*	*8715*
Women 2003	*890*	*1285*	*1618*	*1279*	*1307*	*952*	*903*	*8234*
Women 2006	*794*	*1148*	*1494*	*1279*	*1268*	*470*	*470*	*6923*
Bases (weighted)								
Men 2003	*1047*	*1274*	*1416*	*1185*	*1043*	*731*	*507*	*7202*
Men 2006	*1041*	*1129*	*1356*	*1123*	*1015*	*694*	*496*	*6854*
Women 2003	*1034*	*1285*	*1440*	*1200*	*1074*	*816*	*785*	*7634*
Women 2006	*1014*	*1160*	*1379*	*1141*	*1049*	*768*	*796*	*7307*

[a] Data from 2003 onwards have been weighted for non-response; for 2003 both unweighted and weighted data (shaded rows) are shown.

Table 4.5

Prevalence of doctor-diagnosed diabetes, by age within BMI status and sex

Aged 16 and over with a valid BMI *2006*

Doctor-diagnosed diabetes	Men			Women		
	Not overweight	Overweight[a]	Obese[a]	Not overweight	Overweight[a]	Obese[a]
	%	%	%	%	%	
16-24	0.2	2.5	1.1	0.7	1.8	-
25-34	1.4	1.2	1.2	0.6	1.0	2.6
35-44	0.6	1.7	5.3	0.7	1.0	2.5
45-54	3.2	4.6	8.4	0.8	3.1	6.3
55-64	3.4	5.5	14.5	2.5	5.1	10.1
65-74	8.3	14.9	21.6	6.1	4.7	19.3
75+	6.8	9.5	[25.4]	5.1	8.0	22.6
All	2.0	4.9	9.9	1.6	3.4	8.7
Bases (unweighted)						
16-24	*385*	*140*	*52*	*457*	*138*	*84*
25-34	*285*	*311*	*166*	*475*	*279*	*181*
35-44	*304*	*515*	*265*	*606*	*393*	*309*
45-54	*226*	*447*	*260*	*424*	*398*	*303*
55-64	*202*	*462*	*322*	*376*	*397*	*333*
65-74	*80*	*189*	*107*	*214*	*293*	*269*
75+	*71*	*122*	*43*	*178*	*240*	*157*
All	*1553*	*2186*	*1215*	*2730*	*2138*	*1636*
Bases (weighted)						
16-24	*617*	*230*	*84*	*591*	*170*	*104*
25-34	*376*	*409*	*205*	*495*	*275*	*172*
35-44	*335*	*599*	*312*	*558*	*363*	*286*
45-54	*236*	*477*	*279*	*374*	*351*	*271*
55-64	*181*	*414*	*293*	*312*	*326*	*276*
65-74	*129*	*300*	*169*	*185*	*233*	*211*
75+	*110*	*191*	*68*	*167*	*210*	*130*
All	*1985*	*2620*	*4605*	*2682*	*1929*	*1449*

[a] Not overweight = BMI below 25 kg/m^2; Overweight = BMI 25 to less than 30; Obese = BMI 30 or more.

Table 4.6

Prevalence of doctor-diagnosed diabetes, by age within waist circumference and sex

Aged 16 and over with a valid waist measurement *2006*

Doctor-diagnosed diabetes	Men		Women	
	Waist circumference up to 102cm	Waist circumference more than 102cm	Waist circumference up to 88cm	Waist circumference more than 88cm
	%	%	%	%
16-24	0.7	[2.3]	1.0	-
25-34	1.2	1.1	1.0	1.5
35-44	1.1	4.9	0.8	1.7
45-54	2.5	10.5	1.5	5.1
55-64	4.7	13.3	1.0	10.9
65-74	9.1	24.6	4.1	16.3
75+	7.9	18.0	4.2	17.7
All	2.7	11.5	1.5	8.5
Bases (unweighted)				
16-24	*379*	*36*	*417*	*89*
25-34	*454*	*122*	*496*	*226*
35-44	*615*	*262*	*713*	*400*
45-54	*485*	*296*	*522*	*422*
55-64	*470*	*387*	*491*	*492*
65-74	*317*	*334*	*280*	*415*
75+	*255*	*180*	*249*	*324*
All	*2975*	*1617*	*3168*	*2368*
Bases (weighted)				
16-24	*672*	*71*	*593*	*124*
25-34	*647*	*173*	*545*	*232*
35-44	*691*	*299*	*625*	*359*
45-54	*502*	*313*	*445*	*370*
55-64	*399*	*335*	*381*	*386*
65-74	*252*	*249*	*243*	*303*
75+	*208*	*138*	*246*	*326*
All	*3371*	*1578*	*3077*	*2100*

Table 4.7

Glycated haemoglobin, by age and sex

Aged 16 and over with a valid glycated haemoglobin level *2006*

Glycated haemoglobin	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
Men								
Mean	5.2	5.3	5.4	5.6	5.7	6.0	6.0	5.5
Standard error of the mean	0.03	0.03	0.02	0.05	0.04	0.06	0.05	0.02
≥ 7%[a] (%)	1.1	1.1	2.0	4.0	5.2	10.7	9.4	3.9
Women								
Mean	5.1	5.2	5.3	5.5	5.7	5.9	5.9	5.5
Standard error of the mean	0.03	0.02	0.02	0.02	0.02	0.04	0.04	0.01
≥ 7%[a] (%)	-	0.6	0.6	1.6	4.8	7.5	4.4	2.4
Bases (unweighted)								
Men	*261*	*416*	*667*	*594*	*680*	*474*	*283*	*3375*
Women	*286*	*499*	*807*	*749*	*753*	*537*	*381*	*4012*
Bases (weighted)								
Men	*537*	*588*	*707*	*583*	*534*	*362*	*259*	*3569*
Women	*517*	*603*	*712*	*602*	*545*	*401*	*419*	*3799*

[a] Indicating undiagnosed or uncontrolled diabetes.

Table 4.8

Glycated haemoglobin (observed and age-standardised), by Government Office Region/Strategic Health Authority[a] and sex

Aged 16 and over with a valid glycated haemoglobin level *2006*

Glycated haemoglobin	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
Men											
Observed											
Mean	5.5	5.6	5.5	5.5	5.6	5.5	5.6	5.5	5.6	5.6	5.5
Standard error of the mean	0.06	0.04	0.04	0.05	0.04	0.04	0.07	0.05	0.04	0.07	0.05
≥ 7%[b] (%)	3.2	3.9	4.0	3.3	3.8	2.8	5.3	3.3	4.7	5.9	3.2
Standardised											
Mean	5.5	5.6	5.5	5.5	5.5	5.5	5.7	5.4	5.5	5.6	5.5
Standard error of the mean	0.05	0.04	0.04	0.05	0.04	0.04	0.09	0.05	0.04	0.07	0.05
≥ 7%[b] (%)	2.8	3.7	3.9	3.1	3.4	2.7	6.7	3.1	4.2	2.4	2.2
Women											
Observed											
Mean	5.5	5.5	5.5	5.5	5.6	5.5	5.4	5.5	5.5	5.4	5.5
Standard error of the mean	0.05	0.02	0.03	0.03	0.03	0.03	0.04	0.03	0.03	0.04	0.03
≥ 7%[b] (%)	3.2	1.6	2.6	1.4	3.1	3.8	2.5	1.7	2.3	5.5	2.6
Standardised											
Mean	5.5	5.5	5.5	5.4	5.5	5.5	5.5	5.4	5.4	5.4	5.5
Standard error of the mean	0.05	0.02	0.04	0.03	0.03	0.03	0.05	0.03	0.03	0.04	0.03
≥ 7%[b] (%)	3.1	1.6	3.2	1.2	2.7	3.6	3.8	1.6	2.3	2.5	2.0
Bases (unweighted)											
Men	*193*	*514*	*383*	*321*	*375*	*401*	*285*	*300*	*603*	*316*	*287*
Women	*228*	*631*	*439*	*382*	*472*	*404*	*324*	*399*	*733*	*418*	*315*
Bases (weighted)											
Men	*181*	*469*	*360*	*332*	*372*	*425*	*512*	*340*	*578*	*317*	*261*
Women	*201*	*544*	*379*	*319*	*418*	*390*	*514*	*395*	*639*	*372*	*267*

[a] This table provides data for regional analysis both by Government Office Region (GOR) and the new configuration of Strategic Health Authorities (SHAs) in place from July 2006. The first eight columns represent GORs and SHAs of the same name, while the South East GOR (column nine) is divided into South East Coast SHA and South Central SHA, shown in the final two columns.

[b] Indicating undiagnosed or uncontrolled diabetes.

Table 4.9

Glycated haemoglobin (age-standardised), by equivalised household income and sex

Aged 16 and over with a valid glycated haemoglobin level *2006*

Doctor-diagnosed diabetes	Equivalised household income quintile				
	Highest	2nd	3rd	4th	Lowest
Men					
Mean	5.5	5.5	5.6	5.6	5.7
Standard error of the mean	0.03	0.02	0.04	0.05	0.06
≥ 7%[a] (%)	3.5	2.6	3.7	4.9	5.4
Women					
Mean	5.4	5.5	5.4	5.5	5.5
Standard error of the mean	0.03	0.04	0.02	0.03	0.03
≥ 7%[a] (%)	0.6	3.0	0.6	3.9	3.8
Bases (unweighted)					
Men	*712*	*690*	*604*	*479*	*371*
Women	*699*	*716*	*725*	*730*	*504*
Bases (weighted)					
Men	*711*	*728*	*600*	*485*	*426*
Women	*628*	*649*	*657*	*691*	*523*

[a] Indicating undiagnosed or uncontrolled diabetes.

Table 4.10

Comparison of glycated haemoglobin, 2003 and 2006, by age and sex

Aged 16 and over with a valid glycated haemoglobin level *2003, 2006*

Glycated haemoglobin	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
Men								
2003								
Mean	4.9	5.0	5.3	5.4	5.6	5.7	5.7	5.3
Standard error of the mean	0.02	0.02	0.03	0.03	0.03	0.04	0.04	0.01
≥ 7%[a] (%)	-	-	2.5	3.1	5.3	6.8	4.7	2.8
2006								
Mean	5.2	5.3	5.4	5.6	5.7	6.0	6.0	5.5
Standard error of the mean	0.03	0.03	0.02	0.05	0.04	0.06	0.05	0.02
≥ 7%[a] (%)	1.1	1.1	2.0	4.0	5.2	10.7	9.4	3.9
Women								
2003								
Mean	5.0	5.0	5.1	5.3	5.5	5.7	5.8	5.3
Standard error of the mean	0.02	0.03	0.02	0.02	0.02	0.04	0.04	0.01
≥ 7%[a] (%)	0.3	1.3	1.4	1.2	3.0	6.2	6.1	2.4
2006								
Mean	5.1	5.2	5.3	5.5	5.7	5.9	5.9	5.5
Standard error of the mean	0.03	0.02	0.02	0.02	0.02	0.04	0.04	0.01
≥ 7%[a] (%)	-	0.6	0.6	1.6	4.8	7.5	4.4	2.4
Bases (unweighted)								
Men 2003	*300*	*538*	*763*	*707*	*680*	*492*	*302*	*3782*
Men 2006	*261*	*416*	*667*	*594*	*680*	*474*	*283*	*3375*
Women 2003	*334*	*593*	*897*	*806*	*820*	*540*	*427*	*4417*
Women 2006	*286*	*499*	*807*	*749*	*753*	*537*	*381*	*4012*
Bases (weighted)								
Men 2003	*571*	*707*	*777*	*674*	*576*	*401*	*278*	*3985*
Men 2006	*537*	*588*	*707*	*583*	*534*	*362*	*259*	*3569*
Women 2003	*560*	*707*	*789*	*667*	*601*	*449*	*427*	*4199*
Women 2006	*517*	*603*	*712*	*602*	*545*	*401*	*419*	*3799*

[a] Indicating undiagnosed or uncontrolled diabetes.

Table 4.11

Glycated haemoglobin levels, by doctor-diagnosed diabetes status, age and sex

Aged 35 and over with a valid glycated haemoglobin level[a] *2006*

Glycated haemoglobin	With doctor-diagnosed diabetes				Without doctor-diagnosed diabetes		
	Age		Total		Age		Total
	35-44	65+			35-44	65+	
	%	%	%		%	%	%%
Men				**Men**			
<6.5%[b]	18.6	33.3	26.1	<6.5%[b]	98.4	92.3	97.0
6.5-<7.5%[c]	33.1	35.2	34.2	6.5-<7.5%[c]	1.1	5.5	2.2
≥ 7.5%[d]	48.3	31.4	39.7	≥ 7.5%[d]	0.5	2.2	0.9
Women				**Women**			
<6.5%[b]	26.0	[41.8]	35.9	<6.5%[b]	98.8	97.5	98.4
6.5-<7.5%[c]	39.3	[28.1]	32.3	6.5-<7.5%[c]	0.8	2.5	1.3
≥ 7.5%[d]	34.7	[30.1]	31.8	≥ 7.5%[d]	0.3	-	0.2
Bases (unweighted)				*Bases (unweighted)*			
Men	*89*	*50*	*139*	*Men*	*1852*	*318*	*2170*
Women	*58*	*44*	*102*	*Women*	*2251*	*406*	*2657*
Bases (weighted)				*Bases (weighted)*			
Men	*85*	*88*	*174*	*Men*	*1739*	*529*	*2268*
Women	*50*	*85*	*135*	*Women*	*1809*	*733*	*2542*

[a] The analysis is restricted to those aged 35 and over due to the small numbers of people with diabetes aged under 35.

[b] Indicating good blood glucose control.

[c] Target range for type 2 diabetics.

[d] Indicating poor blood glucose control.

Table 4.12

Prevalence of raised glycated haemoglobin, by age within BMI status and sex

Aged 16 and over with a valid BMI and a valid glycated haemoglobin level *2006*

Glycated haemoglobin ≥7%[a]	Men			Women		
	Not overweight[b]	Overweight[b]	Obese[b]	Not overweight[b]	Overweight[b]	Obese[b]
	%	%	%	%	%	
16-24	-	4.6	[-]	-	-	-
25-34	0.8	1.0	2.0	-	0.6	1.2
35-44	0.5	1.0	6.2	-	1.0	1.3
45-54	0.9	3.6	5.0	0.7	1.0	3.6
55-64	0.6	4.7	9.7	0.7	2.8	9.1
65-74	6.2	9.2	16.1	5.7	3.9	14.7
75+	10.1	5.9	[13.4]	-	5.9	6.5
All	1.4	3.7	7.3	0.6	2.1	5.3
Bases (unweighted)						
16-24	*168*	*62*	*20*	*457*	*138*	*84*
25-34	*138*	*168*	*82*	*475*	*279*	*181*
35-44	*181*	*315*	*149*	*606*	*393*	*309*
45-54	*125*	*272*	*157*	*424*	*398*	*303*
55-64	*138*	*309*	*198*	*376*	*397*	*333*
65-74	*88*	*226*	*122*	*214*	*293*	*269*
75+	*71*	*117*	*41*	*178*	*240*	*157*
All	*909*	*1469*	*769*	*2730*	*2138*	*1636*
Bases (weighted)						
16-24	*350*	*125*	*43*	*332*	*104*	*66*
25-34	*198*	*241*	*111*	*301*	*169*	*104*
35-44	*189*	*335*	*161*	*315*	*209*	*149*
45-54	*119*	*268*	*156*	*218*	*184*	*150*
55-64	*108*	*242*	*156*	*190*	*189*	*133*
65-74	*69*	*169*	*92*	*102*	*142*	*113*
75+	*67*	*104*	*38*	*95*	*136*	*81*
All	*1100*	*1484*	*756*	*1553*	*1132*	*796*

[a] Indicating undiagnosed or uncontrolled diabetes.

[b] Not overweight = BMI below 25; Overweight = BMI 25 to less than 30; Obese = BMI 30 or more.

Table 4.13

Prevalence of raised glycated haemoglobin, by age within waist circumference and sex

Aged 16 and over with a valid waist measurement and a valid glycated haemoglobin level *2006*

Glycated haemoglobin ≥7%[a]	Men		Women	
	Waist circumference up to 102cm	Waist circumference more than 102cm	Waist circumference up to 88cm	Waist circumference more than 88cm
	%	%	%	%
16-24	0.7	b	-	-
25-34	0.9	1.8	0.2	1.4
35-44	0.7	5.4	0.2	1.1
45-54	1.6	7.6	0.4	2.8
55-64	2.9	8.2	1.1	8.7
65-74	5.5	16.1	4.0	10.0
75+	8.1	10.1	1.0	6.5
All	2.0	8.1	1.0	4.4
Bases (unweighted)				
16-24	*240*	*19*	*236*	*50*
25-34	*330*	*86*	*349*	*146*
35-44	*477*	*190*	*527*	*271*
45-54	*365*	*222*	*419*	*316*
55-64	*382*	*292*	*397*	*356*
65-74	*243*	*224*	*230*	*302*
75+	*165*	*110*	*172*	*199*
All	*2202*	*1143*	*2330*	*1640*
Bases (weighted)				
16-24	*493*	*41*	*424*	*92*
25-34	*462*	*126*	*424*	*174*
35-44	*504*	*203*	*454*	*249*
45-54	*354*	*222*	*326*	*260*
55-64	*296*	*234*	*283*	*262*
65-74	*186*	*170*	*170*	*225*
75+	*151*	*100*	*184*	*224*
All	*2445*	*1096*	*2267*	*1486*

[a] Indicating undiagnosed or uncontrolled diabetes.

[b] Results are not shown due to small bases.

Table 4.14

Estimated odds ratios for type 2 diabetes, by associated risk factors and sex

Aged 35 and over[a] *2005*

Variable	N	Odds ratio	95% C.I.[b]	Variable	N	Odds ratio	95% C.I.[b]
Men *Base (weighted) 4666*				**Women** *Base (weighted) 5108*			
Age (p<0.001)				**Age (p<0.001)**			
35-44	1348	1		35-44	1373	1	
45-54	1120	2.92	1.75-4.88	45-54	1126	2.76	1.34-5.70
55-64	1011	3.49	2.07-5.87	55-64	1047	6.10	3.13-11.90
65-74	691	4.55	2.57-8.06	65-74	768	8.39	3.90-18.05
75+	496	3.98	2.19-7.25	75+	793	7.51	3.39-16.67
Alcohol consumption (p<0.001)				**Alcohol consumption (p<0.001)**			
No alcohol in the last 12 months	436	1		No alcohol in the last 12 months	735	1	
No alcohol in last week or < 4 units on heaviest drinking day in last week[c]	2541	0.55	0.37-0.82	No alcohol in last week or < 3 units on heaviest drinking day in last week[c]	2862	0.62	0.43-0.90
Alcohol >4 and < 8 units on heaviest drinking day in last week	792	0.39	0.24-0.64	Alcohol >3 or <6 units on heaviest drinking day in last week	903	0.23	0.12-0.43
Alcohol >8 units on heaviest drinking day in last week	896	0.36	0.22-0.59	Alcohol >6 units on heaviest drinking day in last week	608	0.18	0.07-0.45
Body Mass Index (p=0.001)				**Body Mass Index (p=0.018)**			
BMI <25 kg/m^2	987	1		BMI <25 kg/m^2	1589	1	
BMI >25 -29.9 kg/m^2 (overweight)	1974	1.46	0.85-2.53	BMI >25 -29.9 kg/m^2 (overweight)	1477	1.01	0.56-1.81
BMI >30 kg/m^2 (obese)	1117	2.32	1.33-4.05	BMI >30 kg/m^2 (obese)	1161	1.87	1.03-3.39
Not measured	588	2.36	1.33-4.17	Not measured	881	1.48	0.83-2.64
Waist circumference (p<0.001)				**Waist circumference (p<0.001)**			
Waist circumference <102 cm	2077	1		Waist circumference <88cm	1961	1	
Waist circumference >102 cm	1363	2.26	1.56-3.29	Waist circumference >88cm	1734	4.08	2.24-7.43
Not measured	1227	1.42	0.80-2.49	Not measured	1413	2.31	1.15-4.63
Physical activity (p<0.001)				**Physical activity (p=0.437)**			
Low	2195	1		Low	2644	1	
Medium	1082	0.46	0.30-0.72	Medium	1320	0.78	0.48-1.28
High	1389	0.54	0.37-0.77	High	1145	0.70	0.38-1.26
Blood pressure (p=0.002)				**Blood pressure (p=0.116)**			
Not hypertensive[d]	1794	1		Not hypertensive[d]	2108	1	
Hypertensive[e]	1177	2.00	1.36-2.95	Hypertensive[e]	1179	1.61	1.02-2.53
Not measured	1695	1.46	0.87-2.45	Not measured	1820	1.48	0.81-2.70
Index of multiple deprivation (p=0.375)				**Index of multiple deprivation (p=0.004)**			
Least deprived quintile	1006	1		Least deprived quintile	1096	1	
Second quintile	1064	1.13	0.77-1.66	Second quintile	1176	1.53	0.93-2.51
Third quintile	1023	1.05	0.71-1.57	Third quintile	1131	1.26	0.76-2.09
Fourth quintile	868	1.19	0.78-1.82	Fourth quintile	959	1.72	1.08-2.77
Most deprived quintile	706	1.52	0.98-2.35	Most deprived quintile	746	2.88	1.76-4.69

[a] The analysis is restricted to those aged 35 and over due to the small numbers of people with diabetes aged under 35.

[b] Confidence interval.

[c] Includes 14 cases (men), 18 cases (women) where the information was not given.

[d] Not hypertensive: Systolic blood pressure (BP)<140 , diastolic BP <90 mmHg, and not taking medication for BP.

[e] Hypertensive: Systolic BP >140, diastolic BP >90 mmHg or on medication for hypertension.

BMI, overweight and obesity

5

Vasant Hirani, Ayesha Ali

Key findings

- This chapter reports on measurements relevant to obesity: body mass index (BMI), prevalence of overweight and obesity, and waist circumference.
- Body mass index (BMI), defined as weight in kilograms divided by the square of the height in metres (kg/m^2), was used to categorise adult informants into categories such as overweight and obese.
- Overall, mean BMI in men (27.2 kg/m^2) was similar to women (26.8 kg/m^2). In men it increased with age up to age 55-64, levelled off up to age group 65-74, followed by a decrease in those aged 75 and over. In women, it increased with age up to age 65-74, and then declined in those aged 75 and over.
- 67% of men and 56% of women were either overweight or obese. A greater proportion of men than women were overweight (43% vs 32%). There was no difference in the proportion of men and women that were obese (24%). Women had a higher prevalence of morbid obesity than men (3% vs 1% respectively).
- Mean BMI and the prevalence of obesity have continued to increase in both sexes since 1994. Mean BMI increased from 26.0 kg/m^2 in 1994 to 27.2 kg/m^2 in 2006 among men and from 25.8 kg/m^2 in 1994 to 26.8 kg/m^2 in 2006 among women. The prevalence of overweight, including obesity, increased in men from 58% in 1994 to 67% in 2006 and among women from 49% to 56% respectively. Obesity increased in men from 14% in 1994 to 24% in 2006 and among women from 17% to 24%. There was no significant change in morbid obesity between 1994 and 2006.
- Mean waist circumference was 96.8 cm in men and 86.4cm in women. The proportion of informants with a raised waist circumference was higher in women (41%) than in men (32%) in all age groups. The largest difference between the sexes was in those aged 75 and over (57% of women, 41% of men).
- The increase in prevalence of raised waist circumference between 1994 and 2006 was marked among both men (from 22% to 32%) and women (29% to 41%); however, there was no apparent difference in prevalence of raised waist circumference between 2003 and 2006 in either sex.
- NICE 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/m^2; health risks are very high for those with a BMI of 35 kg/m^2 or more with any waist circumference.
- Using combined categories of BMI and waist circumference to assess risk, for men 20% were estimated to be at increased risk, 13% at high risk and 21% at very high risk. The equivalent percentages for women were 14% at increased risk, 16% at high risk and 23% at very high risk.
- Using the NICE categories the proportion of men and women at very high risk of the health effects of overweight and obesity (i.e. with a high/very high waist circumference

and BMI 30 kg/m^2 or more) increased with age. The increase peaked in the 65-74 age-group, in whom 30% of men and 34% of women were in this category followed by a decline in those aged 75 and over.

- The age-standardised prevalence of obesity and raised waist circumference rose as quintile of equivalised household income fell among women. These measures were not related to income in men. The prevalence of overweight was generally positively related to income in men.
- A logistic regression examined risk factors associated with raised waist circumference. Raised waist circumference was positively associated with age, with being an ex-cigarette smoker, and with low levels of physical activity in both men and women. Additionally, among women only, those in the lowest income quintile had almost twice the odds of a raised waist circumference compared with women in the highest income quintile.

5.1 Introduction

5.1.1 Contents of the chapter

The anthropometric measures presented in this chapter for adults (aged 16 and over) focus on measurements relevant to obesity. Height and weight data used to calculate Body Mass Index (BMI) have been collected in each year of the Health Survey series. Height and weight data were used to calculate BMI; waist circumference was used to assess central obesity. First, the methods and definitions of these measurements are described. The relationships of BMI, underweight, overweight and obesity and raised waist circumference prevalence with a number of socio-demographic variables (Government Office Region (GOR)/Strategic Health Authority (SHA) and equivalised household income) are examined. Trends over time in BMI and waist circumference are then reported, followed by multivariate analysis to look at the relationship of raised waist circumference with a number of risk factors.

5.1.2 Context

The World Health Organisation (WHO) report *Obesity: preventing and managing the global epidemic* states that the global prevalence of obesity is increasing rapidly.[1] In England, more than half of all adults are currently classified as overweight or obese.[2] If current trends continue, obesity rates could well rise even higher.[3] The alarming increase in the prevalence of obesity that has occurred over the last decade is of major public health concern.

Obesity is associated with serious chronic conditions such as Type 2 diabetes, hypertension, and hyperlipidaemia (i.e high levels of lipids (fat) in the blood that can lead to narrowing and blockages of blood vessels), which are major risk factors for cardiovascular disease.[4,5] It is generally recognised that the central deposition of fat (abdominal or visceral obesity, see section 5.2.2) is more closely associated with these chronic diseases than Body Mass Index (BMI, see section 5.2.2 for definition)[6] and is a key constituent of the metabolic syndrome, a disorder characterised by increased risk of developing diabetes and cardiovascular disease.[7] Obesity can reduce people's overall quality of life, creates a strain on health services and can lead to premature death.[8]

The WHO report[1] highlighted that the co-morbidities of obesity would be more easily predicted if intra-abdominal fat were also monitored in addition to BMI, by simple measures such as waist circumference. Abdominal obesity is reported as more highly correlated with metabolic risk factors such as hyperlipidaemia and low HDL-cholesterol (beneficial cholesterol that can help reduce the build up of harmful cholesterol in the blood that in excess can block blood vessels; see Chapter 10 of this volume) than is elevated BMI.[9] Moreover, the National Institute for Health and Clinical Excellence (NICE)[10] guidance is now moving towards a combination of BMI and waist circumference in order to classify health risk from obesity (see section 5.2.2 for categories).

The public health White Paper *Choosing Health: Making healthier choices easier*[11] set out the Government's commitments for action on obesity. *Delivering choosing health, Food and Health Action Plan*[12] and *Physical Activity Plan*[13] specified the action that needs to be taken at national, regional and local level to combat obesity and improve people's health through better diet and nutrition and increasing physical activity. The National Service Frameworks for coronary heart disease (CHD),[14] diabetes[15] and cancer[16] also include actions to address obesity indirectly. NICE has now developed national guidance[10] for healthcare organisations (both within and external to the NHS) on prevention, identification, assessment and management of overweight and obesity.

5.2 Methods and definitions

Full details of the protocols for carrying out the measurements are contained in Volume 3 (Methodology and Documentation), Appendix B (Nurse protocols) and are briefly summarised here. Height and weight were measured during the interviewer visit while waist and hip circumferences were measured during the nurse visit.[17]

5.2.1 Methods

Height

Height was measured using a portable stadiometer with a sliding head plate, a base plate and three connecting rods marked with a metric measuring scale. Informants were asked to remove shoes. One measurement was taken, with the informant stretching to the maximum height and the head positioned in the Frankfort plane. The reading was recorded to the nearest millimetre.

Weight

Weight was measured using Soehnle, Seca and Tanita electronic scales with a digital display. Informants were asked to remove shoes and any bulky clothing. A single measurement was recorded to the nearest 100g. Informants who were pregnant, chairbound, or unsteady on their feet were not weighed. Informants who weighed more than 130kg were asked for their estimated weights because the scales are inaccurate above this level. These estimated weights were included in the analysis.

In the analysis of height and weight, data from those who were considered by the interviewer to have unreliable measurements, for example those who had excessive clothing on, were excluded from the analysis.

Waist circumference

The waist was defined as the midpoint between the lower rib and the upper margin of the iliac crest. It was measured using a tape with an insertion buckle at one end. The measurement was taken twice, using the same tape, and was recorded to the nearest even millimetre. Those whose two waist measurements differed by more than 3cm had a third measurement taken. The mean of the two valid measurements (the two out of the three measurements that were the closest to each other, if there were three measurements) were used in the analysis.

For waist measurements, all those who reported that they had a colostomy or ileostomy, or were chairbound, were excluded from the measurement. All those with measurements considered unreliable by the nurse, for example due to excessive clothing or movement, were excluded from the analysis.

5.2.2 Definitions

Body mass index (BMI)

In order to define overweight or obesity, a measurement is required that allows for differences in weight due to height. A widely accepted measure of weight for height, the Body Mass Index (BMI), defined as weight in kilograms divided by the square of the height in metres (kg/m^2), has been used for this purpose in the Health Survey series.

BMI was calculated for all those informants for whom both a valid height and weight measurement were recorded. Adult informants were classified into the following BMI groups according to the WHO and NICE BMI classification.[10,18]

BMI (kg/m^2)	Description
Less than18.5	Underweight
18.5 to less than 25	Normal
25 to less than 30	Overweight
30 or more	Obese
40 or more	Morbidly obese

BMI categories of overweight and obesity have frequently been combined to show the proportion who are either overweight or obese. As in the 1998, 2003 and 2005 report, a sub-set of the obese category has also been defined, namely those with morbid obesity (BMI 40 kg/m^2 or more) who are at highest risk of morbidity and mortality.[19]

Waist measurement

BMI does not distinguish between mass due to body fat and mass due to muscular physique. It also does not take account of the distribution of fat. It has therefore been postulated that waist circumference may be a better measure than BMI or waist to hip ratio (WHR)[17] to identify those with a health risk from being overweight.

A raised waist circumference has been taken to be greater than 102 cm in men and greater than 88 cm in women, in accordance with the definition of abdominal obesity used by the National Institutes of Health (USA) ATP (Adult Treatment Panel) III.[9] These levels identified people at risk of the metabolic syndrome, a disorder characterised by increased risk of developing diabetes and cardiovascular disease. It has been shown recently that these cut-offs corresponded fairly closely to the 95th percentile of waist circumference for healthy people, indicating that few healthy people have values of waist circumference above these cut offs.[20]

Combined assessment of health risk from obesity

The NICE guidance[10] currently states that the assessment of the health risks associated with overweight and obesity should be based on both BMI and waist circumference in adults with a BMI less than 35 kg/m^2 as follows:

BMI classification	**Waist circumference**		
	Low	High	Very high
Normal weight	No increased risk	No increased risk	Increased risk
Overweight (25 to less than 30 kg/m^2)	No increased risk	Increased risk	High risk
Obesity I (30 to less than 35 kg/m^2)	Increased risk	High risk	Very high risk

Source: NICE guidelines[10]

For men, low waist circumference is defined as less than 94 cm, high as 94–102 cm, and very high as greater than 102 cm. For women, low waist circumference is less than 80 cm, high is 80–88 cm and very high as greater than 88 cm.

NICE also defines categories of Obesity II (35 to less than 40 kg/m^2) and Obesity III (40 kg/m^2 or more). For adults with a BMI of 35 kg/m^2 or more, risks are assumed to be very high with any waist circumference.

5.3 Results

5.3.1 Prevalence of overweight and obesity

Response rates to anthropometric measurements are shown in Table 1. Tables 5.2-5.4 present the prevalence of overweight and obesity by age, region and equivalised income, while Table 5.5 shows trends from 1994-2006. Figure 5A below summarises the prevalence of overweight and obesity by age. Overweight including obese, and obesity increased with age in men up to age 55-64, levelled off up to age group 65-74, followed by a decrease in those aged 75 and over. Among women, the prevalence of overweight and obesity increased with age up to age 65-74, and then declined in those aged 75 and over.

The age-standardised prevalence of obesity was inversely related to quintile of equivalised household income among women, i.e. prevalence of obesity rose as income fell. However, the prevalence of overweight in men was generally positively related to income, with prevalence of overweight generally higher among men with higher incomes.

Figure 5A

Prevalence of overweight and obesity, by age and sex

Base: Aged 16 and over with valid height and weight measurements

5.3.2 Logistic regression for raised waist circumference in relation to risk factors

Analysis showing the link between BMI status and risk factor analysis was not repeated in this chapter because this had already been reported in the Anthropometry chapter (chapter 6) of the HSE 2003 report.[21] Therefore, this chapter examines the link between raised waist circumference and possible risk factors in a logistic regression model developed separately for men and women. The dependent variable was raised waist circumference, taken as greater than102 cm in men and greater than 88 cm in women. The independent variables included in the models were: age, cigarette smoking, alcohol consumption, physical activity, fruit and vegetable consumption, quintile of equivalised household income, IMD (Index of Multiple Deprivation, indicator of area deprivation), and Government Office Region (GOR).

Table 5.10 presents a model of the risk factors associated with raised waist circumference; the odds ratios presented are after adjustment for the other risk factors. Although the model was run separately for men and women, factors of significance in the model for one sex were included in both models.

Age

Age was the predictor most strongly associated with raised waist circumference in both sexes. The reference group chosen was age 16-24. Relative to this group, the odds ratio for raised waist circumference among men increased progressively with age up to 6.7 in those aged 65-74 and up to 6.3 in women of the same age group. In both sexes, the odds were

Figure 5B

Age-standardised prevalence of overweight and obesity, by equivalised household income and sex

Base: Aged 16 and over with valid height and weight measurements

also high (4.1 in men, 5.1 in women) among those aged 75 and over, compared with the youngest group.

Cigarette smoking

Compared with non-smokers, former regular cigarette smokers were more likely to have a raised waist circumference (odds ratios 1.6 for men and 1.2 for women).

Physical activity level

Three levels of summary physical activity levels were analysed:

- *High activity:* 20 or more occasions of moderate or vigorous activity of at least 30 minutes duration in the last four weeks (at least five days a week on average). The term *'high'* in this definition is relative in this context and corresponds to the current recommendations for physical activity (see chapter 6 in this volume)
- *Medium activity:* four to 19 occasions of moderate or vigorous activity of at least 30 minutes' duration in the last four weeks (one to five days a week).
- *Low activity:* Up to three occasions of moderate or vigorous activity of at least 30 minutes' duration in the last four weeks (less than once a week).

Compared with those with high activity levels, those with medium activity levels were 1.4 times more likely to have a raised waist circumference and those with low activity levels were around twice as likely.

Equivalised household income

The highest income quintile was chosen as the reference group. Once the other independent variables were included in the model, income quintile was significantly related to odds of a raised waist circumference, but only in women. Women in the four lower income quintiles had higher odds of a raised waist circumference than those in the highest income quintile (odds ratios ranging from 1.4 to 1.9). **Table 5.10**

Figure 5C

Age-standardised prevalence of raised waist circumference, by equivalised household income and sex

Base: Aged 16 and over with a valid waist circumference measurement

5.3.3 Prevalence of combined health risk by NICE definition

The NICE evidence-based guidelines include details on prevention, identification, assessment and management of overweight and obesity, with the aim of allowing health professionals to be made more aware of how to manage overweight and obesity in primary care. The guidelines highlight the impact of overweight and obesity on risk factors for developing other long-term health problems such as coronary heart disease, Type 2 diabetes, osteoarthritis and some cancers. It states that risk of these co-morbidities should be identified using both BMI and waist circumference as assessment tools in those with a BMI less than 35 kg/m^2 (further details are outlined in section 5.2.2). The NICE guidance states that 'waist circumference is a valid measure of abdominal fat mass and disease risk in individuals with a BMI less than 35. If BMI is 35 or more, waist circumference adds little to the absolute measure of risk provided by BMI'.[10]

Table 5.11 and Figure 5D show the proportions by age and sex that fell into different risk categories, as determined by the combination of measures of generalised obesity (BMI) and abdominal obesity (waist circumference). Using combined categories of BMI and waist circumference to assess risk for men, 20% were estimated to be at increased risk, 13% at high risk and 21% at very high risk. The equivalent percentages for women were 14% at increased risk, 16% at high risk and 23% at very high risk.

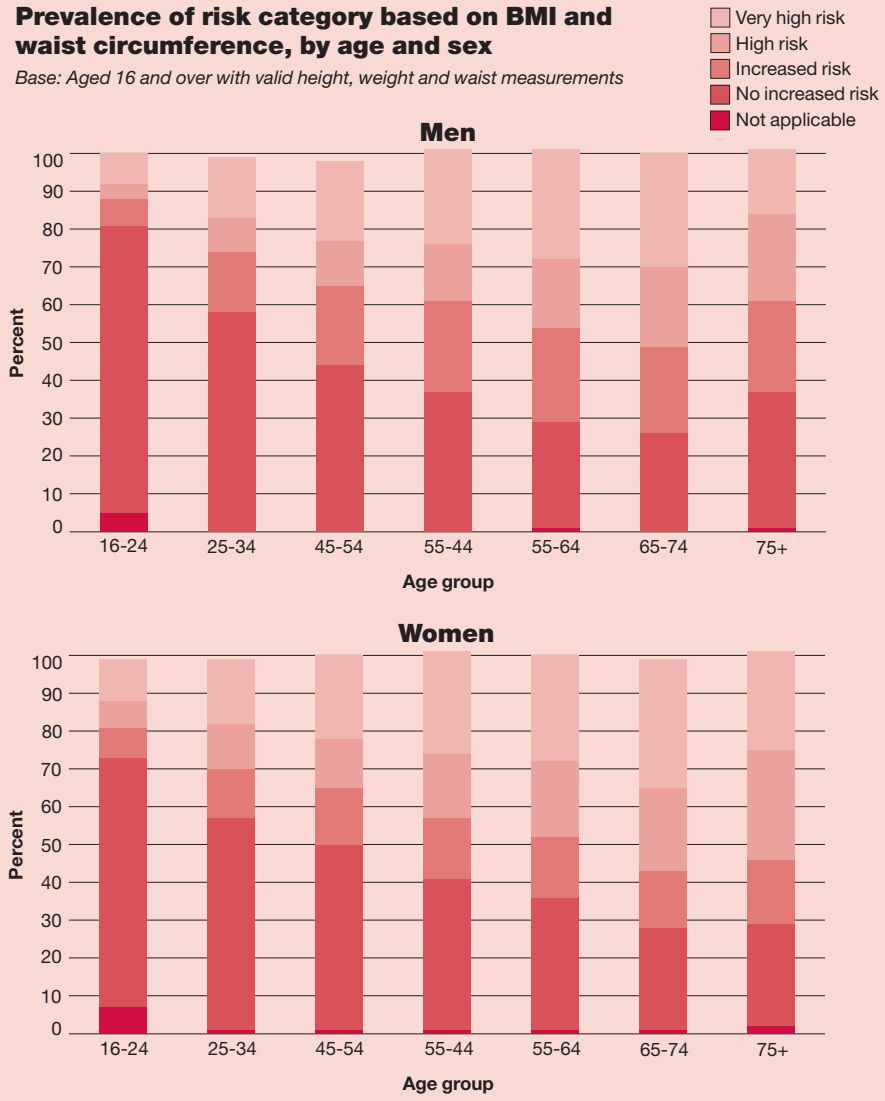
A very small proportion of men and women had both a normal BMI and a very high waist circumference, putting them at **increased risk** of health problems. This was most common in men aged 65 and over (1%) and in women aged 75 and over (4%).

Those who are overweight and have a high waist circumference are defined as being at **increased risk** of health problems from obesity. The proportions in this category were 19% for men and 12% for women. The prevalence among men in this category increased with age, peaking in 55-64 year olds, one quarter of whom fell into this group, and then levelled out thereafter. Fewer women were in this category; prevalence increased with age, from 16-24 to 25-34, but then levelled out.

Figure 5D

Prevalence of risk category based on BMI and waist circumference, by age and sex

Base: Aged 16 and over with valid height, weight and waist measurements



Those who are overweight with a very high waist circumference are defined as being at **high risk** of health problems. 11% of men and 15% of women were in this category.

Those who are obese (category I) have increased health risks, even with a low waist circumference (fewer than 1% of men or women). 3% of men and 1% of women were obese I with a high waist circumference; a further 15% of men and 14% of women were obese I with a very high waist circumference. The proportion of men who were obese I and at very high risk (i.e. also had a very high waist circumference) increased with age, being most common in those aged 65-74, of whom nearly one quarter fell into this group, and then declining to 14% of older men. Among women, the proportion in this group increased with age from 7% in those aged 16-24 to 21% in those aged 65-74 and levelled out in older women.

People who are obese II or III (BMI 35 and over) are defined as being at **very high risk** of health problems, regardless of their waist circumference. 4% of men and 6% of women were in the obese II group; 1% of men and 3% of women were in the obese III group; all of these were in the very high risk group. **Table 5.11**

5.4 Discussion

The data show that the prevalence of overweight, including obesity, and of raised waist circumference in both sexes increased with time between 1994 and 2003 and levelled off by 2006. At these levels it can be expected that the risk of morbidity will be affected. The consistent independent association between obesity, diabetes, hypertension and associated co-morbidities has been shown in another analysis of nationally representative data from the HSE.[22]

The data from Table 5.11 show that the great majority of men and women who were overweight or obese had a high or very high waist circumference. This highlights the importance of early identification of abdominal obesity and the need to consider both BMI and waist circumference when assessing risks of obesity and obesity-related co-morbidities.

The consistent independent association between raised waist circumference and other risk factors shown in these data and in other studies confirms the need for healthcare professionals to incorporate waist circumference measurements in addition to using BMI classifications into routine practice. Treatment of overweight and obesity should be implemented through effective evidence-based weight management interventions such as those highlighted in the NICE guidelines,[10] alongside broader preventive strategies at the population level.

References and notes

1 World Health Organisation. *The problems of overweight and obesity* in WHO. *Obesity: preventing and managing the global epidemic. Report of a WHO consultation*. WHO Technical Report Series 894. WHO, Geneva, 2000. http://whqlibdoc.who.int/trs/WHO_TRS_894_(part1).pdf.in: (accessed 04/09/2007).

2 The Information Centre. *Health Survey for England - updating of trend tables to include 2006 data*. www.ic.nhs.uk/pubs/hse06trends. (accessed 23/10/07).

3 Zaninotto P, Wardle H, Stamatakis E, et al. *Forecasting obesity*. Department of Health, London, 2006. http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsStatistics/DH_4138630

4 Kopelman PG. *Obesity as a medical problem*. Nature. 2000; **404**:635-643.

5 Gensini GF, Comeglio M, Colella A. *Classical risk factors and emerging elements in the risk profile for coronary artery disease*. Eur Heart J. 1998; **19** Suppl A:A53-61.

6 Sjostrom L. *Obesity and its relationship to other diseases* (Chapter 11.4) pp 235-239 in Shetty PS, McPherson K (eds). *Diet, nutrition and chronic disease: lessons from contrasting worlds* 1996. London School of Hygiene and Tropical Medicine Sixth Annual Public Health Forum, 1997, Wiley, London.

7 The International Diabetes Federation (IDF). *Worldwide definition of the metabolic syndrome*. (2006). www.idf.org/webdata/docs/IDF. (accessed 10/06/07)

8 Jonsson S, Hedblad B, Engstrom G et al *Influence of obesity on cardiovascular risk. Twenty-three-year follow-up of 22,025 men from an urban Swedish population*. Int J Obes Metab Disord. 2002; **8**:1046-53.

9 National Institutes of Health. *Third report of the National Cholesterol Education Program Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults* (Adult Treatment Panel III). NIH, Bethesda, Md, 2001. NIH Publication 01-3670.

10 National Institute of Health and Clinical Excellence. *Obesity: the prevention, identification, assessment and management of overweight and obesity in adults and children*. http://www.nice.org.uk/guidance/index.jsp?action=download&o=38295. page 222 (accessed 27/11/2007).

11 Department of Health. *Choosing Health: Making Healthy Choices Easier*. TSO, London, 2004. www.dh.gov.uk/PublicationsAndStatistics/

12 Department of Health. *Choosing a Better Diet: A consultation on priorities for a food and health action plan*. DH, London, 2005 www.dh.gov.uk/assetRoot/04/06/58/34/04065834.pdf (accessed 23/7/06).

13 Department of Health. *Choosing Activity: a physical activity action plan*. DH, London, 2005. www.dh.gov.uk/assetRoot/04/10/57/10/04105710.pdf (accessed 23/7/06).

14 Department of Health. *National Service Framework (NSF) for coronary heart disease. Executive summary*. DH, London, 2000. www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4094274 (accessed 07/09/07)

15 Department of Health. *National Service Framework (NSF) for Diabetes: Delivery Strategy*. DH, London. 2002
www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_4032823.pdf (accessed 07/09/07).

16 Department of Health. *Cancer Plan: a plan for investment, a plan for reform*. DH, London, 2000
www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/Browsable/DH_4098139 (accessed 07/09/07).

17 This chapter includes results of waist circumference measurements but not waist: hip ratios, so details of hip circumference measurements are not included in this chapter.

18 *World Health Organisation body mass index (BMI) classification*.
www.who.int/bmi/index.jsp?introPage=intro_3.html (accessed 17/08/2007).

19 NHS Consensus Development Conference. *Gastrointestinal surgery for severe obesity*. Nutrition. 1996; 12:397-402.

20 Flegal KM. *Waist circumference of healthy men and women in the United States*. Int J Obes. 2007; **31**:1134-9.

21 Hirani V. *Anthropometry* in Primatesta P and Erens B and Prior G (eds). *Health Survey for England 2003*. The Stationery Office, London, 2005.

22 Hirani V, Zaninotto P, Primatesta P. *Generalised and abdominal obesity and risk of diabetes, hypertension and hypertension- diabetes co-morbidity in England*. J Public Health Nutr 2007: 1-7 [epub ahead of print].

Tables

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5.11 Health risk category associated with overweight and obesity in adults based on Body Mass Index (BMI) and waist circumference, by sex and age

Table 5.1

Response to anthropometric measurements, by age and sex

Aged 16 and over who were interviewed/had a nurse visit *2006*

Proportion providing valid measurement	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Height	90	90	93	90	89	88	76	89
Weight	89	87	91	89	88	88	82	89
BMI	89	87	91	88	87	86	74	87
Waist circumference	97	98	98	98	97	98	95	98
Women								
Height	91	91	92	91	89	86	66	88
Weight	88	88	90	88	88	85	75	87
BMI	88	88	89	87	87	83	64	85
Waist circumference	99	99	98	97	99	97	95	98
Bases (unweighted)								
Men								
Height, weight, BMI (interviewed)	*650*	*862*	*1183*	*1050*	*1126*	*852*	*601*	*6324*
Waist circumference (saw nurse)	*431*	*585*	*889*	*797*	*882*	*666*	*458*	*4708*
Women								
Height (interviewed)	*794*	*1148*	*1494*	*1279*	*1269*	*933*	*901*	*7818*
Weight, BMI (interviewed)[a]	*769*	*1065*	*1461*	*1279*	*1269*	*933*	*901*	*7677*
Waist circumference (saw nurse)	*515*	*733*	*1136*	*972*	*996*	*717*	*602*	*5671*
Bases (weighted)								
Men								
Height, weight, BMI (interviewed)	*1041*	*1129*	*1356*	*1123*	*1015*	*694*	*496*	*6854*
Waist circumference (saw nurse)	*769*	*833*	*1005*	*832*	*754*	*516*	*368*	*5076*
Women								
Height (interviewed)	*1014*	*1160*	*1379*	*1141*	*1050*	*768*	*798*	*7310*
Weight, BMI (interviewed)[a]	*985*	*1075*	*1349*	*1141*	*1050*	*768*	*798*	*7167*
Waist circumference (saw nurse)	*727*	*788*	*1004*	*843*	*778*	*569*	*594*	*5303*

[a] Excluding pregnant women.

Table 5.2

Body Mass Index (BMI), underweight, overweight and obesity prevalence, by age and sex

Aged 16 and over with both valid height and weight measurements — *2006*

BMI (kg/m^2) and BMI status (%)[a]	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
Men								
Mean BMI (kg/m^2)	24.1	26.7	27.8	28.0	28.6	28.3	27.0	27.2
Standard error of the mean	0.21	0.17	0.15	0.14	0.15	0.15	0.16	0.07
% Underweight	6	0	0	0	0	0	1	1
% Normal	61	38	26	24	20	19	31	32
% Overweight	25	41	48	48	47	49	51	43
% Obese, excluding morbidly obese	8	20	23	26	30	30	18	22
% Morbidly obese	1	1	2	2	3	1	0	1
% Overweight, including obese	*34*	*62*	*73*	*76*	*80*	*80*	*69*	*67*
% Obese	*9*	*21*	*25*	*28*	*33*	*31*	*18*	*24*
Women								
Mean BMI (kg/m^2)	24.0	25.9	26.8	27.6	28.0	28.6	27.5	26.8
Standard error of the mean	0.21	0.19	0.16	0.17	0.17	0.19	0.22	0.08
% Underweight	7	2	1	1	1	1	2	2
% Normal	62	50	45	37	33	26	29	42
% Overweight	20	29	30	35	36	38	42	32
% Obese, excluding morbidly obese	11	16	21	24	27	31	26	22
% Morbidly obese	1	2	3	3	3	4	2	3
% Overweight, including obese	*32*	*47*	*54*	*62*	*66*	*72*	*69*	*56*
% Obese	*12*	*18*	*24*	*27*	*30*	*35*	*27*	*24*
Bases (unweighted)								
Men	*577*	*762*	*1084*	*933*	*986*	*735*	*446*	*5523*
Women	*679*	*935*	*1308*	*1125*	*1106*	*776*	*575*	*6504*
Bases (weighted)								
Men	*930*	*991*	*1246*	*993*	*888*	*599*	*368*	*6014*
Women	*866*	*942*	*1207*	*996*	*914*	*637*	*511*	*6074*

[a] Underweight: less than 18.5 kg/m^2
Normal weight : 18.5 to less than 25 kg/m^2
Overweight: 25 to less than 30 kg/m^2
Obese, excluding morbidly obese: 30 to less than 40 kg/m^2
Morbidly obese: 40 kg/m^2 or more

Overweight, including obese: 25 kg/m^2 or more
Obese: 30 kg/m^2 or more

Table 5.3

Body Mass Index (BMI), underweight, overweight and obesity prevalence (observed and age-standardised), by Government Office Region/Strategic Health Authority[a] and sex

Aged 16 and over with both valid height and weight measurements *2006*

BMI (kg/m^2) and BMI status (%)[b]	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
Men											
Observed											
Mean BMI (kg/m^2)	27.2	27.1	27.3	27.3	27.9	27.2	26.5	27.7	27.1	27.2	26.9
Standard error of the mean	0.29	0.19	0.16	0.30	0.21	0.19	0.24	0.22	0.17	0.30	0.20
% Underweight	1	2	2	1	1	1	1	0	1	1	1
% Normal	38	32	31	33	23	30	40	30	31	31	31
% Overweight	34	43	41	41	47	48	42	42	47	44	49
% Obese, excluding morbidly obese	26	23	24	23	26	21	15	26	20	22	18
% Morbidly obese	1	1	2	2	2	1	2	2	1	2	1
% Overweight, including obese	*61*	*66*	*67*	*66*	*76*	*69*	*60*	*70*	*68*	*68*	*68*
% Obese	*27*	*24*	*26*	*25*	*28*	*22*	*17*	*28*	*22*	*24*	*19*
Standardised											
Mean BMI (kg/m^2)	27.3	27.1	27.3	27.5	27.9	27.2	26.7	27.5	26.8	26.9	26.7
Standard error of the mean	0.30	0.20	0.16	0.28	0.20	0.19	0.24	0.22	0.18	0.32	0.20
% Underweight	1	2	2	1	1	1	1	0	1	1	1
% Normal	36	32	31	31	23	30	38	32	33	34	32
% Overweight	35	43	41	42	47	48	42	41	46	43	48
% Obese, excluding morbidly obese	27	22	24	24	26	21	17	25	19	21	18
% Morbidly obese	1	1	2	2	2	1	2	2	1	1	1
% Overweight, including obese	*62*	*66*	*67*	*68*	*76*	*69*	*61*	*68*	*66*	*65*	*67*
% Obese	*28*	*23*	*26*	*26*	*29*	*22*	*19*	*27*	*20*	*22*	*18*

[a] This table provides data for regional analysis both by Government Office Region (GOR) and the new configuration of Strategic Health Authorities (SHAs) in place from July 2006. The first eight columns represent GORs and SHAs of the same name, while the South East GOR (column nine) is divided into South East Coast SHA and South Central SHA, shown in the final two columns.

[a] Underweight: less than 18.5 kg/m^2
Normal weight : 18.5 to less than 25 kg/m^2
Overweight: 25 to less than 30 kg/m^2
Obese, excluding morbidly obese: 30 to less than 40 kg/m^2
Morbidly obese: 40 kg/m^2 or more

Overweight, including obese: 25 kg/m^2 or more
Obese: 30 kg/m^2 or more

Continued…

Table 5.3 continued

Aged 16 and over with both valid height and weight measurements *2006*

BMI (kg/m^2) and BMI status (%)[b]	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
Women											
Observed											
Mean BMI (kg/m^2)	27.3	26.6	26.8	27.3	27.7	26.9	25.8	27.0	26.6	26.3	26.9
Standard error of the mean	0.30	0.19	0.20	0.22	0.19	0.22	0.25	0.23	0.23	0.32	0.28
% Underweight	1	2	3	3	2	2	3	1	2	3	2
% Normal	39	43	42	37	36	39	51	42	43	45	41
% Overweight	32	33	31	34	33	36	26	34	30	30	30
% Obese, excluding morbidly obese	26	19	21	24	26	21	18	20	22	21	24
% Morbidly obese	2	2	3	3	4	3	2	3	2	2	3
% Overweight, including obese	*60*	*55*	*56*	*61*	*62*	*59*	*46*	*57*	*55*	*52*	*57*
% Obese	*28*	*22*	*24*	*27*	*29*	*24*	*20*	*23*	*24*	*22*	*27*
Standardised											
Mean BMI (kg/m^2)	27.4	26.5	27.0	27.2	27.6	26.8	26.2	27.0	26.5	26.3	26.8
Standard error of the mean	0.28	0.19	0.20	0.23	0.19	0.22	0.27	0.24	0.23	0.33	0.28
% Underweight	1	2	2	3	2	2	3	1	2	3	2
% Normal	38	44	40	38	36	39	48	42	43	45	42
% Overweight	32	33	32	34	33	36	28	34	30	30	30
% Obese, excluding morbidly obese	26	19	22	23	26	21	19	20	22	21	24
% Morbidly obese	2	2	3	3	4	2	2	3	2	2	3
% Overweight, including obese	*61*	*54*	*57*	*59*	*62*	*59*	*49*	*57*	*54*	*53*	*57*
% Obese	*28*	*22*	*25*	*26*	*29*	*23*	*21*	*23*	*24*	*22*	*26*
Bases (unweighted)											
Men	*286*	*832*	*577*	*553*	*597*	*646*	*607*	*524*	*901*	*451*	*450*
Women	*360*	*967*	*681*	*661*	*741*	*724*	*651*	*671*	*1048*	*561*	*487*
Bases (weighted)											
Men	*297*	*811*	*608*	*547*	*648*	*696*	*861*	*594*	*953*	*480*	*473*
Women	*326*	*840*	*619*	*539*	*677*	*683*	*762*	*659*	*969*	*524*	*445*

[a] This table provides data for regional analysis both by Government Office Region (GOR) and the new configuration of Strategic Health Authorities (SHAs) in place from July 2006. The first eight columns represent GORs and SHAs of the same name, while the South East GOR (column nine) is divided into South East Coast SHA and South Central SHA, shown in the final two columns.

[a] Underweight: less than 18.5 kg/m^2
Normal weight : 18.5 to less than 25 kg/m^2
Overweight: 25 to less than 30 kg/m^2
Obese, excluding morbidly obese: 30 to less than 40 kg/m^2
Morbidly obese: 40 kg/m^2 or more

Overweight, including obese: 25 kg/m^2 or more
Obese: 30 kg/m^2 or more

Table 5.4

Body Mass Index (BMI), underweight, overweight and obesity prevalence (age-standardised), by equivalised household income and sex

Aged 16 and over with both valid height and weight measurements — *2006*

BMI (kg/m^2) and BMI status (%)[a]	Equivalised household income quintile				
	Highest	2nd	3rd	4th	Lowest
Men					
Mean BMI (kg/m^2)	27.1	27.3	27.3	27.3	27.1
Standard error of the mean	0.17	0.15	0.14	0.21	0.24
% Underweight	0	1	1	2	2
% Normal	32	31	31	32	32
% Overweight	47	45	44	39	41
% Obese, excluding morbidly obese	20	22	22	26	22
% Morbidly obese	1	2	1	1	2
% Overweight, including obese	*68*	*68*	*68*	*66*	*65*
% Obese	*21*	*23*	*24*	*27*	*25*
Women					
Mean BMI (kg/m^2)	25.9	26.8	26.9	27.5	27.6
Standard error of the mean	0.23	0.20	0.16	0.20	0.22
% Underweight	2	2	2	2	3
% Normal	48	42	41	37	33
% Overweight	31	34	33	31	32
% Obese, excluding morbidly obese	18	20	21	26	28
% Morbidly obese	1	3	3	3	4
% Overweight, including obese	*50*	*57*	*57*	*60*	*64*
% Obese	*19*	*23*	*24*	*29*	*32*
Bases (unweighted)					
Men	*1079*	*1052*	*949*	*806*	*655*
Women	*1036*	*1117*	*1135*	*1152*	*886*
Bases (weighted)					
Men	*1193*	*1165*	*998*	*809*	*699*
Women	*979*	*1061*	*1047*	*1035*	*813*

[a] Underweight: less than 18.5 kg/m^2
Normal weight : 18.5 to less than 25 kg/m^2
Overweight: 25 to less than 30 kg/m^2
Obese, excluding morbidly obese: 30 to less than 40 kg/m^2
Morbidly obese: 40 kg/m^2 or more

Overweight, including obese: 25 kg/m^2 or more
Obese: 30 kg/m^2 or more

Table 5.5

Trends in Body Mass Index (BMI), underweight, overweight and obesity prevalence, 1994 to 2006, by age and sex

Aged 16 and over with both valid height and weight measurements *2006*

BMI (kg/m^2) and BMI status (%)[a]	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
Men								
1994								
Mean BMI (kg/m^2)	23.5	25.3	26.4	26.8	27.0	27.0	26.5	26.0
Standard error of the mean	0.12	0.10	0.11	0.11	0.12	0.13	0.21	0.05
% Overweight, including obese	31	50	62	68	69	71	63	58
% Obese	6	10	16	17	18	18	15	14
% Morbidly obese	0	0	0	1	0	0	1	0
1998								
Mean BMI (kg/m^2)	23.5	26	27	27	28	27.5	26	26.5
Standard error of the mean	0.13	0.12	0.11	0.12	0.13	0.14	0.19	0.05
% Overweight, including obese	28	56	65	73	76	77	64	63
% Obese	5	16	17	21	23	21	16	17
% Morbidly obese	0	1	1	1	1	1	0	1
2003 (unweighted)[b]								
Mean BMI (kg/m^2)	24.7	26.4	27.6	28.0	28.0	28.1	27.1	27.1
Standard error of the mean	0.17	0.15	0.13	0.15	0.13	0.16	0.19	0.07
% Overweight, including obese	32	59	72	76	77	77	71	67
% Obese	9	18	25	28	27	29	21	23
% Morbidly obese	0	1	1	1	1	1	0	1
2003 (weighted)[b]								
Mean BMI (kg/m^2)	23.7	26.3	27.6	28.0	28.0	28.1	27.1	26.9
Standard error of the mean	0.14	0.13	0.12	0.14	0.13	0.16	0.20	0.06
% Overweight, including obese	31	59	72	76	77	77	71	65
% Obese	9	18	25	28	27	29	21	22
% Morbidly obese	0	1	1	1	1	1	0	1
2006								
Mean BMI (kg/m^2)	24.1	26.7	27.8	28.0	28.6	28.3	27.0	27.2
Standard error of the mean	0.21	0.17	0.15	0.14	0.15	0.15	0.16	0.07
% Overweight, including obese	34	62	73	76	80	80	69	67
% Obese	9	21	25	28	33	31	18	24
% Morbidly obese	1	1	2	2	3	1	0	1

[a] Overweight, including obese: 25 kg/m^2 or more
Obese: 30 kg/m^2 or more
Morbidly obese: 40 kg/m^2 or more

[b] From 2003 data have been weighted for non-response. For 2003, two rows of data are shown: one unweighted, and one with non-response weighting. For 2006, data are weighted.

Continued…

Table 5.5 continued

Aged 16 and over with both valid height and weight measurements *2006*

BMI (kg/m^2) and BMI status (%)[a]	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
Women								
1994								
Mean BMI (kg/m2)	23.5	24.8	25.7	26.3	27.5	27.3	25.7	25.8
Standard error of the mean	0.14	0.12	0.13	0.14	0.16	0.15	0.18	0.06
% Overweight, including obese	28	38	45	54	64	66	52	49
% Obese	8	13	17	18	26	25	16	17
% Morbidly obese	1	1	2	1	2	2	1	2
1998								
Mean BMI (kg/m^2)	23.8	25.5	26.4	27.0	27.6	27.8	26.4	26.4
Standard error of the mean	0.16	0.13	0.14	0.14	0.16	0.17	0.18	0.06
% Overweight, including obese	27	43	51	60	68	70	55	53
% Obese	11	16	21	24	29	29	21	21
% Morbidly obese	1	2	3	2	2	2	1	2
2003 (unweighted)[b]								
Mean BMI (kg/m^2)	24.2	26	26.7	27.1	28	28.2	27.7	26.9
Standard error of the mean	0.26	0.24	0.2	0.23	0.21	0.25	0.65	0.1
% Overweight, including obese	32	47	55	59	67	71	67	57
% Obese	13	19	22	27	28	30	26	23
% Morbidly obese	2	3	4	4	2	3	1	3
2003 (weighted)[b]								
Mean BMI (kg/m^2)	24.2	26	26.7	27.4	27.8	28.1	27.3	26.7
Standard error of the mean	0.21	0.17	0.15	0.18	0.15	0.18	0.21	0.07
% Overweight, including obese	31	46	56	59	67	72	67	56
% Obese	13	18	22	26	28	30	26	23
% Morbidly obese	2	3	4	4	3	3	1	3
2006								
Mean BMI (kg/m^2)	24.0	25.9	26.8	27.6	28.0	28.6	27.5	26.8
Standard error of the mean	0.21	0.19	0.16	0.17	0.17	0.19	0.22	0.08
% Overweight, including obese	32	47	54	62	66	72	69	56
% Obese	12	18	24	27	30	35	27	24
% Morbidly obese	1	2	3	3	3	4	2	3
Bases (unweighted)								
Men 1994	*935*	*1373*	*1288*	*1076*	*925*	*816*	*382*	*6795*
Men 1998	*825*	*1261*	*1229*	*1197*	*910*	*745*	*433*	*6600*
Men 2003	*686*	*962*	*1178*	*1001*	*997*	*736*	*406*	*5966*
Men 2006	*577*	*762*	*1084*	*933*	*986*	*735*	*446*	*5523*
Women 1994	*990*	*1524*	*1418*	*1227*	*988*	*1048*	*689*	*7884*
Women 1998	*903*	*1433*	*1449*	*1373*	*1043*	*853*	*676*	*7730*
Women 2003	*788*	*1088*	*1452*	*1142*	*1194*	*810*	*616*	*7090*
Women 2006	*679*	*935*	*1308*	*1125*	*1106*	*776*	*575*	*6504*
Bases (weighted)								
Men 2003	*960*	*1194*	*1316*	*1073*	*943*	*664*	*369*	*6519*
Men 2006	*930*	*991*	*1246*	*993*	*888*	*599*	*368*	*6014*
Women 2003	*912*	*1085*	*1289*	*1073*	*982*	*694*	*536*	*6570*
Women 2006	*866*	*942*	*1207*	*996*	*914*	*637*	*511*	*6074*

[a] Overweight, including obese: 25 kg/m^2 or more
Obese: 30 kg/m^2 or more
Morbidly obese: 40 kg/m^2 or more

[b] From 2003 data have been weighted for non-response. For 2003, two rows of data are shown: one unweighted, and one with non-response weighting. For 2006, data are weighted.

Table 5.6

Waist circumference, by age and sex

Aged 16 and over with a valid waist measurement *2006*

Waist circumference (cm) and raised waist circumference (%)	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
Men								
Mean waist circumference (cm)	85.6	93.5	97.7	99.4	101.8	102.8	101.0	96.8
Standard error of the mean	0.65	0.53	0.43	0.44	0.41	0.46	0.50	0.24
% with raised waist circumference[a]	10	21	30	38	46	51	41	32
Women								
Mean waist circumference (cm)	77.4	82.9	85.4	88.5	90.1	92.1	91.0	86.4
Standard error of the mean	0.54	0.51	0.43	0.43	0.44	0.48	0.51	0.23
% with raised waist circumference[a]	17	30	36	45	50	60	57	41
Bases (unweighted)								
Men	*415*	*576*	*877*	*781*	*857*	*651*	*435*	*4592*
Women	*506*	*722*	*1113*	*944*	*983*	*695*	*573*	*5536*
Bases (weighted)								
Men	*743*	*820*	*990*	*815*	*734*	*504*	*349*	*4954*
Women	*716*	*777*	*983*	*815*	*768*	*550*	*565*	*5175*

[a] Raised waist circumference has been taken to be greater than 102 cm in men and greater than 88 cm in women.

Table 5.7

Waist circumference, (observed and age-standardised), by Government Office Region/Strategic Health Authority[a] and sex

Aged 16 and over with a valid waist measurement — *2006*

Waist circumference (cm) and raised waist circumference (%)	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
Men											
Observed											
Mean waist circumference (cm)	95.5	97.0	97.0	96.0	98.3	97.3	94.8	98.6	97.1	97.6	96.5
Standard error of the mean	0.87	0.48	0.54	0.94	0.62	0.63	0.81	0.79	0.55	0.93	0.62
% with raised waist circumference[b]	31	33	30	29	35	31	28	39	33	35	31
Standardised											
Mean waist circumference (cm)	95.7	96.7	97.0	96.7	98.1	97.2	95.9	97.9	96.3	96.8	95.6
Standard error of the mean	0.91	0.50	0.55	0.88	0.64	0.62	0.81	0.83	0.60	1.02	0.71
% with raised waist circumference[b]	32	32	30	31	34	31	30	37	31	33	29
Women											
Observed											
Mean waist circumference (cm)	87.0	85.8	85.9	87.0	87.3	87.4	84.7	87.7	86.2	86.2	86.2
Standard error of the mean	0.94	0.62	0.53	0.75	0.51	0.67	0.81	0.63	0.60	0.92	0.68
% with raised waist circumference[b]	41	38	38	43	43	45	37	46	40	39	42
Standardised											
Mean waist circumference (cm)	86.7	85.4	86.2	86.4	87.2	87.2	85.9	87.4	86.0	86.0	86.1
Standard error of the mean	0.92	0.62	0.53	0.79	0.54	0.68	0.82	0.65	0.60	0.94	0.67
% with raised waist circumference[b]	41	37	39	41	42	44	40	45	40	39	42
Bases (unweighted)											
Men	*270*	*673*	*509*	*468*	*487*	*545*	*412*	*430*	*798*	*403*	*395*
Women	*326*	*835*	*613*	*557*	*596*	*604*	*466*	*570*	*969*	*521*	*448*
Bases (weighted)											
Men	*261*	*645*	*500*	*451*	*521*	*572*	*746*	*464*	*795*	*405*	*390*
Women	*272*	*726*	*524*	*441*	*559*	*563*	*696*	*539*	*855*	*463*	*392*

[a] This table provides data for regional analysis both by Government Office Region (GOR) and the new configuration of Strategic Health Authorities (SHAs) in place from July 2006. The first eight columns represent GORs and SHAs of the same name, while the South East GOR (column nine) is divided into South East Coast SHA and South Central SHA, shown in the final two columns.

[b] Raised waist circumference has been taken to be greater than 102 cm in men and greater than 88 cm in women.

Table 5.8

Waist circumference (age-standardised), by equivalised household income and sex

Aged 16 and over with a valid waist measurement *2006*

Waist circumference (cm) and raised waist circumference (%)	Equivalised household income quintile				
	Highest	2nd	3rd	4th	Lowest
Men					
Mean waist circumference (cm)	96.7	96.7	96.6	97.2	96.9
Standard error of the mean	0.52	0.48	0.47	0.66	0.68
% with raised waist circumference[a]	31	32	31	35	35
Women					
Mean waist circumference (cm)	84.6	85.9	86.7	88.2	88.3
Standard error of the mean	0.63	0.52	0.48	0.59	0.57
% with raised waist circumference[a]	36	41	41	45	47
Bases (unweighted)					
Men	*906*	*888*	*812*	*699*	*551*
Women	*894*	*971*	*994*	*999*	*763*
Bases (weighted)					
Men	*985*	*983*	*822*	*695*	*603*
Women	*826*	*904*	*908*	*912*	*716*

[a] Raised waist circumference has been taken to be greater than 102 cm in men and greater than 88 cm in women.

Table 5.9

Trends in waist circumference, 1994 to 2006, by age and sex

Aged 16 and over with a valid waist measurement *2006*

Waist circumference (cm) and raised waist circumference (%)	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
Men								
1994								
Mean waist circumference (cm)	83.5	90.0	94.2	96.4	98.4	99.2	99.1	93.8
Standard error of the mean	0.34	0.28	0.31	0.31	0.36	0.38	0.55	0.14
% with raised waist circumference[a]	5	11	21	27	33	37	39	22
1998								
Mean waist circumference (cm)	82.3	90.5	93.9	97.4	99.1	100.2	97.9	94.4
Standard error of the mean	0.36	0.31	0.31	0.33	0.39	0.42	0.49	0.15
% with raised waist circumference[a]	4	13	20	30	35	41	32	24
2003 (unweighted)[b]								
Mean waist circumference (cm)	85.2	93.4	97.3	99.5	101.4	102.1	100.7	97.6
Standard error of the mean	0.53	0.42	0.36	0.39	0.39	0.42	0.56	0.17
% with raised waist circumference[a]	10	20	30	39	42	49	46	34
2003 (weighted)[b]								
Mean waist circumference (cm)	85.1	93.1	97.4	99.3	101.2	102.2	100.5	96.5
Standard error of the mean	0.58	0.47	0.41	0.41	0.39	0.45	0.60	0.22
% with raised waist circumference[a]	9	20	30	38	41	49	46	31
2006								
Mean waist circumference (cm)	85.6	93.5	97.7	99.4	101.8	102.8	101.0	96.8
Standard error of the mean	0.65	0.53	0.43	0.44	0.41	0.46	0.50	0.24
% with raised waist circumference[a]	10	21	30	38	46	51	41	32
Women								
1994								
Mean waist circumference (cm)	75.1	78.6	81.4	83.3	87.4	88.3	87.2	82.5
Standard error of the mean	0.32	0.29	0.31	0.32	0.38	0.37	0.43	0.14
% with raised waist circumference[a]	9	16	25	29	45	49	45	29
1998								
Mean waist circumference (cm)	75.4	79.5	82.4	84.4	86.7	88.5	87.2	83.2
Standard error of the mean	0.39	0.31	0.34	0.34	0.39	0.42	0.45	0.15
% with raised waist circumference[a]	11	19	27	35	41	48	43	31
2003 (unweighted)[b]								
Mean waist circumference (cm)	78.7	83.1	85.4	87.4	89.5	92.3	90.6	86.7
Standard error of the mean	0.51	0.44	0.36	0.40	0.39	0.49	0.46	0.17
% with raised waist circumference[a]	21	30	36	43	50	60	56	42
2003 (weighted)[b]								
Mean waist circumference (cm)	78.7	83.0	85.5	87.3	89.7	92.6	90.6	86.4
Standard error of the mean	0.53	0.49	0.39	0.40	0.41	0.51	0.49	0.21
% with raised waist circumference[a]	21	30	37	42	51	61	56	41
2006								
Mean waist circumference (cm)	77.4	82.9	85.4	88.5	90.1	92.1	91.0	86.4
Standard error of the mean	0.54	0.51	0.43	0.43	0.44	0.48	0.51	0.23
% with raised waist circumference[a]	17	30	36	45	50	60	57	41
Bases (unweighted)								
Men 1994	*795*	*1260*	*1184*	*979*	*855*	*749*	*362*	*6184*
Men 1998	*693*	*1119*	*1121*	*1130*	*849*	*725*	*462*	*6099*
Men 2003	*476*	*736*	*978*	*866*	*869*	*644*	*399*	*4968*
Women 1994	*876*	*1370*	*1312*	*1130*	*894*	*917*	*614*	*7113*
Women 1998	*782*	*1291*	*1323*	*1287*	*986*	*798*	*693*	*7160*
Women 2003	*606*	*877*	*1193*	*1014*	*1047*	*698*	*564*	*5999*
Bases (weighted)								
Men 2003	*773*	*969*	*1074*	*892*	*780*	*551*	*365*	*5404*
Men 2006	*743*	*820*	*990*	*815*	*734*	*504*	*349*	*4954*
Women 2003	*754*	*891*	*1045*	*895*	*810*	*606*	*556*	*5558*
Women 2006	*716*	*777*	*983*	*815*	*768*	*550*	*565*	*5175*

[a] Raised waist circumference has been taken to be greater than 102 cm in men and greater than 88 cm in women.

[b] From 2003 data have been weighted for non-response. For 2003, two rows of data are shown: one weighted, and one with non-response weighting. For 2006, data are weighted.

Table 5.10

Estimated odds ratios for raised waist circumference[a], by associated risk factors and sex

Aged 16 and over a valid waist measurement *2006*

Variable	N	Odds ratio	95% C.I.[b]	Variable	N	Odds ratio	95% C.I.[b]
Men *Base (weighted) 4593*				**Women** *Base (weighted) 5537*			
Age (p<0.001)				**Age (p<0.001)**			
16-24	415	1		16-24	506	1	
25-34	576	2.3	1.57-3.87	25-34	722	2.1	1.59-2.87
35-44	877	3.8	2.45-5.76	35-44	1113	2.8	2.14-3.74
45-54	782	5.0	3.29-7.75	45-54	945	4.1	3.10-5.51
55-64	857	6.1	3.93-9.36	55-64	983	4.7	3.58-6.25
65-74	651	6.7	4.13-10.91	65-74	695	6.3	4.63-8.47
75 and over	435	4.1	2.51-6.55	75 and over	573	5.1	3.70-7.14
Cigarette smoking status (p<0.001)				**Cigarette smoking status (p=0.018)**			
Never smoked cigarettes at all	1902	1		Never smoked cigarettes at all	2769	1	
Used to smoke cigarettes occasionally	219	0.9	0.62-1.24	Used to smoke cigarettes occasionally	326	0.9	0.69-1.12
Used to smoke cigarettes regularly	1450	1.6	1.36-1.90	Used to smoke cigarettes regularly	1293	1.2	1.06-1.42
Current cigarette smoker	1022	0.9	0.78-1.13	Current cigarette smoker	1149	1.0	0.86-1.18
Physical activity level (p<0.001)				**Physical activity level (p<0.001)**			
High	1617	1		High	1473	1	
Medium	1286	1.4	1.17-1.66	Medium	1798	1.4	1.19-1.64
Low	1140	2.1	1.71-2.48	Low	1623	1.9	1.59-2.22
Question not answered	550	1.5	1.10-1.95	Question not answered	643	1.4	1.05-1.77
Equivalised household income quintile (p=0.219)				**Equivalised household income quintile (p<0.001)**			
Highest quintile	906	1		Highest quintile	894	1	
2nd quintile	889	1.1	0.88-1.41	2nd quintile	972	1.4	1.16-1.78
3rd quintile	812	1.0	0.81-1.33	3rd quintile	994	1.4	1.13-1.67
4th quintile	699	1.2	0.96-1.59	4th quintile	999	1.7	1.38-2.06
Lowest quintile	551	1.3	0.98-1.67	Lowest quintile	763	1.9	1.49-2.37
Question not answered	736	0.9	0.70-1.21	Question not answered	915	1.3	1.05-1.61

[a] Raised waist circumference defined as greater than 102cm in men and greater than 88cm in women.

[b] Confidence interval.

Table 5.11

Health risk category associated with overweight and obesity in adults based on Body Mass Index (BMI)[a] and waist circumference, by age and sex

Aged 16 and over with valid height, weight and waist circumference measurements *2006*

Waist circumference[b] and BMI classification[c]	Health risk category[d]	Age group							Total
		16-24	25-34	35-44	45-54	55-64	65-74	75+	
		%	%	%	%	%	%	%	
Men									
% Underweight									
Low waist circumference	Not applicable	5	-	0	-	1	0	1	1
High waist circumference	Not applicable	-	-	-	-	-	-	-	-
Very high waist circumference	Not applicable	-	-	-	-	-	-	-	-
All underweight		*5*	*-*	*0*	*-*	*1*	*0*	*1*	*1*
% Normal									
Low waist circumference	No increased risk	61	37	23	20	16	14	20	29
High waist circumference	No increased risk	2	1	3	3	4	4	9	3
Very high waist circumference	Increased risk	-	-	0	0	0	1	1	0
All normal		*62*	*38*	*27*	*23*	*21*	*20*	*30*	*32*
Overweight									
Low waist circumference	No increased risk	14	20	18	13	7	7	7	13
High waist circumference	Increased risk	7	16	21	23	25	22	23	19
Very high waist circumference	High risk	2	5	9	12	16	20	22	11
All overweight		*23*	*41*	*47*	*49*	*48*	*49*	*52*	*43*
Obesity I									
Low waist circumference	Increased risk	-	0	-	-	-	-	-	0
High waist circumference	High risk	2	4	4	3	2	1	1	3
Very high waist circumference	Very high risk	4	12	15	18	21	24	14	15
All obese I		*5*	*17*	*19*	*21*	*24*	*25*	*15*	*18*
Obesity II									
Low waist circumference	Very high risk	-	-	-	0	-	-	-	0
High waist circumference	Very high risk	0	0	-	-	-	-	-	0
Very high waist circumference	Very high risk	2	3	4	5	5	5	3	4
All obese II	*Very high risk*	*3*	*3*	*4*	*5*	*5*	*5*	*3*	*4*
Obesity III									
Low waist circumference	Very high risk	-	-	-	-	-	-	-	-
High waist circumference	Very high risk	-	-	-	-	-	-	-	-
Very high waist circumference	Very high risk	1	1	2	1	2	1	0	1
All obese III	*Very high risk*	*1*	*1*	*2*	*1*	*2*	*1*	*0*	*1*
Men – Overall risk[d]	Not applicable	5	-	0	-	1	0	1	1
	No increased risk	76	58	44	37	27	26	36	45
	Increased risk	7	16	21	24	25	23	24	20
	High risk	4	9	12	15	18	21	23	13
	Very high risk	8	16	21	25	29	30	17	21

[a] BMI categories according to NICE guidelines: Underweight: Less than 18.5 kg/m^2, Normal: 18.5 to less than 25 kg/m^2',Overweight: 25 to less than 30 kg/m^2, Obesity I: 30 to less than 35 kg/m^2, Obesity II: 35 to less than 40 kg/m^2,Obesity III: 40kg/m^2 or more.

[b] Waist circumference categories according to NICE guidelines: for men, less than 94cm is low, 94–102cm is high, and more than 102cm is very high. For women, less than 80cm is low, 80–88cm is high, and more than 88cm is very high.

[c] Percentages and bases in this table are based on those who have a valid measurement for waist circumference, in addition to valid measurements of weight and height. Therefore subtotals for BMI categories by age and sex in this table are not definitive and may vary from estimates shown in Table 5.2.

[d] Health risk category according to NICE Guidelines. See section 5.2.2 for further information.

Continued…

Table 5.11

Table 5.11 continued

Aged 16 and over with valid height, weight and waist circumference measurements *2006*

Waist circumference[b] and BMI classification[c]	Health risk category[d]	Age group							Total
		16-24	25-34	35-44	45-54	55-64	65-74	75+	
		%	%	%	%	%	%	%	
Women									
% Underweight									
Low waist circumference	Not applicable	7	1	1	1	1	1	2	2
High waist circumference	Not applicable	-	-	-	-	-	-	-	-
Very high waist circumference	Not applicable	-	0	-	-	-	-	-	0
All underweight		*7*	*2*	*1*	*1*	*1*	*1*	*2*	*2*
% Normal									
Low waist circumference	No increased risk	56	43	35	25	21	13	14	31
High waist circumference	No increased risk	5	7	9	11	10	11	11	9
Very high waist circumference	Increased risk	1	1	2	2	2	3	4	2
All normal		*61*	*51*	*45*	*38*	*34*	*27*	*29*	*42*
Overweight									
Low waist circumference	No increased risk	6	6	5	4	3	4	2	4
High waist circumference	Increased risk	7	12	14	14	14	12	13	12
Very high waist circumference	High risk	6	11	12	16	20	22	27	15
All overweight		*19*	*29*	*30*	*34*	*37*	*38*	*42*	*32*
Obesity I									
Low waist circumference	Increased risk	-	0	0	-	0	-	-	0
High waist circumference	High risk	1	1	1	1	1	0	2	1
Very high waist circumference	Very high risk	7	10	13	15	17	21	20	14
All obese I		*9*	*11*	*15*	*16*	*17*	*21*	*21*	*15*
Obesity II									
Low waist circumference	Very high risk	-	-	-	-	-	-	-	-
High waist circumference	Very high risk	-	0	-	-	-	-	-	0
Very high waist circumference	Very high risk	3	5	6	8	7	9	4	6
All obese II	*Very high risk*	*3*	*5*	*6*	*8*	*7*	*9*	*4*	*6*
Obesity III									
Low waist circumference	Very high risk	-	-	-	-	-	-	-	-
High waist circumference	Very high risk	-		0	-	-	-	0	0
Very high waist circumference	Very high risk	1	2	3	3	3	4	1	3
All obese III	*Very high risk*	*1*	*2*	*3*	*3*	*3*	*4*	*2*	*3*
Women - Overall risk[d]	Not applicable	7	1	1	1	1	1	2	2
	No increased risk	66	56	49	40	35	27	27	45
	Increased risk	8	13	15	16	16	15	17	14
	High risk	7	12	13	17	20	22	29	16
	Very high risk	11	17	22	27	28	34	26	23
Bases (unweighted)									
Men		*394*	*536*	*845*	*734*	*803*	*597*	*365*	*4274*
Women		*486*	*676*	*1044*	*877*	*918*	*617*	*425*	*5043*
Bases (weighted)									
Men		*708*	*765*	*955*	*768*	*687*	*462*	*293*	*4638*
Women		*688*	*728*	*923*	*754*	*718*	*488*	*423*	*4722*

[a] BMI categories according to NICE guidelines: Underweight: Less than 18.5 kg/m^2, Normal: 18.5 to less than 25 kg/m^2,Overweight: 25 to less than 30 kg/m^2, Obesity I: 30 to less than 35 kg/m^2, Obesity II: 35 to less than 40 kg/m^2,Obesity III: 40kg/m^2 or more.

[b] Waist circumference categories according to NICE guidelines: for men, less than 94cm is low, 94–102cm is high, and more than 102cm is very high. For women, less than 80cm is low, 80–88cm is high, and more than 88cm is very high.

[c] Percentages and bases in this table are based on those who have a valid measurement for waist circumference, in addition to valid measurements of weight and height. Therefore subtotals for BMI categories by age and sex in this table are not definitive and may vary from estimates shown in Table 5.2.

[d] Health risk category according to NICE Guidelines. See section 5.2.2 for further information.

Physical activity

6

Moushumi Chaudhury, Marilyn Roth

Key findings

- This chapter focuses on physical activity in the English adult population. Information was collected using the long version of the HSE physical activity questionnaire, which was last used in 1998.
- Physical inactivity is associated with all-cause mortality and many chronic diseases, including ischaemic heart disease, diabetes, certain cancers, and obesity. In terms of economic impact, inactivity in England is estimated to cost £8.2 billion a year. A minority of people meet the current minimum recommendations (30 minutes or more activity per day of at least moderate intensity, on at least five days per week). Many people attribute their failure to achieve the target recommendations to a lack of time to exercise.
- In 2006, 40% of men and 28% of women aged 16 and over met the Chief Medical Officer's minimum recommendations for physical activity in adults. The proportion meeting recommended levels of participation in physical activity decreased with age for both men and women.
- The level of physical activity undertaken was significantly related to equivalised household income among men. Between 42-45% of men in the three highest quintiles met the recommendations of physical activity, falling to 35% in the lowest income quintile. However the pattern was not so clear across income quintiles among women, although women in the second and third highest income quintiles (both 31%) were significantly more likely to be meeting the recommendations than women in the lowest income quintile (26%). The proportion of men and women who were in the low activity category was inversely related to income.
- Overall the proportion of men and women achieving the current physical activity recommendations has significantly increased from 1997 to 2006 (from 32% to 40% of men and from 21% to 28% of women respectively).
- Men were more likely than women to participate in each activity measured in the survey, other than heavy housework. The most common type of activity for men was sports and exercise (46% had participated in the last four weeks) and for women was heavy housework (57%). The least common activity was heavy manual work/gardening/DIY (29% of men and 11% of women).
- On average, men aged 16-24 participated in physical activity on 19.0 days in the previous four weeks, more than any other age group. Among women, those aged 25-44 were the most frequently active, participating in physical activity on 14.5 days in the last four weeks.
- On average, men participated in more hours of physical activity per week (8.0) than women (5.4). Among men, those aged 25-34 spent the most time per week participating in physical activity (10.4 hours), while among women it was those aged 35-44 (7.0 hours). Men spent most time walking (2.1 hours), whereas women spent most time doing heavy housework (1.6 hours).

- In 2006, a significantly higher proportion of men and women than in 1998 reported participating in any walking, and in any sports and exercise. For men, 32% reported any walking in 1998 compared with 38% in 2006. Likewise, participation in any sports and exercise has risen from 42% to 46%. In 1998 24% of women reported any walking compared with 30% in 2006, while 36% participated in sports and exercise in 1998 compared with 39% in 2006. There was also a significant increase (80% in 1998 to 82% in 2006) in participation in physical activity of any kind among men.
- The increase in participation in sports and exercise, and walking, between 1998 and 2006 was accompanied by increased frequency of these activities among both men and women. For men, the average number of days of walking in the last four weeks rose from 4.6 in 1998 to 5.6 in 2006, while for women it increased from 3.7 to 4.7. On average, men were participating in sports and exercise 4.9 days per four weeks in 1998 compared with 5.7 days in 2006. The average number of days women participated in sports and exercise also rose, from 3.3 days in 1998 to 3.9 days in 2006. Similarly, both men and women spent more time walking in 2006 compared with 1998. The average number of hours per week men spent walking increased from 1.5 to 2.1, and for women it increased from 1.1 to 1.5 hours.

6.1 Introduction

This chapter focuses on physical activity in the adult English population aged 16 and over. Questions concerned participation in housework, manual work/gardening/DIY, walking, and sports and exercise in the last four weeks. Variations in summary activity levels are analysed in relation to socio-demographic characteristics. This chapter presents trends in physical activity over time using HSE data from 1997, 1998, 2003, 2004 and 2006, and includes analysis of the proportion of the adult English population meeting the current physical activity recommendations, using HSE 2003 definitions.

Physical activity is an important public health issue: the health benefits of a physically active lifestyle have been well documented.[1,2] There is evidence that physical inactivity is associated with many chronic conditions, including ischaemic heart disease,[3] diabetes,[4] osteoporosis,[5] certain types of cancer,[6,7] and obesity.[1] Physically active adults have 20-30% reduced risk of premature death and up to 50% reduced risk of developing major chronic diseases.[1] Moreover, participation in regular physical activity can increase the quality of life and independence in older age[8] and, by increasing muscle strength, reduces the risk of falls and broken hips which are a major cause of mortality amongst the elderly.[8] The amount of habitual physical activity accrued is also closely linked with all-cause mortality risk,[9] yet the majority of people in many countries do not accumulate sufficient exercise to derive health related benefits.[10]

In England, physical inactivity is estimated to cost £8.2 billion a year.[11] Beyond its role in the development of obesity, physical inactivity and associated poor cardio-respiratory fitness pose direct health risks. For example, lean unfit men may have a higher risk for cardiovascular disease and death than fit obese men.[12,13] The World Health Organisation (WHO) rated physical inactivity as one of the leading causes of death in developed countries. Among people developing the following diseases, the WHO estimated that physical inactivity is responsible for 22-23% of coronary heart disease, 16-17% of colon cancers, 15% of diabetes 12-13% of strokes, and 11% of breast cancers.[14]

Increasing physical activity amongst adults has been a subject of public health promotion policies and government health strategies in England since the early 1990s.[1,11,15, 16,17] Guidelines for physical activity for maintaining optimal health have been available since the mid to late 1970s.[18] Recent National Institute for Health and Clinical Excellence (NICE) guidance highlights the contribution of regular physical activity to promoting the health of communities.[19] In 2004, the Chief Medical Officer published *'At least five a week: evidence on the impact of physical activity and its relationship to health'*.[1] Adults are recommended that on at least five days a week, they should be active at moderate or greater intensity for at least 30 minutes a day either in one session or through a number of shorter bouts of activity of 10 minutes or longer. There is a need to translate these physical activity guidelines so that they can fit into individuals' behaviour patterns. The activity can be lifestyle activity, or structured exercise or sports, or a combination of these. These recommendations are also considered to be appropriate for older adults. Many people attribute their failure to achieve the current target for exercise to a lack of time.[19]

The *Game Plan*, which sets out physical activity targets for the UK, says that by 2020, 70% of adults should be undertaking 30 minutes of physical activity on at least 5 days a week. An interim target was also specified, 50% of individuals partaking in physical activity by 2011 (the figure is currently 34% in 2006).[11] This aspirational target is based on the levels of physical activity that have been reported in Scandinavian countries and in particular in Finland.[11] The report further highlights its primary aim, *'to develop a sport and physical activity culture to produce a fitter, more active population and realise the significant health benefits and savings available, and the potential wider social benefits. Such an aim requires long- term cultural change'*.

Monitoring whether these targets are achieved is essential; the HSE plays an important role as a monitoring tool. There are several advantages to using the HSE as a monitoring tool to assess whether the *Game Plan's* physical activity targets are being met. For instance, the HSE is a continuous survey and is, therefore, immune to physical activity seasonality

effects. Moreover, existing data allow for the retrospective assessment of physical activity trends from 1997 or 1998, depending on the measure.

The prevalence of obesity, the 'disease of the millennium', has steadily risen in the UK among adults and children.[20] Some evidence suggests that physical inactivity and the overall decrease in energy expenditure levels contribute to the rise in obesity at least as much as, if not more than, dietary intake and related factors.[21] However, caution should be exercised when considering results that suggest physical activity levels are declining,[22] as much of the evidence which supports this claim is based on ecological proxy measures, (i.e. TV watching[23] and increased car usage[24]) rather than direct measures or reports of physical activity like the HSE.

6.2 Methods and definitions

6.2.1 The physical activity questionnaire

Information was collected in 2006 using the long version of the physical activity questionnaire, which was last used in HSE 1998. The questions for the HSE were derived from a major national study of activity carried out in 1990, the Allied Dunbar National Fitness Survey.[25] The physical activity module was first introduced to the HSE 1991 and repeated in 1992 to1994 with minor changes, and received more substantial revisions in 1997 and 1998 (producing what is generally referred to as the long version of the questionnaire). A shorter version of the questionnaire was introduced in 1999, when the focus was minority ethnic groups; the shorter questionnaire was repeated in 2002, 2003 and 2004. In 2006, a slightly modified version of the long form of the questionnaire was used. Questions concerned participation during the last four weeks in housework, manual work/gardening/DIY, walking and sports and exercise. The main difference from 1998 was that only a single question relating to occupational activity levels was asked in 2006: *'Thinking about your job, in general would you say that you are, very physically active, fairly physically active, not very physically active, or not at all physically active in your job?'*

Adults' physical activity in the four weeks prior to interview was measured in HSE 2006 by examining overall participation; frequency of participation in activities that lasted at least 15 minutes; type of activities; and duration of activities. A question about intensity of the activity was asked for sports and exercise and for walking. Responses to the question on occupational activity were taken into account in the estimation of the summary activity levels.

This chapter includes an analysis of physical activity over time. These comparisons include Health Survey data from 1997, 1998, 2003, 2004 and 2006. It was not possible to include 1994 or earlier data due to important differences in the questions, which would limit the meaningfulness of these comparisons. In 2003 and 2004 the short version of the questionnaire was administered and 1997 and 1998 results were recalculated in order to allow for comparisons. To enable continuation of these trend data, the same methods for analysis were used in 2006. In summary, the key difference between the physical activity questions in 1997, 1998, 2003, 2004 and 2006 was that the lower duration limit for an activity (including walking) to be included was 15 minutes in 1997, 1998 and 2006 and 30 minutes in 2003 and 2004.

Activity types, frequency, duration, and intensity

Details about three main types of physical activity were asked in the questionnaire. For most activities in which they had participated, informants were asked on how many days in the last four weeks they had done the activity for at least 15 minutes, and the average length of time spent on those days.

1. Home activity consisted of housework and gardening/DIY/building that lasted 15 minutes or more. The lead-in question was *'Have you done any housework in the last four weeks?'* Informants were shown a card with a list of examples of light housework and were asked

if they had done any of the listed activities. They were then asked about heavy housework by showing another card with higher intensity activities, for which frequency was assessed. A similar sequence of questions was asked for gardening/DIY/building work. Frequency of light home activity (i.e. those activities listed in the first set of show cards) was not assessed.[26]

2. Walks of 15 minutes or more. The key question was *'During the past four weeks, on how many days did you do a walk of least 15 minutes?'* Walking intensity was assessed by asking informants to rate their usual walking pace (slow / average / fairly brisk / fast).

3. Sports and exercise activities that lasted 15 minutes or more. For sports and exercise activities in the four weeks prior to interview, informants were asked *'Can you tell me on how many separate days did you do (name of specific sport and exercise activity) for at least 15 minutes at a time during the past four weeks…?'*, followed by a question about the activity's usual duration on these days. The intensity of these activities was assessed by asking informants whether or not the activity had made them *'out of breath or sweaty'*.[27]

6.2.2 Weighting

To avoid an over-long interview for informants aged 65 and over, only half of these older people were asked the long physical activity module. The weighting used in the analyses in this chapter takes this into account (see Volume 3, Methodology and documentation, for further details of weighting).

Trends in the proportion meeting the current physical activity recommendation were examined by comparing results from HSE 1997, 1998, 2003, and 2004 -. HSE data up to 2002 was unweighted, and since 2003, HSE data have been weighted to adjust for non-response. Results from 2003 onwards have therefore been shown both with unweighted (for comparison with earlier years) and with non-response weighting, to permit comparison with results from HSE 2006.

6.2.3 Definitions

Summary activity levels

The summary measure of physical activity levels groups informants according to the CMO's physical activity guidelines, which are that adults should take part in five or more occasions per week of activity of at least moderate intensity, of 30 minutes or more duration.1 The summary measure incorporates three basic dimensions (frequency, intensity, and duration) of the informants' overall physical activity level. As in 1998, 2003, and 2004 full time workers in manual occupations who reported being at least moderately active in their work were counted as having done 20 days' activity in the last four weeks and part time workers as 12 days' activity.

The summary activity level classification is as follows:

High activity

20 or more occasions of moderate or vigorous activity of at least 30 minutes duration in the last four weeks (at least five days per week on average). The term 'high' in this definition is relative in this context and corresponds to the minimum activity level required to gain some general health benefits (e.g. reduction in the relative risk for cardiovascular morbidity). However, it does not necessarily indicate the extent of activity required for optimal cardiovascular fitness or for optimal weight control.

Medium activity

4 to 19 occasions of moderate or vigorous activity of at least 30 minutes' duration in the last four weeks (one to five days per week on average).

Low activity

Up to 3 occasions of moderate or vigorous activity of at least 30 minutes' duration in the last four weeks (less than once per week on average).

For comparisons of summary activity levels over time, HSE 2006 data have been analysed with the lower duration for activities set to 30 minutes, to be compatible with results obtained from the shorter 2003 questionnaire. 1997 and 1998 data were also reanalysed using this longer minimum duration, and limiting occupational data to the single question asked in 2003 and 2006, to enable data for the four years to be compared. The results presented in this chapter are therefore likely to be an underestimate of the proportion of the population that meets the revised recommendations.

Assumptions underlying the intensity level classification of physical activities

All analyses presented in this chapter refer to physical activity of at least moderate intensity.

Walks at a 'fairly brisk' or 'fast pace' were classified as 'moderate'. Walks at a 'slow' or 'average' pace were classified as 'light'.

For home activity, (housework, manual/gardening/DIY) informants were given examples of types of housework/gardening /DIY that counted as 'heavy' and 'light'. Heavy housework and heavy gardening/DIY were classified as 'moderate', other gardening/DIY as 'light', and light housework only as 'inactive'.[26]

For sports and exercise, activities were classified according to the nature of the activity, and on the informant's own assessment of the amount of effort involved in doing that activity. For example, swimming was counted as 'vigorous' if the effort was usually enough to make the informant 'out of breath or sweaty', otherwise as 'moderate'.[27]

6.3 Results

6.3.1 Summary activity levels in the population

Respondents who were classified in the high activity group can be seen as fulfilling the current physical activity recommendations (figure 6A). The proportion meeting the recommendations fell significantly with age for both sexes. The prevalence of low activity levels (defined as participation for less than 30 minutes a week in activity of at least moderate intensity) generally increased with age and was markedly higher among older age groups. **Table 6.1**

Figures 6B and 6C show two measures of participation in any physical activity over the last four weeks: mean number of days, and mean number of hours. While men were more likely to participate in physical activity than women in any age group, the gap between the sexes was widest among younger informants. The frequency of and time spent in physical activity declined markedly among older people of both sexes. **Tables 6.5 and 6.7**

Equivalised household income is a measure of household income that takes account of the number of persons in the household. The age-standardised prevalence of those in the 'high' category meeting the current recommendations for physical activity was significantly related to quintile of equivalised income among men. However the pattern was not so clear across income quintiles among women, although women in the second and third highest income quintiles were significantly more likely to be meeting the recommendations than women in the lowest income quintile.

Looking at the prevalence of those in the 'low' activity category, there is a clear gradient across the income quintiles for both men and women, with those in the lowest income quintile more likely to be in the low activity group than those in the highest income quintile. **Table 6.3**

Figure 6A

Summary activity level, by sex and age

Base: Aged 16 and over

Figure 6B

Mean number of days in the past four weeks participating in any physical activity (for at least 15 continuous minutes), by sex and age

Base: Age 16 and over

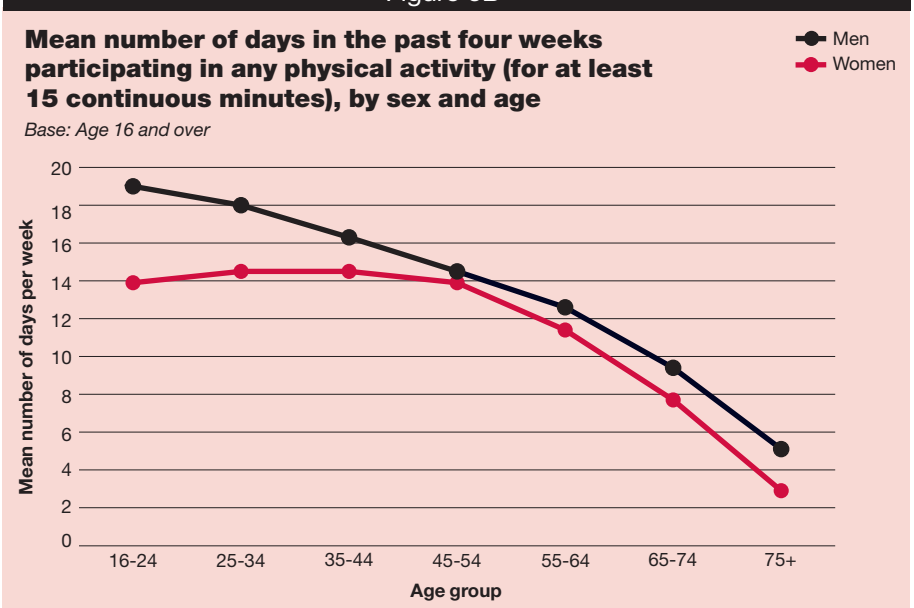


Figure 6C

Mean number of hours per week participating in any physical activity (for at least 15 continuous minutes) in the past four weeks, by sex and age

Base: Aged 16 and over

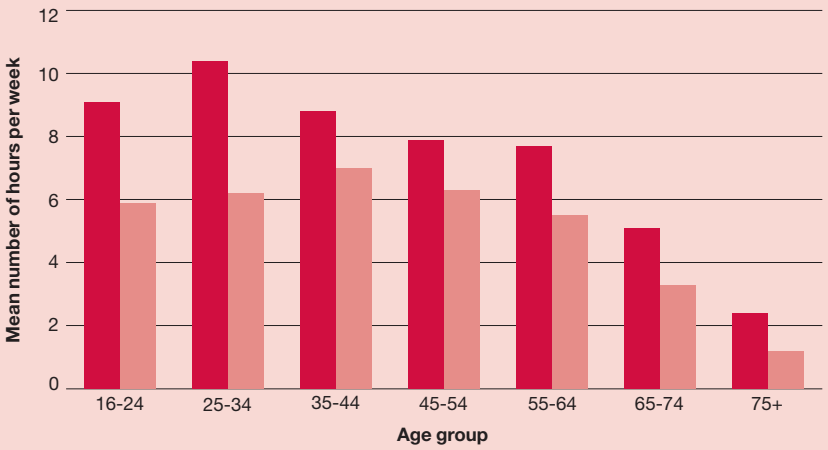
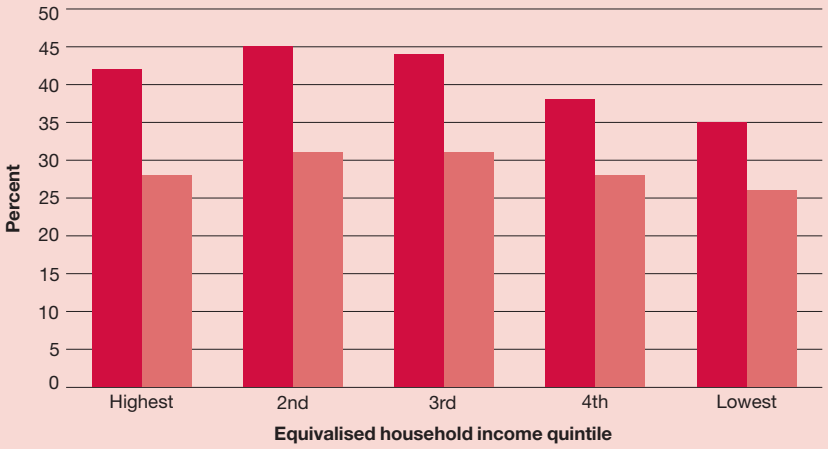


Figure 6D

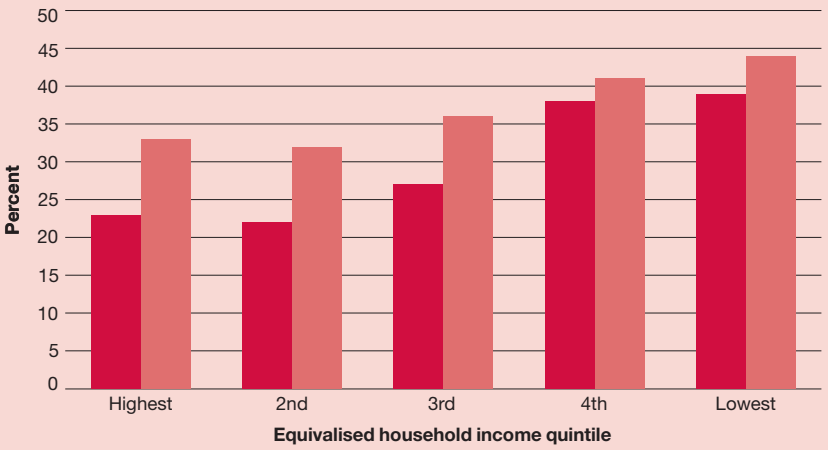
High activity levels: proportion meeting the recommendations, by equivalised household income and sex

Base: Aged 16 and over



Low activity levels: proportion doing less than 30 mins activity per week, by equivalised household income and sex

Base: Aged 16 and over



Levels of participation in sports and exercise and walking have increased for both men and women since 1998. Figures 6E, 6F, 6G, and 6H show the proportion of men and women participating in sports and exercise and walking, and the mean number of days they took part in each in the last four weeks by age for 2006. **Table 6.6, 6.8**

Figure 6E

Proportion participating in sports and exercise (for at least 15 continuous minutes) in the past four weeks, by sex and age

Base: Aged 16 and over

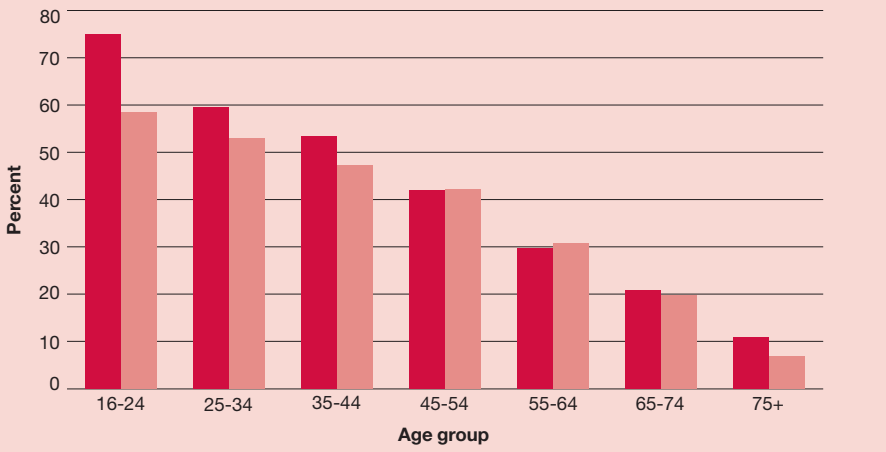
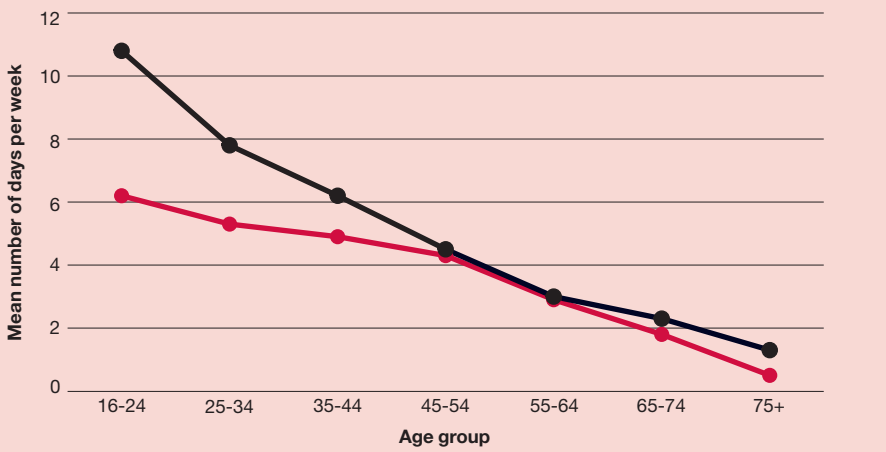


Figure 6F

Mean number of days participating in sports and exercise (for at least 15 continuous minutes) in the past four weeks, by sex and age

Base: Age 16 and over



6.4 Discussion

6.4.1 Limitations of collecting physical activity data

There are various limitations in using a questionnaire to collect data about physical activity. Self-reported physical activity measures are well known to have limitations in the scope of their measurement.[28] For example, sports and exercise are typically carried out in a planned and organised manner and therefore are relatively easy to recall. However, routine activities such as domestic activity (housework, gardening, etc) and walking for travel rather than leisure, which are categorised as 'lifestyle' activities by the CMO, are much more difficult to recall and report. A possible solution to this in population studies is the introduction of

Figure 6G

Proportion participating in walking (for at least 15 continuous minutes) in the past four weeks, by sex and age

Base: Aged 16 and over

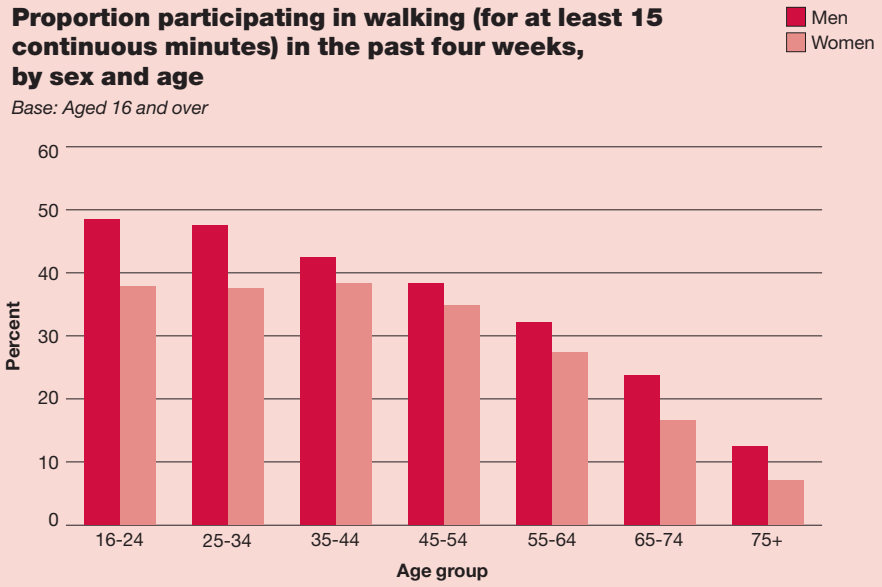
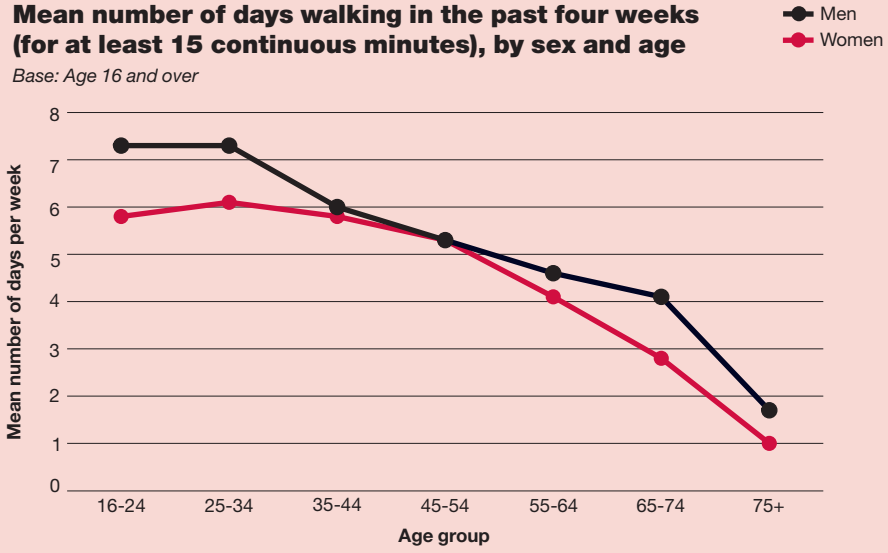


Figure 6H

Mean number of days walking in the past four weeks (for at least 15 continuous minutes), by sex and age

Base: Age 16 and over



objective measures such as accelerometers, which measure movements in one or more planes. Objective measurement of physical activity could supplement self-reported data with more accurate information on the frequency, duration and intensity of free-living (i.e. everyday lifestyle) physical activity.[22] A large scale general population study in the US, National Health and Nutrition Survey (NHANES)[29] has demonstrated that it is feasible to monitor and measure physical activity objectively. HSE 2008 will be using accelerometers in a subsample of participants.

Self-reported physical activity measures are, therefore, subject to recall limitations, as well as social desirability bias, and lack of objectivity.[28,30,31] Despite these limitations, questionnaires are the most practical and cost effective way of measuring physical activity in large-scale epidemiological research. The HSE is the only nationally representative, population-based survey that has collected multiple-domain (i.e. occupational, lifestyle, sport and exercise) physical activity data several times since its inception in 1991.

In 2006, in order to maintain comparability with previous years of HSE, no information was collected on bouts of activity lasting less than 15 minutes. Information on activity spells of at least 15 minutes' duration have been included in the tables showing participation, frequency, and duration of activity by type of activity. However, the summary variable

included data only from activity spells of at least 30 minutes' duration, to enable comparison with 2003 data. The government's recommendations changed in 1996[16] to allow daily activity to be accumulated in bouts of at least 10 minutes' duration. However, the current questionnaire was not designed to accommodate this change, so the results presented are likely to be an underestimate of the proportion of the population that meets the revised recommendations. The questionnaire has been amended for 2008 to catch shorter bouts of activity within a day.

6.4.2 Trends and comparison in physical activity level over time

Overall, the proportion of men and women meeting the current physical activity levels of 30 minutes or more of moderate or vigorous activity on at least 5 days a week, has significantly increased from 1997 to 2006 for both men and women, using the same definitions. Likewise, comparison of results from 1998 with 2006 indicates that more men and women are walking, they are spending longer walking, and they are more likely to participate in sports and exercise and take part in sports and exercise on more occasions). There has also been a significant increase in participation in physical activity of any kind among men. These changes may suggest that messages about physical activity recommendations are beginning to impact on behaviour. It is also possible that more recent information that several shorter bouts of activity of 10 minutes or more can be combined to build up the daily total, may have made the targets seem more achievable for some people.

Tables 6.4, 6.5, 6.6, 6.8

Another possible explanation for the increase in walking and sports and exercise among men and women, and the overall increase in any physical activity among men, is that as more people continue to be diagnosed with chronic disease, medical advice may encourage some to engage in more physical activity to combat the progression of their disease. Further research could explore physical activity levels among people with chronic diseases. While some may have increased their activity, the severity of their condition may preclude others from taking exercise.

Confirming the trends and comparisons in this chapter, other recent analyses examining HSE data from 1991 to 2004 also suggest that sports participation has increased over the last 15 years, as well as overall physical activity between 1999 and 2004.22 The authors stress that caution needs to be exercised when interpreting these results, as highly prevalent activities such as walking have been measured inconsistently over time. However, thee results from this paper help to account for the apparent discrepancy between increasing levels of obesity and increasing rates of participation in physical activity. As well as possible biases because of problems with recall and social desirability (because of the extent to which physical activity recommendations have been publicised), the self-reported increase in levels of physical activity may also reflect other social trends, including media coverage regarding diet, exercise, fitness, and weight loss. [22]

References and notes

1 The Chief Medical Officer. *At least five a week: evidence on the impact of physical activity and its relationship to health*. Department of Health, London, 2004.

2 Dietz WH. *The role of lifestyle in health: the epidemiology and consequences of inactivity*. Proc. Nutr Soc. 1996; **55**:829-840.

3 Hohl III, HW. *Physical activity and cardiovascular disease: evidence for a dose response*. Med. Sci. Sports Exercise. 2001; **33**:S472-S483.

4 Lynch J, Helmrich SP, Lakka TA, et al. *Moderately intense physical activities and high levels of cardiorespiratory fitness reduce the risk of insulin-dependent diabetes mellitus in middle-aged men*. Arch. Intern. Med. 1996; **156**:1258-1354.

5 Wolman R. *Osteoporosis and exercise*. BMJ. 1994; **309**: 400-403.

6 Thune I, Furberg AS. *Physical activity and cancer risk: dose-response and cancer, all sites and site specific*. Med. Sci. Sports Exercise. 2001; **33**: S530-S550.

7 Shephard RJ, Futcher R. *Physical Activity and Cancer: How may protection be maximised?* Crit Rev Oncogen. 1997; **8**:219-272.

8 US Department of Health and Human Services. *Physical Activity and Health: a report of the Surgeon General*. DHHS Center for Disease Control, Atlanta, 1996.

9 Blair SN, Cheng Y, Holder S. *Is Physical activity or physical fitness more important in defining health benefits?* Med Sci Sports Exercise. 2001; **33**:S379-S399.

10 Craig CL, Marshall AL, Sjostrom M et al. *International physical activity questionnaire: 12-country reliability and validity*. Med Sci Sports Exercise. 2003; **35**:1381-1395.

11 Department of Culture, Media and Sports. *Game Plan: A Strategy for Delivering the Government's Sports and Physical Activity Objectives*. Strategy Unit, London, 2002.

12 Lee CD, Blair SN, Jackson AS. *Cardiorespiratory fitness, body composition, and all-cause and cardiovascular disease mortality in men*. Am J Clin Nutr. 1999; **69**:373-380.

13 Stevens J, Evenson KR, Thomas O, et al. *Associations of fitness and fatness with mortality in Russian and American men in the Lipids Research Clinics study*. Int J Obes, 2004; **28**:1463-1470.

14 World Health Organisation. *World Health Report*. World Health Organisation, Geneva, 2002.

15 Killoran AJ, Fentem P, Caspersen C. *Moving on: International perspectives on promoting physical activity*. HEA, London, 1994.

16 Department of Health. *Strategy Statement on Physical Activity*. The Stationery Office, London, 1996.

17 Health Education Authority. *Promoting physical activity in primary health care: Guidance for the primary healthcare team*. HEA, London, 1996.

18 Blair SN, LaMoute MJ, Nickman MZ. *The evolution of physical activity recommendations: how much is enough?* Am J Clin Nutr. 2004; **79**:913-920.

19 NICE. *Four commonly used methods to increase physical inactivity; brief interventions in primary care, exercise referral schemes, pedometer and community-based exercise programmes for walking and cycling*. (Public Health Intervention Guidance No2) National Institute for Clinical Excellence, London, 2006,

20 Health and Social Care Information Centre, 2005. Health Survey for England 2004. Updating of Trend Tables to include 2004 Data. Health and Social Care Information Centre, London, England. www.ic.nhs.uk/pubs/hlthsvyeng2004upd.

21 Prentice AM, Jebb SA. *Obesity in Britain: gluttony or sloth?* BMJ. 1995; **311**:437-439.

22 Stamatakis E, Ekelund U, Wareham NJ. *Temporal trends in physical activity in England: The Health Survey for England 1991 to 2004*. Prev Med 2007. Doi:10.1016/j.ypmed.2006.12.014

23 Rickards L, Fox K, Roberts C et al. *Living in Britain: Results from the 2002 General Household Survey*. Office of National Statistics, London, England, 2004.

24 Department of Transport. *Transport Trends 2005 edition*. Department of Transport, London, England, 2006. www.dft.gov.uk/stellent/groups/dft_transstats_035650.pdf

25 *Allied Dunbar National Fitness Survey*, Health Education Authority and Sports Council, London, 1992.

26 **Home activities – Intensity classification**

Examples of 'heavy' housework classified as moderate intensity:
Walking with heavy shopping for more than 5 minutes, moving heavy furniture, spring cleaning, scrubbing floors with a scrubbing brush, cleaning windows, or other similar heavy housework

Examples of 'heavy' gardening or DIY work classified as moderate intensity:
Digging, clearing rough ground, building in stone/bricklaying, mowing large areas with a hand mower, felling trees, chopping wood, mixing/laying concrete, moving heavy loads, refitting a kitchen or bathroom or any similar heavy manual work.

Examples of 'light' housework classified as 'inactive':
Hoovering, dusting, ironing, general tidying, washing floors and paintwork.

Examples of 'light' gardening or DIY work classified as light intensity:
Hoeing, weeding, pruning, mowing with a power mower, planting flowers/seeds, decorating, minor household repairs, car washing and polishing, car repairs and maintenance.

27 **Sports and exercise activities - Intensity classification**

Vigorous:
a) All occurrences of running/jogging, squash, boxing, kick boxing, skipping, trampolining.
b) Sports were coded as vigorous intensity if they had made the informant out of breath or sweaty, but were otherwise coded as moderate intensity including: cycling, aerobics, keep fit, gymnastics, dance for fitness, weight training, football, rugby, swimming, tennis, badminton.

Moderate:
a) See 'vigorous' category b).
b) All occasions of a large number of activities including: basketball, canoeing, fencing, field athletics, hockey, ice skating, lacrosse, netball, roller skating, rowing, skiing, volleyball.
c) Sports were coded as moderate intensity if they had made the informant out of breath or sweaty, but were otherwise coded as light intensity, including: exercise (press-ups, sit-ups etc), dancing.

Light:

a) See 'moderate' category c).
b) All occasions of a large number of activities including: abseiling, baseball, bowls, cricket, croquet, darts, fishing, golf, riding, rounders, sailing, shooting, snooker, snorkelling, softball, table tennis, yoga.

28 Durante R, Ainsworth BE, Hartman TJ, et al. *The recall of physical activity using a cognitive model of the question-answering process*. Med Sci Sports Exercise. 1996; **28**:1282-1291.

29 National Health and Nutrition Examination Survey, 2003-04. Laboratory Proceedings Manual, Chapter 16: Physical Activity Monitor. www.cdc.gov/nchs/data/nhanes/nhanes_03_04/lab_pm.pdf

30 Klesges RC, Eck LH, Mellon MW, et al. *The accuracy of self-reports of physical activity*. Med Sci Sports Exerc. 1990; **22**:690-697.

31 Warnecke RB, Johnson TP, Chavez N et al. *Improving questions workings in surveys of culturally diverse populations*. Ann Epidemiol. 1997; **7**:324-342.

Tables

6.1 Summary activity levels (participation in at least moderate intensity activity), by age and sex

6.2 Summary activity levels (observed and age standardised), by Government Office Region / Strategic Health Authority and sex

6.3 Summary activity levels (age standardised), by equivalised household income and sex

6.4 Trends in the proportion meeting current physical activity recommendations 1997 - 2006, by age and sex

6.5 Number of days' participation in different activities in the last four weeks, by age and sex

6.6 Comparison of number of days' participation in specific activities in the last four weeks, 1998 and 2006, by age and sex

6.7 Average time spent participating in different activities per week, by age and sex

6.8 Comparison of average time spent participating in specific activities per week, 1998 and 2006, by age and sex

Table 6.1

Summary activity levels (participation in at least moderate intensity activity), by age and sex

Aged 16 and over[a] *2006*

Summary activity level[b,c]	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
High	53	52	46	38	35	21	9	40
Medium	28	29	30	34	29	33	23	30
Low	19	19	24	28	37	46	68	30
Women								
High	33	36	35	34	27	16	4	28
Medium	36	36	40	35	36	30	15	34
Low	32	27	25	31	38	54	81	38
Bases (unweighted)								
Men	*649*	*860*	*1181*	*1049*	*1123*	*415*	*284*	*5561*
Women	*792*	*1146*	*1490*	*1279*	*1269*	*463*	*430*	*6869*
Bases (weighted)								
Men	*1040*	*1127*	*1354*	*1122*	*1012*	*694*	*496*	*6845*
Women	*1011*	*1157*	*1375*	*1141*	*1050*	*768*	*798*	*7300*

[a] To avoid an over-long interview for informants aged 65 and over, only half of these older people were asked the long physical activity module. The weighting used in the analyses in this chapter takes this into account.

[b] High= 30 minutes or more of moderate or vigorous activity on at least 5 days a week; Medium=30 minutes or more of moderate or vigorous activity on 1 to 4 days a week; Low= lower levels of activity.

[c] Episodes of activity of less than 30 minutes have been excluded, to allow comparison with results from HSE 2003.

Table 6.2

Summary activity levels (observed and age-standardised), by Government Office Region/Strategic Health Authority[a] and sex

Aged 16 and over[b] *2006*

Summary activity level[c,d]	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
	%	%	%	%	%	%	%	%	%	%	%
Men											
Observed											
High	33	39	42	38	35	39	42	43	42	39	45
Medium	27	29	29	32	31	30	27	33	31	33	29
Low	40	32	29	30	33	31	31	25	26	27	26
Standardised											
High	33	39	42	38	36	39	40	43	44	43	46
Medium	27	29	29	32	31	30	26	32	31	33	29
Low	40	32	29	30	32	30	33	24	25	25	25
Women											
Observed											
High	26	29	29	25	24	30	29	31	29	29	29
Medium	36	34	33	37	35	31	32	33	34	34	34
Low	38	37	38	39	41	39	39	36	36	36	37
Standardised											
High	25	29	28	24	25	31	27	31	30	30	30
Medium	35	34	33	37	35	31	31	33	35	35	34
Low	40	37	39	39	40	38	42	36	36	35	36
Bases (unweighted)											
Men	*288*	*828*	*591*	*540*	*580*	*640*	*678*	*496*	*920*	*455*	*465*
Women	*379*	*1009*	*726*	*665*	*749*	*739*	*765*	*684*	*1153*	*608*	*545*
Bases (weighted)											
Men	*342*	*910*	*701*	*603*	*717*	*778*	*1046*	*644*	*1104*	*550*	*554*
Women	*386*	*989*	*746*	*616*	*797*	*797*	*983*	*768*	*1218*	*654*	*564*

[a] This table provides data for regional analysis both by Government Office Region (GOR) and the new configuration of Strategic Health Authorities (SHAs) in place from July 2006. The first eight columns represent GORs and SHAs of the same name, while the South East GOR (column nine) is divided into South East Coast SHA and South Central SHA, shown in the final two columns.

[b] To avoid an over-long interview for informants aged 65 and over, only half of these older people were asked the long physical activity module. The weighting used in the analyses in this chapter takes this into account.

[c] High= 30 minutes or more of moderate or vigorous activity on at least 5 days a week; Medium=30 minutes or more of moderate or vigorous activity on 1 to 4 days a week; Low=lower levels of activity.

[d] Episodes of activity of less than 30 minutes have been excluded, to allow comparison with results from HSE 2003.

Table 6.3

Summary activity levels (age-standardised), by equivalised household income and sex

Aged 16 and over[a] *2006*

Summary activity level[b,c]	Equivalised household income quintile				
	Highest	2nd	3rd	4th	Lowest
	%	%	%	%	%
Men					
High	42	45	44	38	35
Medium	35	33	29	24	26
Low	23	22	27	38	39
Women					
High	28	31	31	28	26
Medium	38	37	33	31	30
Low	33	32	36	41	44
Bases (unweighted)					
Men	*1143*	*1083*	*908*	*718*	*666*
Women	*1175*	*1216*	*1160*	*1066*	*942*
Bases (weighted)					
Men	*1318*	*1270*	*1107*	*915*	*829*
Women	*1160*	*1212*	*1213*	*1212*	*967*

[a] To avoid an over-long interview for informants aged 65 and over, only half of these older people were asked the long physical activity module. The weighting used in the analyses in this chapter takes this into account.

[b] High= 30 minutes or more of moderate or vigorous activity on at least 5 days a week; Medium=30 minutes or more of moderate or vigorous activity on 1 to 4 days a week; Low=lower levels of activity

[c] Episodes of activity of less than 30 minutes have been excluded, to allow comparison with results from HSE 2003.

Table 6.4

Trends in the proportion meeting current physical activity recommendations 1997 - 2006, by age and sex

Aged 16 and over[a] *1997,1998, 2003, 2004, 2006*

Meeting current physical activity recommendations[b,c]	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
1997	49	41	37	32	23	12	7	32
1998	53	45	41	34	30	14	6	34
2003	53	44	41	37	32	17	8	35
2003[d]	52	44	41	38	32	17	8	36
2004	56	46	41	37	32	18	8	37
2006	53	52	46	38	35	21	9	40
Women								
1997	26	26	29	24	19	8	5	21
1998	28	28	28	25	18	9	3	21
2003	30	29	30	30	23	13	3	24
2003[d]	30	29	30	31	23	13	3	24
2004	32	30	32	30	20	14	4	25
2006	33	36	35	34	27	16	4	28
Men								
Bases (unweighted)								
1997	*492*	*739*	*740*	*694*	*535*	*455*	*243*	*3898*
1998	*875*	*1338*	*1305*	*1289*	*987*	*837*	*562*	*7193*
2003	*744*	*1024*	*1260*	*1098*	*1097*	*807*	*551*	*6581*
2004	*291*	*446*	*535*	*439*	*508*	*378*	*276*	*2873*
2006	*649*	*860*	*1181*	*1049*	*1123*	*415*	*284*	*5561*
Bases (weighted)[c]								
2003	*1044*	*1272*	*1412*	*1180*	*1037*	*731*	*501*	*7177*
2004	*485*	*556*	*647*	*530*	*477*	*329*	*231*	*3256*
2006	*1040*	*1127*	*1354*	*1122*	*1012*	*694*	*496*	*6845*
Women								
Bases (unweighted)								
1997	*560*	*916*	*833*	*806*	*585*	*545*	*439*	*4684*
1998	*1006*	*1630*	*1573*	*1484*	*1148*	*967*	*907*	*8715*
2003	*886*	*1279*	*1615*	*1278*	*1304*	*948*	*900*	*8210*
2004	*364*	*550*	*746*	*626*	*621*	*482*	*429*	*3818*
2006	*792*	*1146*	*1490*	*1279*	*1269*	*463*	*430*	*6869*
Bases (weighted)[d]								
2003	*1029*	*1279*	*1437*	*1199*	*1071*	*813*	*782*	*7611*
2004	*472*	*563*	*653*	*541*	*491*	*364*	*353*	*3436*
2006	*1011*	*1157*	*1375*	*1141*	*1050*	*768*	*798*	*7300*

[a] To avoid an over-long interview for informants aged 65 and over, only half of these older people were asked the long physical activity module. The weighting used in the analyses in this chapter takes this into account.

[b] 30 minutes per day on at least 5 days a week of at least moderate intensity.

[c] Episodes of activity of less than 30 minutes have been excluded, to allow comparison with results from HSE 2003.

[d] Data from 2003 onwards have been weighted for non-response; for 2003 both unweighted and weighted data (shaded rows) are shown.

Table 6.5

Number of days' participation in different activities in the last four weeks, by age and sex

Aged 16 and over[a] *2006*

Days of participation in the last 4 weeks (at least 15 minutes)	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
Men								
Heavy housework								
None	74	52	52	57	58	56	71	59
Any	*26*	*48*	*48*	*43*	*42*	*44*	*29*	*41*
1 to 3 days	14	24	25	20	19	18	13	20
4 to 11 days	10	19	20	19	18	22	14	18
12 to19 days	1	2	2	2	3	3	1	2
20 days or more	0	2	2	2	2	1	1	1
Mean number of days[b]	1.1	2.2	2.1	2.1	2.2	2.3	1.3	1.9
Standard error of the mean	0.12	0.15	0.12	0.12	0.14	0.21	0.17	0.06
Heavy manual/ gardening/DIY								
None	85	72	70	65	65	67	80	71
Any	*15*	*28*	*30*	*35*	*35*	*33*	*20*	*29*
1 to 3 days	8	14	16	16	16	14	8	14
4 to 11 days	4	10	11	14	14	13	8	11
12 to19 days	1	1	1	2	2	3	1	2
20 days or more	2	3	3	3	4	3	3	3
Mean number of days[b]	1.1	1.6	1.7	2.0	2.3	2.1	1.5	1.8
Standard error of the mean	0.20	0.17	0.14	0.15	0.16	0.24	0.28	0.08
Walking[c]								
None	52	52	58	62	68	76	88	62
Any	*48*	*48*	*42*	*38*	*32*	*24*	*12*	*38*
1 to 3 days	7	7	6	7	5	3	2	6
4 to 11 days	13	12	13	13	10	4	4	11
12 to19 days	7	6	6	4	4	4	3	5
20 days or more	21	22	17	15	13	12	4	16
Mean number of days[b]	7.3	7.3	6.0	5.3	4.6	4.1	1.7	5.6
Standard error of the mean	0.41	0.40	0.29	0.31	0.25	0.44	0.33	0.14
Sports and exercise								
None	25	41	47	58	70	79	89	54
Any	*75*	*59*	*53*	*42*	*30*	*21*	*11*	*46*
1 to 3 days	12	9	11	9	8	6	2	9
4 to 11 days	24	20	18	16	11	7	4	16
12 to19 days	12	12	11	7	5	4	1	8
20 days or more	27	18	13	9	5	5	3	13
Mean number of days[b]	10.8	7.8	6.2	4.5	3.0	2.3	1.3	5.7
Standard error of the mean	0.44	0.35	0.26	0.27	0.21	0.30	0.29	0.14
Any physical activity[d]								
None	9	9	11	15	23	31	53	18
Any	*91*	*91*	*89*	*85*	*77*	*69*	*47*	*82*
1 to 3 days	5	6	10	9	11	12	11	9
4 to 11 days	13	15	17	22	19	24	19	18
12 to19 days	10	12	12	11	10	9	5	10
20 days or more	62	57	51	43	37	24	12	45
Mean number of days[b]	19.0	18.0	16.3	14.5	12.6	9.4	5.1	14.7
Standard error of the mean	0.44	0.43	0.36	0.36	0.34	0.54	0.52	0.18
Bases (unweighted)[e]								
Men	*650*	*862*	*1183*	*1050*	*1126*	*415*	*284*	*5570*
Bases (weighted)[e]								
Men	*1041*	*1129*	*1356*	*1123*	*1015*	*694*	*496*	*6854*

[a] To avoid an over-long interview for informants aged 65 and over, only half of these older people were asked the long physical activity module. The weighting used in the analyses in this chapter takes this into account.

[b] Mean is based on all informants including those who reported no participation.

[c] Walking at a 'Fairly brisk' or 'Fast' pace.

[d] Includes Heavy housework; Heavy manual/gardening/DIY; Walking; Sports and exercise; and Occupational activity (counted as 20 days for full-time workers, 12 days for part-time workers).

[e] Bases vary: those shown are for the overall sample.

Continued…

Table 6.5 continued

Aged 16 and over[a] *2006*

Days of participation in the last 4 weeks (at least 15 minutes)	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
Women								
Heavy housework								
None	56	35	32	35	40	47	74	43
Any	*44*	*65*	*68*	*65*	*60*	*53*	*26*	*57*
1 to 3 days	21	26	23	27	22	24	12	22
4 to 11 days	19	29	35	29	27	22	11	26
12 to19 days	2	5	5	5	6	4	1	4
20 days or more	3	5	6	5	5	3	1	4
Mean number of days[b]	2.3	4.0	4.6	3.9	4.1	3.0	1.2	3.5
Standard error of the mean	0.18	0.18	0.16	0.17	0.19	0.23	0.16	0.08
Heavy manual/ gardening/DIY								
None	96	91	86	86	87	86	95	89
Any	*4*	*9*	*14*	*14*	*13*	*14*	*5*	*11*
1 to 3 days	2	5	10	9	7	7	2	6
4 to 11 days	1	3	4	5	5	6	2	4
12 to19 days	0	0	0	0	1	0	1	0
20 days or more	0	0	0	0	1	1	0	0
Mean number of days[b]	0.2	0.3	0.5	0.6	0.6	0.7	0.3	0.5
Standard error of the mean	0.05	0.05	0.06	0.07	0.07	0.12	0.08	0.03
Walking[c]								
None	62	62	62	65	73	83	93	70
Any	*38*	*38*	*38*	*35*	*27*	*17*	*7*	*30*
1 to 3 days	4	4	4	4	4	1	0	3
4 to 11 days	10	10	11	11	8	4	3	9
12 to19 days	7	5	6	4	4	3	1	5
20 days or more	17	18	17	16	11	9	3	14
Mean number of days[b]	5.8	6.1	5.8	5.3	4.1	2.8	1.0	4.7
Standard error of the mean	0.36	0.30	0.25	0.28	0.25	0.36	0.22	0.13
Sports and exercise								
None	42	47	53	58	69	80	93	61
Any	*58*	*53*	*47*	*42*	*31*	*20*	*7*	*39*
1 to 3 days	12	13	11	10	8	5	2	9
4 to 11 days	26	21	19	16	13	10	4	17
12 to19 days	9	10	9	9	6	3	0	7
20 days or more	11	9	8	7	4	3	1	7
Mean number of days[b]	6.2	5.3	4.9	4.3	2.9	1.8	0.5	3.9
Standard error of the mean	0.37	0.26	0.21	0.20	0.18	0.25	0.13	0.10
Any physical activity[d]								
None	16	12	12	13	22	35	65	23
Any	*84*	*88*	*88*	*87*	*78*	*65*	*35*	*77*
1 to 3 days	10	12	8	13	12	16	12	11
4 to 11 days	20	21	25	21	24	24	14	21
12 to19 days	16	15	15	14	12	6	3	12
20 days or more	39	41	40	39	30	19	6	32
Mean number of days[b]	13.9	14.5	14.5	13.9	11.4	7.7	2.9	11.9
Standard error of the mean	0.46	0.34	0.30	0.31	0.32	0.46	0.30	0.16
Bases (unweighted)[e]								
Women	*794*	*1148*	*1494*	*1279*	*1269*	*463*	*430*	*6877*
Bases (weighted)[e]								
Women	*1014*	*1160*	*1379*	*1141*	*1050*	*768*	*798*	*7310*

[a] To avoid an over-long interview for informants aged 65 and over, only half of these older people were asked the long physical activity module. The weighting used in the analyses in this chapter takes this into account.

[b] Mean is based on all informants including those who reported no participation.

[c] Walking at a 'Fairly brisk' or 'Fast' pace.

[d] Includes Heavy housework; Heavy manual/gardening/DIY; Walking; Sports and exercise; and Occupational activity (counted as 20 days for full-time workers, 12 days for part-time workers).

[e] Bases vary: those shown are for the overall sample.

Table 6.6

Comparison of number of days' participation in specific activities in the last four weeks, 1998 and 2006, by sex

Aged 16 and over[a] *1998, 2006*

Number of days in the last four weeks (at least 15 minutes a day)	Men		Women	
	Survey year			
	1998[b]	2006[b]	1998[b]	2006[b]
Heavy housework				
None	62	59	42	43
Any	*38*	*41*	*58*	*57*
1 to 3 days	18	20	23	22
4 to 11 days	16	18	26	26
12 to19 days	2	2	4	4
20 days or more	2	1	5	4
Mean number of days[c]	1.9	1.9	3.6	3.5
Standard error of the mean	0.05	0.06	0.06	0.08
Heavy manual/ gardening/DIY				
None	69	71	88	89
Any	*31*	*29*	*12*	*11*
1 to 3 days	16	14	7	6
4 to 11 days	11	11	4	4
12 to19 days	2	2	0	0
20 days or more	2	3	0	0
Mean number of days[c]	1.6	1.8	0.5	0.5
Standard error of the mean	0.05	0.08	0.02	0.03
Walking[d]				
None	68	62	76	70
Any	*32*	*38*	*24*	*30*
1 to 3 days	6	6	3	3
4 to 11 days	9	11	7	9
12 to19 days	4	5	3	5
20 days or more	13	16	11	14
Mean number of days[c]	4.6	5.6	3.7	4.7
Standard error of the mean	0.10	0.14	0.09	0.13
Sports and exercise				
None	58	54	64	61
Any	*42*	*46*	*36*	*39*
1 to 3 days	10	9	10	9
4 to 11 days	14	16	15	17
12 to19 days	7	8	5	7
20 days or more	10	13	5	7
Mean number of days[c]	4.9	5.7	3.3	3.9
Standard error of the mean	0.10	0.14	0.07	0.10
Any physical activity[e]				
None	20	18	24	23
Any	*80*	*82*	*76*	*77*
1 to 3 days	10	9	13	11
4 to 11 days	18	18	23	21
12 to19 days	10	10	12	12
20 days or more	42	45	29	32
Mean number of days[c]	13.7	14.7	11.0	11.9
Standard error of the mean	0.13	0.18	0.11	0.16
Bases (unweighted)[f]	*7193*	*5570*	*8715*	*6877*
Bases (weighted)[f]	*n/a*	*6854*	*n/a*	*7310*

[a] To avoid an over-long interview for informants aged 65 and over, in 2006 only half of these older people were asked the long physical activity module. The weighting used in the analyses in this chapter takes this into account.

[b] Data from 1998 are unweighted, while data from 2006 have been weighted for non-response.

[c] Mean is based on all informants including those who reported no participation.

[d] Walking at a 'Fairly brisk' or 'Fast' pace.

[e] Includes Heavy housework; Heavy manual/gardening/DIY; Walking; Sports and exercise; and Occupational activity (counted as 20 days for full-time workers, 12 days for part-time workers).

[f] Bases vary: those shown are for the overall sample.

Table 6.7

Average time spent participating in different activities per week, by age and sex

Aged 16 and over[a] *2006*

Average time spent per week (at least 15 minutes a day)	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Heavy housework								
No time	74	52	52	57	59	56	71	59
Less than 1 hour	15	23	24	21	17	19	14	20
1, less than 3 hours	8	16	17	14	15	16	10	14
3, less than 5 hours	1	5	4	4	4	5	2	4
5, less than 7 hours	1	2	1	2	2	3	1	2
7 hours of more	1	3	2	3	3	1	1	2
Mean number of hours[b]	0.3	1.0	0.8	0.8	0.9	0.8	0.5	0.8
Standard error of the mean	0.05	0.10	0.06	0.07	0.10	0.09	0.10	0.03
Heavy manual/ gardening/DIY								
No time	85	72	70	65	65	67	80	71
Less than 1 hour	5	6	6	7	7	6	4	6
1, less than 3 hours	3	9	10	11	10	11	7	9
3, less than 5 hours	2	4	5	5	6	5	4	4
5, less than 7 hours	1	2	2	3	3	3	1	2
7 hours of more	5	6	7	9	9	8	4	7
Mean number of hours[b]	1.3	2.0	1.7	2.3	2.4	1.8	1.1	1.9
Standard error of the mean	0.25	0.26	0.18	0.23	0.24	0.26	0.26	0.10
Walking[c]								
No time	51	52	57	61	68	76	88	62
Less than 1 hour	11	11	11	10	7	4	3	9
1, less than 3 hours	17	14	12	10	10	4	4	11
3, less than 5 hours	9	9	8	7	5	5	4	7
5, less than 7 hours	4	4	3	3	2	2	0	3
7 hours of more	7	9	9	8	9	9	1	8
Mean number of hours[b]	2.0	2.6	2.6	2.1	2.1	1.7	0.5	2.1
Standard error of the mean	0.21	0.29	0.31	0.21	0.23	0.26	0.16	0.10
Sports and exercise								
No time	25	41	47	58	70	79	89	54
Less than 1 hour	15	14	15	13	12	9	4	13
1, less than 3 hours	21	20	18	15	10	6	4	15
3, less than 5 hours	16	12	10	6	4	3	2	8
5, less than 7 hours	7	4	5	4	2	0		4
7 hours of more	16	10	6	3	2	3	1	7
Mean number of hours[b]	3.3	2.2	1.7	1.2	0.7	0.6	0.3	1.6
Standard error of the mean	0.18	0.13	0.10	0.09	0.07	0.14	0.08	0.05
Any physical activity[d]								
No time	9	9	12	15	23	31	53	18
Less than 1 hour	8	6	10	11	11	12	13	10
1, less than 3 hours	12	15	15	14	15	16	13	14
3, less than 5 hours	14	12	11	13	8	11	7	11
5, less than 7 hours	9	8	8	8	6	6	2	7
7 hours of more	47	50	45	39	36	24	10	39
Mean number of hours[b]	9.1	10.4	8.8	7.9	7.7	5.1	2.4	8.0
Standard error of the mean	0.46	0.46	0.34	0.37	0.34	0.45	0.37	0.17
Bases (unweighted)[e]								
Men	*650*	*862*	*1183*	*1050*	*1126*	*415*	*284*	*5570*
Bases (weighted)[e]								
Men	*1041*	*1129*	*1356*	*1123*	*1015*	*694*	*496*	*6854*

[a] To avoid an over-long interview for informants aged 65 and over, only half of these older people were asked the long physical activity module. The weighting used in the analyses in this chapter takes this into account.

[b] Mean is based on all informants including those who reported no participation.

[c] Walking at a 'Fairly brisk' or 'Fast' pace.

[d] Includes Heavy housework; Heavy manual/gardening/DIY; Walking; Sports and exercise; and Occupational activity (counted as 10 hours for full-time workers, 6 hours for part-time workers).

[e] Bases vary: those shown are for the overall sample.

Continued…

Table 6.7 continued

Aged 16 and over[a] *2006*

Average time spent per week (at least 15 minutes a day)	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Women								
Heavy housework								
No time	56	35	32	35	40	47	74	44
Less than 1 hour	20	24	21	22	19	21	14	21
1, less than 3 hours	15	23	24	24	22	18	8	20
3, less than 5 hours	4	7	10	7	7	6	2	7
5, less than 7 hours	2	4	4	5	4	3	0	3
7 hours of more	3	6	8	7	8	5	1	6
Mean number of hours[b]	1.0	1.8	2.3	1.9	2.0	1.4	0.5	1.6
Standard error of the mean	0.12	0.12	0.12	0.13	0.13	0.17	0.09	0.05
Heavy manual/ gardening/DIY								
No time	96	91	86	86	87	86	95	89
Less than 1 hour	1	3	5	4	4	5	2	4
1, less than 3 hours	1	3	5	6	5	5	1	4
3, less than 5 hours	0	1	1	2	2	1	1	1
5, less than 7 hours	0	1	1	0	1	1	0	1
7 hours of more	1	1	1	1	2	2	0	1
Mean number of hours[b]	0.1	0.2	0.4	0.4	0.5	0.4	0.2	0.3
Standard error of the mean	0.04	0.04	0.05	0.04	0.07	0.07	0.08	0.02
Walking[c]								
No time	62	62	62	65	73	83	93	70
Less than 1 hour	8	8	9	6	6	3	1	6
1, less than 3 hours	13	10	11	10	6	5	2	9
3, less than 5 hours	7	9	6	7	5	2	1	6
5, less than 7 hours	4	5	5	4	3	2	1	3
7 hours of more	6	7	8	8	8	5	2	6
Mean number of hours[b]	1.7	1.8	1.9	1.7	1.5	1.0	0.4	1.5
Standard error of the mean	0.22	0.12	0.14	0.13	0.12	0.20	0.12	0.06
Sports and exercise								
No time	42	47	53	58	69	80	93	61
Less than 1 hour	16	17	15	15	11	8	3	13
1, less than 3 hours	22	21	20	16	14	8	3	16
3, less than 5 hours	11	7	6	7	4	3	0	6
5, less than 7 hours	4	3	3	2	2	0		2
7 hours of more	6	4	4	2	1	2	0	3
Mean number of hours[b]	2.1	1.4	1.3	0.9	0.6	0.4	0.1	1.0
Standard error of the mean	0.19	0.10	0.08	0.05	0.5	0.06	0.03	0.04
Any physical activity[d]								
No time	16	12	12	13	22	35	66	23
Less than 1 hour	12	12	10	12	12	15	14	12
1, less than 3 hours	20	21	20	19	20	21	11	19
3, less than 5 hours	13	13	13	11	8	7	3	10
5, less than 7 hours	10	10	11	9	9	5	1	9
7 hours of more	29	31	33	35	28	16	4	27
Mean number of hours[b]	5.9	6.2	7.0	6.3	5.5	3.3	1.2	5.4
Standard error of the mean	0.30	0.25	0.26	0.23	0.22	0.31	0.20	0.11
Bases (unweighted)[e]								
Women	*794*	*1148*	*1494*	*1279*	*1269*	*463*	*430*	*6877*
Bases (weighted)[e]								
Women	*1014*	*1160*	*1379*	*1141*	*1050*	*768*	*798*	*7310*

[a] To avoid an over-long interview for informants aged 65 and over, only half of these older people were asked the long physical activity module. The weighting used in the analyses in this chapter takes this into account.

[b] Mean is based on all informants including those who reported no participation.

[c] Walking at a 'Fairly brisk' or 'Fast' pace.

[d] Includes Heavy housework; Heavy manual/gardening/DIY; Walking; Sports and exercise; and Occupational activity (counted as 10 hours for full-time workers, 6 hours for part-time workers).

[e] Bases vary: those shown are for the overall sample.

Table 6.8

Comparison of average time spent participating in specific activities per week, 1998 and 2006, by sex

Aged 16 and over[a] *1998, 2006*

Number of days in the last four weeks (at least 15 minutes a day)	Men		Women	
	Survey year			
	1998[b]	2006[b]	1998[b]	2006[b]
Heavy housework				
No time	62	59	42	44
Less than 1 hour	19	20	21	21
1, less than 3 hours	12	14	20	20
3, less than 5 hours	3	4	7	7
5, less than 7 hours	1	2	3	3
7 hours of more	2	2	7	6
Mean number of hours[c]	0.8	0.8	1.7	1.6
Standard error of the mean	0.03	0.03	0.04	0.05
Heavy manual/ gardening/DIY				
No time	69	71	88	89
Less than 1 hour	7	6	4	4
1, less than 3 hours	11	9	4	4
3, less than 5 hours	5	4	2	1
5, less than 7 hours	2	2	1	1
7 hours of more	7	7	1	1
Mean number of hours[c]	1.5	1.9	0.4	0.3
Standard error of the mean	0.06	0.10	0.02	0.02
Walking[d]				
No time	68	62	76	70
Less than 1 hour	9	9	6	6
1, less than 3 hours	9	11	7	9
3, less than 5 hours	5	7	5	6
5, less than 7 hours	3	3	2	3
7 hours of more	6	8	4	6
Mean number of hours[c]	1.5	2.1	1.1	1.5
Standard error of the mean	0.06	0.10	0.04	0.06
Sports and exercise				
No time	58	54	64	61
Less than 1 hour	13	13	13	13
1, less than 3 hours	14	15	14	16
3, less than 5 hours	6	8	5	6
5, less than 7 hours	3	4	2	2
7 hours of more	5	7	2	3
Mean number of hours[c]	1.3	1.6	0.8	1.0
Standard error of the mean	0.04	0.05	0.02	0.4
Any physical activity[e]				
No time	20	18	24	23
Less than 1 hour	11	10	14	12
1, less than 3 hours	15	14	19	19
3, less than 5 hours	9	11	10	10
5, less than 7 hours	6	7	8	9
7 hours of more	38	39	25	27
Mean number of hours[c]	7.2	8.0	4.8	5.4
Standard error of the mean	0.11	0.17	0.08	0.11
Bases (unweighted)[f]	*7193*	*5570*	*8715*	*6877*
Bases (weighted)[f]	*n/a*	*6854*	*n/a*	*7310*

[a] To avoid an over-long interview for informants aged 65 and over, in 2006 only half of these older people were asked the long physical activity module. The weighting used in the analyses in this chapter takes this into account.

[b] Data from 1998 are unweighted, while data from 2006 have been weighted for non-response.

[c] Mean is based on all informants including those who reported no participation.

[d] Walking at a 'Fairly brisk' or 'Fast' pace.

[e] Includes Heavy housework; Heavy manual/gardening/DIY; Walking; Sports and exercise; and Occupational activity (counted as 10 hours for full-time workers, 6 hours for part-time workers).

[f] Bases vary: those shown are for the overall sample.

Diet

7

Dhriti Jotangia, Sarah Pigott

Key findings

- This chapter presents data on the consumption of fruit and vegetables and the intake of fat among adults aged 16 and over, looking specifically at the number of portions of fruit and vegetables consumed and trends in consumption since 2001, as well as the mean fat intake compared with 2003.
- Fruit and vegetable consumption was higher among women than men. On average, women consumed 3.9 portions of fruit and vegetables per day while men consumed 3.6 portions. More women than men consumed the recommended five or more portions per day (32% compared with 28% respectively).
- Mean consumption of fruit and vegetables was lowest among those aged 16-24 among both men and women (with a mean of 3.0 and 3.3 portions per day respectively). It then increased with age, peaking at 4.0 portions among men aged 65-74, and 4.5 portions among women aged 55-64, and dropped back slightly among older informants.
- Fresh fruit and any vegetables (fresh, raw, tinned and frozen) were the most commonly eaten food items. Fresh fruit was consumed by 62% of men and 71% of women over the previous 24-hour period. Vegetables were consumed by 55% of men and 59% of women.
- There were significant differences in fruit and vegetable consumption by equivalised household income. Those in the highest income quintile were the most likely to eat at least five portions of fruit and vegetables a day (36% of men, 38% of women) and those in the lowest quintiles the least likely to do so (20% and 22% among men in the lowest two quintiles, 23% among women in the lowest).
- There was no significant change in fruit and vegetable consumption between 2001 and 2004, but consumption among both men and women increased significantly in 2005, and this trend continued in 2006. Among men, the proportion meeting the recommended guidelines of consuming five or more portions of fruit and vegetables a day rose from 23% in 2004 to 28% in 2006. The equivalent increase for women was from 27% to 32%.
- Men were more likely to have high fat scores (indicating a fat intake of over 122g per day) than women (14% and 7% respectively). Among women, mean fat scores varied little with age up to the age of 64, ranging from 23.5 to 24.0, but increased among older informants, peaking at 28.6 in those aged 75 and over. The pattern was different among men, where those aged 16-24 and those aged 75 and over had the highest mean fat scores (30.6 and 30.9 respectively), while scores were lower and varied relatively little among the age groups in between (from 27.2 to 28.1).
- Among men, fat intake varied with equivalised household income. The proportion with a high fat score was significantly lower among men in the highest income quintile (11%) than in the other quintiles (ranging from 15% to 19%). There was no equivalent pattern according to income quintile among women.
- The proportion of men and women consuming more than the recommended fat intake has increased markedly between 2003 and 2006 (from 6% to 14% among men, and from 3% to 7% among women).

7.1 Introduction

It is widely recognised that poor diet and nutrition are major contributory risk factors for ill health and premature death worldwide.[1] The government's white paper, *Choosing a Better Diet: a food and health action plan* (May 2005) suggests that up to 60% of premature mortality in England is attributable to diet related diseases such as cardiovascular disease (CVD) and its associated risk factors.[2] In 2005 alone, around 57,000 premature deaths in the UK were CVD related.[3]

In response to this, the government's food and health action plan sets out the strategy to promote a healthy balanced diet based on dietary recommendations. Key features of this framework include improving access to, and increasing the average consumption of a variety of fruit and vegetables to at least five portions per day, and reducing the average total intake of fat to 35% of food energy.[1,4,5]

Findings from the Health Survey for England provides important information about aspects of diet and nutrition. This chapter explores data for fruit and vegetable consumption and fat intake.

7.1.1 Fruit and vegetable consumption

The World Health Organisation (2003) emphasises the importance of a diet abundant in fruit and vegetables as a preventive measure against coronary heart disease.[1] Research suggests a diet low in fruit and vegetables accounts for about 20% of chronic diseases such as CVD, stroke, diabetes and certain cancers.[1,2,6] It is estimated that increasing the consumption of fruit and vegetables to at least five portions a day would result in the reduction of up to 20% in overall deaths from coronary heart disease.[7] Studies in the USA estimated that an average intake of at least four portions of fruit and vegetables decreases the risk of coronary heart disease,[8] with the intake of at least three portions lowering the incidence of stroke and mortality rates from ischemic heart disease.[9]

Dietary recommendations for the consumption of fruit and vegetables advise eating at least five portions (400g) or more per day.[4] The Department of Health has used this recommendation as the key to its '5 A DAY' programme, which is a national priority aimed at reducing the risk of heart disease, some cancers and other chronic conditions. The '5 A DAY' programme encourages the population to consume at least five portions or more of a variety of fruit and vegetables (including fruit juice and pulses) per day.[10] The underpinning objectives of this programme are to raise knowledge and awareness of the health benefits of eating fruit and vegetables, in addition to removing the barriers that exist in accessing a healthy nutritious diet.

7.1.2 Dietary recommendations for fat intake

The epidemiological association between fat intake and the risk of CVD has been dominated by the 'diet-heart' hypothesis.[11] The hypothesis predicts a detrimental effect of dietary fatty acids on coronary mortality. A diet high in saturated fats can result in abnormal levels of fat in the blood, a risk linked to raised blood cholesterol, coronary heart disease and CVD.[7,12] The current levels of saturated fat intake of 13.3% of food energy exceed public health recommendations of 11% of food energy.[2] It is suggested that a reduction in saturated fat intake to bring current levels in line with the recommendations would prevent approximately 3,500 deaths in the UK each year.[2,13]

The reduction in fat intake has therefore been a key focus of national dietary recommendations to reduce the risk of cardio-vascular conditions.[4] Dietary Reference Values (DRVs) have been formulated for fat intake and have been expressed as population averages.[14] The Committee on Medical Aspects of Food Policy (COMA) recommended that total fat intake (including saturated and polyunsaturated fatty acids) should contribute no more than 35% of daily food energy intake (excluding alcohol).[4] This is in line with the government's priority to maintain the current situation with the average total intake of fat at around 35% of food energy.[2]

In 2001-2002, the average daily intake of total fat for men (86.5g) represented 36% of total food energy intake, whilst average intake for women (61.4g) represented 35% of total food energy intake.[15]

7.2 Methods and definitions

7.2.1 Methods and measurements

HSE has included questions about fruit and vegetable consumption since 2001. The questions are administered by the interviewer during the Computer Assisted Personal Interview (CAPI) and are asked of all informants aged 5 and over. The questions are devised to examine fruit and vegetable consumption in terms of the '5 A DAY' programme.

Informants are asked to focus on consumption on the day before the interview, which is defined as the 24 hours from midnight to midnight. This is to ensure that varying work patterns and times of meals do not affect the average measure of daily consumption.

Portion size

The analyses measure fruit and vegetable consumption in portions per day. Five portions are defined as 400g per day, with an average portion being an 80g serving. A variety of different foodstuffs represents a portion, including vegetables (fresh, frozen, tinned), vegetables in composite dishes, salads, pulses, fruit (fresh, frozen, tinned, dried), fruit in composites and fruit juice.

To assist informants with reporting their consumption, portion size was converted into everyday household measures. Examples were given in the questionnaire to aid the recall process. For example, informants were asked to report how many tablespoons of vegetables, cereal bowls full of salad, pieces of medium size fruit (such as apples), or handfuls of very small fruit (such as berries) they had eaten in the previous 24 hours. The table below shows the portion sizes for different food items included in the analysis.

Food item	Portion Size
Vegetables (fresh, raw, tinned and frozen)	3 tablespoons
Pulses	3 tablespoons
Salad	1 cereal bowl
Vegetables in composites, such as vegetable curry	3 tablespoons
Very large fruit, such as melon	1 average slice
Large fruit, such as grapefruit	Half a fruit
Medium fruit, such as apples	1 fruit
Small fruit, such as plums	2 fruits
Very small fruit and berries	1 average handful
Dried fruit	1 tablespoon
Frozen fruit/tinned fruit	3 tablespoons
Fruit in composites, such as stewed fruit	3 tablespoons
Fruit juice	1 small glass (150 ml)

The '5 A DAY' policy clearly advises which food items count towards the recommendation; these guidelines were incorporated within questions asked of informants. For example, questions about vegetable consumption specified the exclusion of potatoes or rice. Additionally, the consumption of fruit juice, pulses and dried fruit were each counted as one portion, regardless of how much had been consumed in a given day. Eating a variety of fruit and vegetable sources provides a range of vitamin, minerals and fibre essential in the diet.

Interpretation of the data

Fruit and vegetable consumption data are based on self-reported information collected during a 24-hour recall period. Every attempt has been made to ensure that informants report an accurate representation of consumption levels by identifying portions using everyday measures. However there may be variations in how informants defined and reported the amount of fruit and vegetables consumed, for example when assessing the amount of fruit contained in composite foods such as apple pie. Evidence has suggested that informants may intentionally over-report their fruit and vegetable consumption to indicate socially desirable behaviour.[16] Nevertheless, survey estimates can still provide useful comparisons of consumption patterns of the population.

Within specific groups, mean consumption may also be increased by a small number of informants eating a large amount of fruit and vegetables. Median consumption is also shown, where appropriate, to indicate the mid-range value as an alternative measure that is not influenced by extreme values.

7.2.2 Fat intake

Total fat intake on the Health Survey for England has been measured since 1998 and is assessed through validated questionnaire items derived from the Dietary Instrument for Nutrition Education (DINE).[17] The instrument, devised by Imperial Cancer Research Fund's General Practice Research group, has been specifically developed for use in nurse-administered health checks. Nutrients important to cardiovascular disease and cancer, namely fat and fibre, are assessed through a weighted food frequency questionnaire consisting of 19 food groups. These food groups account for about 70% of the fat and fibre in a typical UK diet (according to the National Food Survey[18]).

Consistent with previous years, in HSE 2006 the DINE questionnaire was presented to informants aged 16 and over in a self completion format administered during the nurse visit (see Volume 3, Methodology and Documentation, Appendix A). This method of administration has resulted in a sample size smaller than that presented for fruit and vegetable consumption. The questionnaire in 2006 included items on fat consumption, but not dietary fibre intake. Items examined the frequency of consumption of foods such as cheese, white meat, red meat, fried foods, snacks and cakes, the type and amount of milk consumed, as well as types of spreads and cooking fats used.

Fat scores were derived based on the frequency of consumption of these foods and the fat content of a standard portion. The DINE instrument does not provide an estimate of daily food energy intake as recommended by COMA.[17] Instead, dietary fat is classified as total fat intake rather than fat as a percentage of energy. Therefore, the percentage of energy contributed by fat cannot be calculated and direct comparisons cannot be made with COMA recommendations.

The DINE instrument groups scores into three categories: low intake (less than 30), medium intake (30-40) and high intake (more than 40).[17] Informants with a total fat score of less than 30 (low intake) were classified as consuming an average of 83g of fat or less per day. A fat score of 30 to 40 (medium) represents a fat intake of 84 to 122g per day, and a score of more than 40 represents a fat intake greater than 122g per day.[17] This categorisation is based on the recommendation of fat intake at 35% of energy,[4] together with the Recommended Dietary Allowances (RDA) for energy for moderately active adults.

Data are shown for the intake of total fat (including saturated fatty acids), and mean fat scores are presented, based on the consumption of certain foods.

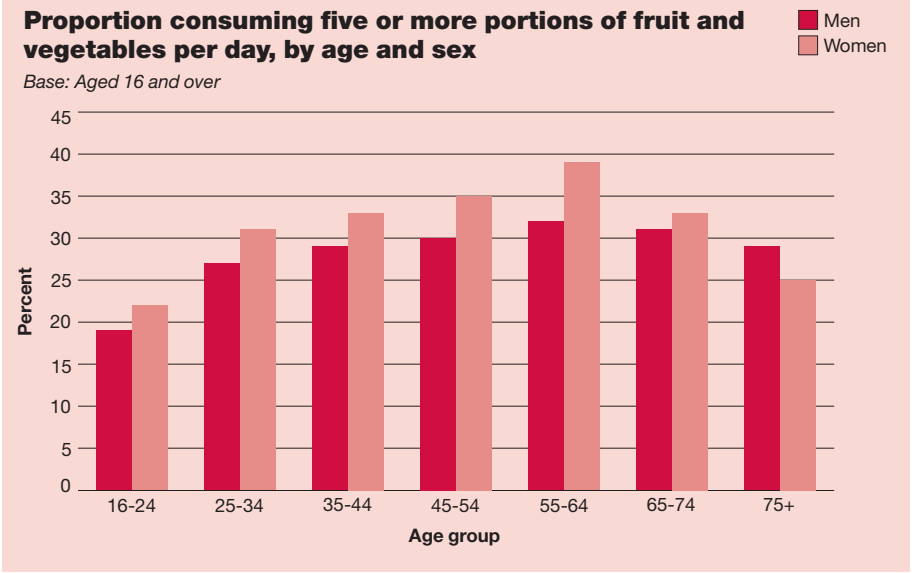
2006 data on fat intake are compared with those for 2003. Comparisons with earlier years are not possible as the scores were calculated differently; previous years incorporated adjustments for energy requirement.

7.3 Results

7.3.1 Portions of fruit and vegetables consumed

Figure 7A shows the proportion of informants meeting the government's recommendations of consuming five or more portions of fruit and vegetables a day. A higher proportion of women than men met the government's guidelines (32% and 28% respectively). This pattern was found for all age groups apart from those aged 75 and over.

Figure 7A



Among men and women, mean consumption of fruit and vegetables varied with age. Consumption was lowest among those aged 16-24 among both men and women (with a mean of 3.0 and 3.3 portions per day respectively). It then increased with age, peaking at 4.0 portions among men aged 65-74, and 4.5 portions among women aged 55-64, and dropped back slightly among older informants.

Around three quarters of women had eaten fresh, frozen or tinned fruit, or fruit in composites, on the previous day (77%) and a similar proportion had eaten fresh, raw, tinned or frozen vegetables and vegetables in composites or salad (76%). The equivalent figures for men were 68% and 70% respectively. Fresh fruit was the main source of fruit and vegetables (eaten by 71% of women and 62% of men the previous day), followed by fresh, raw, tinned or frozen vegetables (59% and 55% respectively). This was a pattern also found among children aged 5-15 (see Volume 2, Chapter 4 on children's fruit and vegetable consumption). **Table 7.1, 7.6**

7.3.2 Fruit and vegetable consumption by Government Office Region

Examining differences between fruit and vegetable consumption in Government Office Regions shows that men and women in London were more likely to consume five or more portions of fruit and vegetables per day (38% and 42% respectively) than those in other regions, where consumption of five or more portions ranged from 22% to 29% for men and 23% to 34% for women. As the London region is a relatively small but densely populated and diverse area it is likely that other factors will influence estimates of lifestyle behaviours. For example, the London region has a higher minority ethnic population than other regions. In the HSE 2004, which focused on the health of minority ethnic populations, it was established that both adults and children in most ethnic groups were more likely to consume five or more portions of fruit and vegetables a day than the general population[19] and this therefore goes some way to explaining the difference. **Table 7.2**

7.3.3 Fruit and vegetable consumption by equivalised household income

There were significant differences in fruit and vegetable consumption by equivalised household income. Those in the highest income quintile were the most likely to eat at least five portions of fruit and vegetables a day (36% of men, 38% of women) and those in the lowest quintiles the least likely to do so (20% and 22% among men in the lowest two quintiles, 23% among women in the lowest). The proportion of men and women meeting the recommended levels of consumption were similar in the highest and lowest quintiles, but in the middle three there was a much greater gap between men and women. **Table 7.3**

Figure 7B

Proportion consuming five or more portions of fruit and vegetables per day, by equivalised household income and sex

Base: Aged 16 and over

As with total consumption of fruit and vegetables, the proportions who ate individual types of foods decreased from highest to lowest income quintile. Significantly fewer in the lowest quintile consumed fresh fruit, fruit juice, vegetables or salad. The exception to this pattern was for pulses, where there was much less variation across the quintiles (from 34%-38% among men, and 31%-35% among women). **Table 7.8**

7.3.4 Fruit and vegetable consumption since 2001

There was no significant change in fruit and vegetable consumption between 2001 and 2004, but consumption among both men and women increased significantly in 2005, and this trend continued in 2006.

Figure 7C presents the proportion of informants consuming five or more portions of fruit and vegetables per day since 2001. In 2005, 26% of men consumed 5 or more portions of fruit and vegetables compared with 28% in 2006. Among women, this proportion increased from 30% in 2005 to 32% in 2006. **Table 7.5**

7.3.5 Mean fat score by age and sex

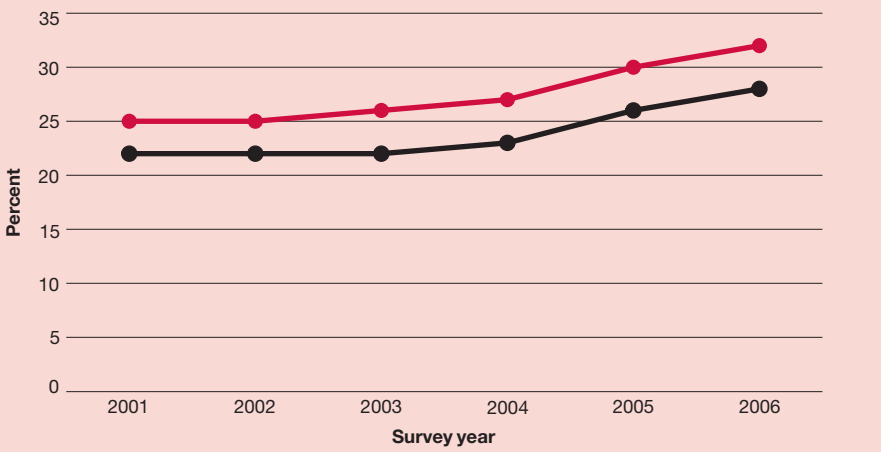
Figure 7D shows mean fat scores for men and women by age. Overall, mean fat scores were higher among men (28.3) than women (24.4). This pattern was evident in all age groups.

Among women, mean fat scores varied little with age up to the age of 64, ranging from 23.5 to 24.0, but increased among older informants, peaking at 28.6 in those aged 75 and over. The pattern was different among men, where those aged 16-24 and those aged 75 and over had the highest mean fat scores (30.6 and 30.9 respectively), while scores were lower and varied relatively little among the age groups in between (from 27.2 to 28.1). **Table 7.9**

Figure 7C

Proportion consuming five or more portions of fruit and vegetables per day, by sex and survey year

Aged 16 and over

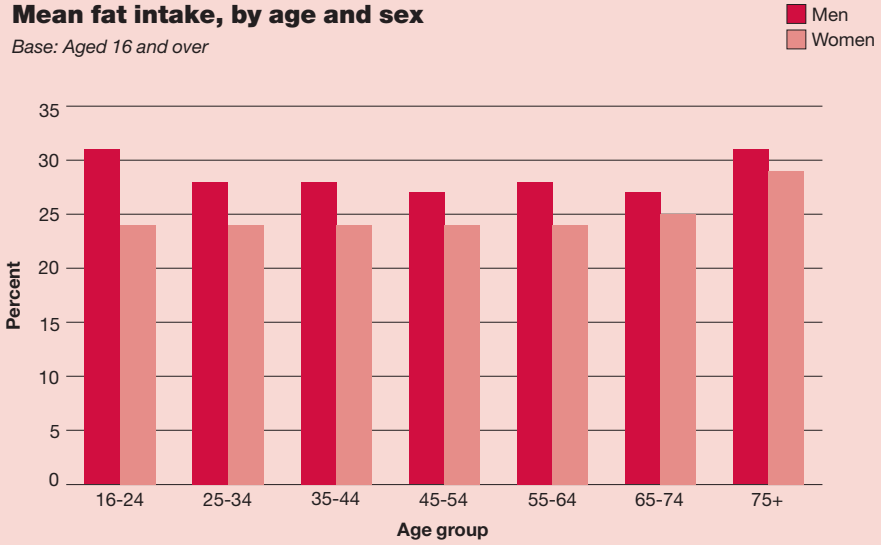


Note: Data for 2003-2006 have been weighted for non-response.

Figure 7D

Mean fat intake, by age and sex

Base: Aged 16 and over



7.3.6 Comparison of total fat intake in 2003 and 2006

Table 7.13 shows the proportion of men and women with high fat scores in 2003 and 2006. Fat intake continues to be higher among men than women, and there has been a significant increase among both sexes between 2003 and 2006. The proportion of informants with high fat scores increased from 6% to 14% of men and from 3% to 7% of women. This pattern was consistent within all age groups. Mean fat intake also increased, from a mean score of 24.3 in 2003 to 28.3 in 2006 among men, and from 21.2 to 24.4 among women over the same period. **Table 7.13**

7.4 Discussion

The increase of fruit and vegetable consumption since 2005 suggests that government messages about the protective health benefits of fruit and vegetables are beginning to influence consumption patterns as well as awareness and attitudes. The Department of Health's '5 A DAY' scheme contains clear and simple guidelines in terms of the types of fruit and vegetables that are included as one of the '5 A DAY'. The guidelines were modified in 2003 following some confusion among consumers regarding what amounts to a portion.

Community initiatives have been funded to improve access to and increase consumption of fruit and vegetable intake amongst all socio-economic groups.

Despite the upward trend of fruit and vegetable consumption since 2003, intake still remains well below the recommended 400g serving a day, with fewer than a third of informants achieving this target in 2006. While there is variation according to equivalised household income, even among those in the highest quintile fewer than two in five meet the government's recommendations.

In addition to fruit and vegetable consumption, this chapter explored the intake of dietary fat. The proportion of informants consuming an average fat intake of 122g or more per day (those with a high fat score) has risen since 2003. This suggests that reducing fat intake still needs to be advised. The food industry can help promote healthier food choices by producing foods that contain less fat, particularly saturated fat. Clear and effective food labelling may also help to raise awareness of the fat content of processed foods. This is an area that has recently been targeted by the Foods Standards Agency.[20]

Analyses were carried out comparing fruit and vegetable consumption and fat intake among informants who reported doctor-diagnosed cardiovascular disease, hypertension and diabetes, or none of these conditions. These analyses did not show significant differences between the groups (Tables 7.4 and 7.12). This is surprising given the links between diet and health, and suggests that there may be more complex interactions than these analyses reveal. It is also possible that some of those with CVD, hypertension or diabetes may have modified their eating patterns following medical advice.

References and notes

1 World Health Organization. *Diet, Nutrition and the prevention of Chronic Diseases: report of a joint WHO/FAO expert consultation*. WHO Technical Report Series, Geneva, Switzerland, 2003; 916.

2 Department of Health. Choosing Health? *Choosing a Better Diet: A consultation on priorities for a food and health action plan*. 2004. Gateway reference: 3134.

3 Allender S, Peto V, Scarborough P et al. *Coronary Heart Disease Statistics: 2007*. British Heart Foundation: London.

4 Department of Health (1994). *Nutritional Aspects of Cardiovascular Disease. Review Group of the Committee on Medical Aspects of Food Policy*. HMSO: London.

5 Scientific Advisory Committee on Nutrition (2003). Salt and Health. The Stationery Office: London. See: www.sacn.gov.uk/pdfs/sacn_06_37.pdf.

6 Ness AR and Powles JW. *Fruit and Vegetables, and Cardiovascular Disease: A Review*. International Journal Epidemiol. 1997 Feb; **26(1)**:1-13.

7 Department of Health (Oct 2006). Fact Sheet on Diet and Nutrition.

8 Joshipura KJ, Hu FB, Manson JE et al. *The Effect of Fruit and Vegetable Intake on Risk for Coronary Heart Disease*. Ann intern Med. 2001; **134**:1106-14.

9 Bazzano LA, He J, Ogden LG et al. *Fruit and vegetable intake and risk of cardiovascular disease in US adults: the first National Health and Nutrition Examination Survey Epidemiologic Follow-up Study*. American Journal of Clinical Nutrition. 2002;**76**:93-9.

10 For further information about the '5 A DAY' programme see the Department of Health website: www.dh.gov.uk/en/Policyandguidance/Healthandsocialcaretopics/FiveADay/index.htm

11 Kelly CNM & Stanner, SA. *Diet and cardiovascular disease in the UK: are the messages getting across?* Proceedings of the Nutrition Society (2003), **62**, 583-589.

12 Caterina De R, Zampolli A, Del Turco S et al. Nutritional mechanisms that influence cardiovascular disease. American Journal of Clinical Nutrition. 2006; **83**: 421s-426.

13 Partial Regulatory Impact Assessment: *Saturated Fat and Energy Programme – Enabling Consumers to reduce their intake of saturated fat to achieve and maintain energy balance*. May 2007. www.food.gov.uk.

14 Report on Health and Social Subjects 41 *Dietary Reference Values (DRVs) for Food Energy and Nutrients for the UK*, Report of the Panel on DRVs of the Committee on Medical Aspects of Food Policy (COMA) 1991. The Stationery Office. London

15 Henderson L, Gregory J & Irving K (eds.). *The National Diet and Nutrition Survey: adults aged 19 to 64 years. Energy, protein, carbohydrate, fat and alcohol intake. Volume 2*. The Stationery Office. London: HMSO, 2003.

16 Herbert JR, Clemow I, Pbert L et al. *Social desirability bias in dietary self report may compromise the validity of dietary intake measures*. International Journal of Epidemiology. 1995; **24**: 389-398.

17 Roe, L, Strong C, Whiteside C, et al. *Dietary intervention in primary care: validity of the DINE method for diet assessment*. Family Practice. 1994; **11**, No.4: 375-381.

18 Ministry of Agriculture, Fisheries and Food. *Household Food Consumption and Expenditure: 1988. Annual Report of the National Food Survey Committee*. London: HMSO, 1989.

19 Sproston K and Mindell J (eds). *Health Survey for England 2004. Volume1: The health of minority ethnic groups. (Chapters 9, 12)* The Information Centre, Leeds, 2006.

20 Food Standards Agency. *Draft saturated fat and energy intake programme*. www.fsascience.net/2007/03/30/fat_and_energy.

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7.13 Trends in fat intake, 2003 and 2006, by sex

Table 7.1

Fruit and vegetable consumption, by age and sex

Aged 16 and over *2006*

Portions per day	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
Men								
None	12	7	9	6	5	3	3	7
Less than1 portion	3	2	2	3	3	3	3	3
1 portion or more but less than 2	21	17	15	16	14	11	14	16
2 portions or more but less than 3	21	17	17	14	17	17	18	17
3 portions or more but less than 4	14	17	15	18	15	21	17	16
4 portions or more but less than 5	10	14	13	13	15	14	15	13
5 portions or more	19	27	29	30	32	31	29	28
Mean	3.0	3.7	3.5	3.7	3.9	4.0	3.8	3.6
Standard error of the mean	0.12	0.11	0.08	0.09	0.08	0.09	0.11	0.05
Median	2.3	3.0	3.0	3.3	3.7	3.5	3.3	3.0
Women								
None	8	5	6	4	2	2	3	5
Less than1 portion	3	2	2	2	2	2	4	3
1 portion or more but less than 2	17	14	14	14	11	11	14	14
2 portions or more but less than 3	20	16	16	15	14	17	18	16
3 portions or more but less than 4	17	17	16	17	16	20	20	17
4 portions or more but less than 5	13	15	13	13	15	14	17	14
5 portions or more	22	31	33	35	39	33	25	32
Mean	3.3	3.9	4.0	4.2	4.5	4.1	3.6	3.9
Standard error of the mean	0.11	0.09	0.08	0.08	0.09	0.08	0.07	0.04
Median	3.0	3.5	3.7	3.7	4.2	3.7	3.3	3.6
Bases (unweighted)								
Men	*649*	*861*	*1182*	*1050*	*1126*	*852*	*601*	*6321*
Women	*794*	*1148*	*1494*	*1279*	*1269*	*933*	*900*	*7817*
Bases (weighted)								
Men	*1040*	*1128*	*1355*	*1123*	*1015*	*694*	*496*	*6850*
Women	*1014*	*1160*	*1379*	*1141*	*1050*	*768*	*797*	*7309*

Table 7.2

Fruit and vegetable consumption (observed and age-standardised), by Government Office Region/Strategic Health Authority[a] and sex

Aged 16 and over *2006*

Portions per day	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
Men											
Observed											
None	10	7	10	5	9	5	6	6	7	9	5
Less than1 portion	3	4	4	3	3	2	2	2	2	2	2
1 portion or more but less than 2	20	17	18	13	17	17	14	18	14	14	14
2 portions or more but less than 3	17	20	20	19	17	16	13	18	18	17	18
3 portions or more but less than 4	13	17	14	19	16	15	16	18	16	14	18
4 portions or more but less than 5	13	11	12	13	12	16	13	15	15	17	13
5 portions or more	24	25	22	27	26	29	37	24	29	27	30
Mean	3.3	3.4	3.2	3.6	3.4	3.8	4.2	3.5	3.7	3.7	3.8
Standard error of the mean	0.19	0.11	0.12	0.11	0.14	0.12	0.20	0.11	0.10	0.16	0.12
Median	3.0	3.0	2.7	3.3	3.0	3.5	3.9	3.0	3.3	3.3	3.3
Standardised											
None	10	8	10	6	9	5	6	7	7	9	5
Less than1 portion	3	3	4	3	3	2	2	2	2	2	2
1 portion or more but less than 2	20	17	18	13	17	17	13	18	14	14	14
2 portions or more but less than 3	17	20	20	18	17	16	13	19	18	18	18
3 portions or more but less than 4	14	17	14	19	16	15	17	18	16	14	18
4 portions or more but less than 5	13	11	12	13	12	16	12	14	15	17	13
5 portions or more	25	25	22	28	26	29	38	23	28	26	30
Mean	3.3	3.4	3.2	3.6	3.4	3.8	4.3	3.4	3.7	3.6	3.8
Standard error of the mean	0.17	0.11	0.12	0.11	0.14	0.13	0.19	0.12	0.10	0.15	0.13
Median	3.0	3.0	2.7	3.3	3.0	3.5	3.8	3.0	3.3	3.3	3.3

Continued…

Table 7.2 continued

Aged 16 and over *2006*

Portions per day	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
Women											
Observed											
None	9	6	6	5	5	3	3	3	3	3	4
Less than1 portion	4	4	4	2	2	2	1	3	1	2	1
1 portion or more but less than 2	14	15	17	15	15	13	12	13	11	13	10
2 portions or more but less than 3	23	16	16	15	20	16	14	15	16	15	17
3 portions or more but less than 4	16	18	18	17	16	19	15	18	18	18	18
4 portions or more but less than 5	11	14	13	14	14	14	13	17	16	17	15
5 portions or more	23	28	26	32	29	32	41	31	34	33	35
Mean	3.2	3.8	3.5	3.9	3.8	4.0	4.5	4.0	4.1	4.1	4.1
Standard error of the mean	0.15	0.14	0.12	0.11	0.12	0.11	0.14	0.11	0.09	0.14	0.11
Median	3.0	3.3	3.0	3.7	3.3	3.7	4.0	3.7	4.0	4.0	4.0
Standardised											
None	9	6	6	5	5	3	3	4	3	3	4
Less than1 portion	4	4	4	2	2	2	1	3	1	2	1
1 portion or more but less than 2	14	15	16	15	15	14	12	13	11	13	10
2 portions or more but less than 3	22	16	16	15	20	16	14	15	16	14	17
3 portions or more but less than 4	16	18	18	17	16	19	14	18	18	17	19
4 portions or more but less than 5	11	14	13	14	14	14	13	17	16	17	15
5 portions or more	23	28	26	32	29	32	42	31	34	34	35
Mean	3.2	3.7	3.6	3.8	3.8	4.0	4.5	4.0	4.1	4.1	4.1
Standard error of the mean	0.14	0.14	0.12	0.11	0.12	0.11	0.15	0.12	0.08	0.14	0.11
Median	3.0	3.3	3.0	3.5	3.3	3.7	4.2	3.7	4.0	4.0	4.0
Bases (unweighted)											
Men	*334*	*945*	*647*	*618*	*662*	*733*	*735*	*593*	*1054*	*513*	*541*
Women	*435*	*1152*	*823*	*774*	*869*	*848*	*833*	*790*	*1293*	*681*	*612*
Bases (weighted)											
Men	*347*	*920*	*680*	*605*	*708*	*782*	*1038*	*667*	*1104*	*540*	*564*
Women	*392*	*1002*	*750*	*635*	*792*	*794*	*975*	*775*	*1195*	*636*	*560*

[a] This table provides data for regional analysis both by Government Office Region (GOR) and the new configuration of Strategic Health Authorities (SHAs) in place from July 2006. The first eight columns represent GORs and SHAs of the same name, while the South East GOR (column nine) is divided into South East Coast SHA and South Central SHA, shown in the final two columns.

Table 7.3

Fruit and vegetable consumption (age-standardised), by equivalised household income and sex

Aged 16 and over *2006*

Portions per day	Equivalised household income quintile				
	Highest	2nd	3rd	4th	Lowest
	%	%	%	%	%
Men					
None	4	6	8	9	11
Less than1 portion	1	2	2	4	4
1 portion or more but less than 2	14	14	17	19	20
2 portions or more but less than 3	15	18	18	18	18
3 portions or more but less than 4	17	16	15	16	15
4 portions or more but less than 5	14	16	14	15	10
5 portions or more	36	29	25	20	22
Mean	4.2	3.8	3.4	3.2	3.1
Standard error of the mean	0.10	0.09	0.09	0.10	0.12
Median	3.8	3.3	3.0	3.0	2.7
Women					
None	1	4	5	5	7
Less than1 portion	1	2	2	3	4
1 portion or more but less than 2	10	11	13	18	19
2 portions or more but less than 3	13	16	16	19	18
3 portions or more but less than 4	20	15	16	18	17
4 portions or more but less than 5	17	15	14	13	12
5 portions or more	38	36	33	25	23
Mean	4.7	4.2	3.9	3.5	3.3
Standard error of the mean	0.10	0.09	0.08	0.08	0.09
Median	4.2	4.0	3.7	3.0	3.0
Bases (unweighted)					
Men	*1195*	*1141*	*1054*	*933*	*779*
Women	*1219*	*1267*	*1296*	*1387*	*1076*
Bases (weighted)					
Men	1322	1266	1104	932	827
Women	1163	1205	1198	1246	983

Table 7.4

Fruit and vegetable consumption (age-standardised), by self-reported doctor-diagnosed CVD, hypertension or diabetes and sex

Aged 16 and over *2006*

Portions per day	CVD[a]	Hypertension or diabetes[b]	None of these diseases
	%	%	%
Men			
None	7	6	6
Less than1 portion	1	2	2
1 portion or more but less than 2	22	16	15
2 portions or more but less than 3	19	21	18
3 portions or more but less than 4	11	14	18
4 portions or more but less than 5	14	13	14
5 portions or more	25	29	28
Mean	3.4	3.7	3.7
Standard error of the mean	0.18	0.13	0.07
Women			
None	4	4	4
Less than1 portion	2	4	3
1 portion or more but less than 2	15	11	12
2 portions or more but less than 3	15	25	17
3 portions or more but less than 4	19	15	17
4 portions or more but less than 5	15	11	15
5 portions or more	31	30	31
Mean	4.0	3.7	4.0
Standard error of the mean	0.17	0.18	0.07
Bases (unweighted)			
Men	*471*	*919*	*2047*
Women	*503*	*875*	*2874*
Bases (weighted)			
Men	*593*	*1065*	*2472*
Women	*582*	*983*	*2861*

[a] CVD: self-reported doctor-diagnosed CVD (including angina, heart attack, stroke, heart murmur, irregular heart rhythm).

[b] Hypertension: defined as SBP≥ 140 mmHg or DBP≥ 90 mmHg or on medication to reduce blood pressure. Diabetes: self-reported doctor-diagnosed diabetes, including type 1 and 2 diabetes. Includes those with hypertension and diabetes only and no other CVD.

Table 7.5

Trends in fruit and vegetable consumption, 2001-2006, by age and sex

Aged 16 and over *2001-2006*

Portions per day	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
Men								
2001								
None	15	9	9	7	5	4	4	8
Less than 5 portions	72	72	70	68	67	69	75	70
5 portions or more	13	19	21	25	28	27	21	22
Mean	2.5	3.0	3.2	3.4	3.7	3.6	3.4	3.3
Standard error of the mean	0.1	0.07	0.07	0.08	0.08	0.08	0.09	0.03
Median	2.0	2.5	2.7	3.0	3.3	3.3	3.0	3.0
2002								
None	15	10	8	7	5	6	3	8
Less than 5 portions	69	74	70	67	65	67	77	70
5 portions or more	16	16	22	26	30	27	20	22
Mean	2.7	2.9	3.2	3.5	3.8	3.6	3.3	3.3
Standard error of the mean	0.06	0.10	0.09	0.11	0.12	0.14	0.14	0.04
Median	2.0	2.5	2.7	3.0	3.3	3.0	3.0	3.0
2003								
None	16	11	10	8	5	5	5	9
Less than 5 portions	71	68	68	69	70	66	71	69
5 portions or more	13	21	22	23	25	29	24	23
Mean	2.4	3.1	3.2	3.4	3.6	3.8	3.6	3.3
Standard error of the mean	0.08	0.09	0.07	0.08	0.07	0.08	0.09	0.03
Median	2.0	2.7	2.7	3.0	3.3	3.7	3.3	3.0
2003[a]								
None	16	11	10	8	5	5	5	9
Less than 5 portions	71	68	69	69	70	66	71	69
5 portions or more	13	21	21	23	25	29	24	22
Mean	2.4	3.2	3.2	3.3	3.6	3.8	3.6	3.2
Standard error of the mean	0.06	0.08	0.07	0.07	0.07	0.09	0.10	0.03
Median	2.0	2.7	2.7	3.0	3.3	3.7	3.3	3.0
2004								
None	13	11	8	8	4	5	3	8
Less than 5 portions	70	69	70	69	64	68	72	69
5 portions or more	16	20	22	23	32	28	24	23
Mean	2.7	3.0	3.3	3.4	3.8	3.8	3.6	3.3
Standard error of the mean	0.12	0.10	0.13	0.12	0.13	0.15	0.13	0.05
Median	2.3	2.5	3.0	3.0	3.5	3.7	3.3	3.0
2005								
None	12	8	7	5	6	6	5	7
Less than 5 portions	70	67	66	68	66	63	65	67
5 portions or more	17	25	27	28	28	31	30	26
Mean	3.0	3.5	3.6	3.6	3.7	3.9	3.7	3.5
Standard error of the mean	0.14	0.13	0.13	0.11	0.10	0.13	0.13	0.06
Median	2.3	3.0	3.0	3.0	3.7	3.7	3.6	3.0
2006								
None	12	7	9	6	5	3	3	7
Less than 5 portions	69	67	62	64	64	66	67	65
5 portions or more	19	27	29	30	32	31	29	28
Mean	3.0	3.7	3.5	3.7	3.9	4.0	3.8	3.6
Standard error of the mean	0.12	0.11	0.08	0.09	0.08	0.09	0.11	0.05
Median	2.3	3.0	3.0	3.3	3.7	3.5	3.3	3.0

Continued…

Table 7.5

Table 7.5 continued

Aged 16 and over *2001-2006*

Portions per day	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
Men								
Bases (unweighted)								
Men 2001	*810*	*1139*	*1320*	*1210*	*1054*	*883*	*550*	*6966*
Men 2002[b]	*1676*	*509*	*686*	*530*	*494*	*379*	*269*	*3317*
Men 2003	*746*	*1025*	*1263*	*1101*	*1103*	*807*	*557*	*6602*
Men 2004	*291*	*449*	*535*	*440*	*508*	*379*	*276*	*2878*
Men 2005	*421*	*522*	*588*	*615*	*586*	*426*	*297*	*3455*
Men 2006	*649*	*861*	*1182*	*1050*	*1126*	*852*	*601*	*6321*
Bases (weighted)[a]								
Men 2003	*1047*	*1274*	*1416*	*1185*	*1043*	*731*	*507*	*7202*
Men 2004	*485*	*561*	*647*	*531*	*477*	*330*	*231*	*3262*
Men 2005	*563*	*624*	*727*	*605*	*543*	*373*	*266*	*3701*
Men 2006	*1040*	*1128*	*1355*	*1123*	*1015*	*694*	*496*	*6850*
Women								
2001								
None	11	7	7	5	4	3	3	6
Less than 5 portions	72	70	68	65	67	71	76	69
5 portions or more	18	23	25	30	29	26	21	25
Mean	2.9	3.4	3.5	3.8	3.9	3.6	3.3	3.5
Standard error of the mean	0.07	0.07	0.07	0.07	0.08	0.07	0.07	0.03
Median	2.3	3.0	3.0	3.3	3.7	3.3	3.0	3.0
2002								
None	12	7	6	5	3	5	6	6
Less than 5 portions	70	70	70	63	62	67	77	69
5 portions or more	18	22	24	32	35	27	18	25
Mean	2.9	3.3	3.5	3.9	4.1	3.7	3.2	3.5
Standard error of the mean	0.05	0.10	0.09	0.09	0.11	0.11	0.10	0.04
Median	2.5	3.0	3.0	3.7	3.7	3.3	3.0	3.2
2003								
None	11	8	7	5	4	4	4	6
Less than 5 portions	73	69	66	63	64	68	76	68
5 portions or more	16	22	27	32	33	28	19	26
Mean	2.8	3.3	3.6	3.9	4.0	3.8	3.3	3.6
Standard error of the mean	0.08	0.07	0.06	0.07	0.07	0.09	0.07	0.03
Median	2.3	3.0	3.2	3.5	3.7	3.5	3.0	3.2
2003[a]								
None	10	8	7	5	4	4	4	6
Less than 5 portions	74	69	66	63	64	68	76	68
5 portions or more	16	23	27	32	32	28	20	26
Mean	2.8	3.4	3.6	3.9	4.0	3.8	3.3	3.5
Standard error of the mean	0.07	0.07	0.07	0.07	0.08	0.10	0.07	0.03
Median	2.3	3.0	3.2	3.5	3.7	3.5	3.0	3.0
2004								
None	11	8	6	5	4	3	3	6
Less than 5 portions	71	67	67	65	62	67	74	67
5 portions or more	18	25	27	31	34	30	23	27
Mean	2.8	3.4	3.7	3.8	4.1	3.9	3.5	3.6
Standard error of the mean	0.13	0.11	0.10	0.10	0.11	0.10	0.10	0.05
Median	2.2	3.0	3.3	3.5	3.7	3.7	3.2	3.3

Continued…

Table 7.5 continued

Aged 16 and over *2001-2006*

Portions per day	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
Women								
2005								
None	8	4	6	4	3	3	4	5
Less than 5 portions	74	63	66	64	58	64	73	66
5 portions or more	17	33	28	32	39	34	23	30
Mean	3.1	4.0	3.7	3.9	4.4	4.1	3.5	3.8
Standard error of the mean	0.14	0.12	0.09	0.10	0.10	0.11	0.11	0.05
Median	2.7	3.7	3.3	3.7	4.0	4.0	3.3	3.5
2006								
None	8	5	6	4	2	2	3	5
Less than 5 portions	70	64	61	61	58	64	73	64
5 portions or more	22	31	33	35	39	33	25	32
Mean	3.3	3.9	4.0	4.2	4.5	4.1	3.6	3.9
Standard error of the mean	0.11	0.09	0.08	0.08	0.09	0.08	0.07	0.04
Median	3.0	3.5	3.7	3.7	4.2	3.7	3.3	3.6
Bases (unweighted)								
Women 2001	*964*	*1447*	*1721*	*1480*	*1156*	*1029*	*884*	*8681*
Women 2002[b]	*1948*	*614*	*836*	*663*	*583*	*452*	*421*	*4077*
Women 2003	*890*	*1285*	*1618*	*1279*	*1307*	*952*	*903*	*8234*
Women 2004	*364*	*550*	*748*	*626*	*622*	*486*	*429*	*3825*
Women 2005	*480*	*640*	*781*	*721*	*678*	*463*	*407*	*4170*
Women 2006	*794*	*1148*	*1494*	*1279*	*1269*	*933*	*900*	*7817*
Bases (weighted)[a]								
Women 2003	*1034*	*1285*	*1440*	*1200*	*1074*	*816*	*785*	*7634*
Women 2004	*472*	*563*	*655*	*541*	*492*	*367*	*353*	*3441*
Women 2005	*541*	*633*	*739*	*612*	*563*	*410*	*426*	*3926*
Women 2006	*1014*	*1160*	*1379*	*1141*	*1050*	*768*	*797*	*7309*

[a] Data from 2003 have been weighted for non-response (shaded rows) ; for 2003 both weighted and unweighted data are shown.

[b] In 2002 the sample of young people aged 16-24 was boosted. The column for those aged 16-24 includes all informants from both core and boost samples. The total column excludes those from the boost sample.

Table 7.6

Types of fruit and vegetables consumed, by age and sex

Aged 16 and over *2006*

Types of fruit and vegetables consumed	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
Men								
Any fruit and vegetables	88	93	91	94	95	97	97	93
Any vegetables (including salad)	57	71	69	70	73	75	79	70
Any vegetables (excluding salad)	47	58	55	58	61	65	71	58
Any fruit (including fruit juice)	73	77	76	79	83	85	87	79
Any fruit (excluding fruit juice)	55	61	63	72	75	79	83	68
Vegetables (fresh, raw, tinned and frozen)	43	54	52	55	58	63	69	55
Pulses	33	32	33	36	36	39	39	35
Salad	25	33	32	31	31	27	26	30
Vegetables in composites	5	10	7	7	6	5	5	7
Fresh fruit	52	57	58	67	68	72	72	62
Fruit in composites	3	6	5	8	9	11	17	7
Dried fruit	4	6	11	8	12	14	15	9
Frozen fruit	2	1	3	3	6	7	13	4
Fruit juice	50	51	43	40	42	41	41	44
Women								
Any fruit and vegetables	92	95	94	96	98	98	97	95
Any vegetables (including salad)	67	77	75	77	82	77	75	76
Any vegetables (excluding salad)	55	63	60	63	68	63	66	62
Any fruit (including fruit juice)	79	82	82	85	89	90	89	85
Any fruit (excluding fruit juice)	62	72	74	79	85	85	85	77
Vegetables (fresh, raw, tinned and frozen)	51	60	55	60	65	60	65	59
Pulses	31	33	34	31	31	33	34	33
Salad	32	39	39	41	40	33	28	37
Vegetables in composites	7	9	9	8	7	6	3	7
Fresh fruit	57	67	70	74	79	79	77	71
Fruit in composites	5	4	5	7	11	12	11	7
Dried fruit	7	11	15	16	20	19	17	15
Frozen fruit	4	3	3	4	6	7	13	5
Fruit juice	54	45	45	40	43	48	42	45
Bases (unweighted)								
Men	*649*	*861*	*1182*	*1050*	*1126*	*852*	*601*	*6321*
Women	*794*	*1148*	*1494*	*1279*	*1269*	*933*	*900*	*7817*
Bases (weighted)								
Men	*1040*	*1128*	*1355*	*1123*	*1015*	*694*	*496*	*6850*
Women	*1014*	*1160*	*1379*	*1141*	*1050*	*768*	*797*	*7309*

Table 7.7

Types of fruit and vegetables consumed (observed and age-standardised), by Government Office Region/Strategic Health Authority[a] and sex

Aged 16 and over *2006*

Types of fruit and vegetables consumed	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
Men											
Observed											
Any fruit and vegetables	90	93	90	95	91	95	94	94	93	91	95
Any vegetables (including salad)	63	67	64	72	69	74	75	69	70	67	73
Any vegetables (excluding salad)	53	57	51	57	56	61	65	58	58	54	62
Any fruit (including fruit juice)	71	78	73	78	76	80	84	82	82	82	83
Any fruit (excluding fruit juice)	58	65	61	69	64	70	71	73	72	71	73
Vegetables (fresh, raw, tinned and frozen)	51	54	49	53	53	60	58	53	56	52	59
Pulses	41	33	31	39	36	34	35	36	35	31	38
Salad	25	26	26	31	29	31	38	26	30	30	31
Vegetables in composites	2	6	5	6	5	5	13	8	5	5	5
Fresh fruit	55	59	56	63	59	64	67	66	66	63	68
Fruit in composites	6	6	7	9	8	10	6	11	7	8	6
Dried fruit	7	8	8	10	7	10	9	13	11	12	10
Frozen fruit	4	5	5	5	4	4	3	6	4	4	3
Fruit juice	42	44	39	41	38	43	55	42	47	49	46
Standardised											
Any fruit and vegetables	90	92	90	94	91	95	94	93	93	91	95
Any vegetables (including salad)	62	67	64	73	69	74	75	67	69	66	72
Any vegetables (excluding salad)	53	57	51	56	56	61	65	56	58	53	62
Any fruit (including fruit juice)	72	77	73	77	76	80	83	81	82	82	82
Any fruit (excluding fruit juice)	58	64	61	69	64	69	72	71	71	70	72
Vegetables (fresh, raw, tinned and frozen)	51	54	49	53	53	60	59	51	55	51	59
Pulses	41	33	30	38	36	34	36	36	35	31	39
Salad	25	26	26	32	29	31	37	26	30	30	30
Vegetables in composites	3	6	5	6	5	5	13	8	5	5	5
Fresh fruit	55	59	56	63	58	63	67	64	65	62	68
Fruit in composites	6	6	7	9	7	10	6	10	6	7	6
Dried fruit	7	7	8	10	7	10	10	12	11	12	10
Frozen fruit	4	4	5	5	4	4	4	5	3	4	3
Fruit juice	42	44	39	42	38	43	52	42	48	50	45

Continued…

Table 7.7 continued

Aged 16 and over *2006*

Types of fruit and vegetables consumed	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
Women											
Observed											
Any fruit and vegetables	91	94	94	95	95	97	97	97	97	97	96
Any vegetables (including salad)	65	75	72	75	74	77	81	79	78	77	79
Any vegetables (excluding salad)	52	62	57	62	58	64	70	66	64	61	67
Any fruit (including fruit juice)	79	82	80	83	84	87	87	87	90	91	88
Any fruit (excluding fruit juice)	70	73	71	75	75	79	78	81	82	83	81
Vegetables (fresh, raw, tinned and frozen)	51	60	53	58	55	62	65	61	61	59	63
Pulses	34	31	29	35	34	34	36	33	30	30	31
Salad	31	35	35	35	35	38	44	32	39	39	38
Fresh fruit	63	67	65	70	70	73	74	77	77	77	77
Fruit in composites	6	7	6	7	9	11	5	8	7	7	8
Dried fruit	12	13	14	13	12	15	17	18	17	17	17
Frozen fruit	5	5	5	6	4	6	4	5	6	6	5
Fruit juice	42	46	42	44	43	45	51	43	47	50	44
Standardised											
Any fruit and vegetables	91	94	94	95	95	97	97	96	97	97	96
Any vegetables (including salad)	66	75	72	75	73	77	81	78	78	77	79
Any vegetables (excluding salad)	52	62	57	62	57	64	70	66	64	62	67
Any fruit (including fruit juice)	79	82	80	83	84	86	87	87	89	91	88
Any fruit (excluding fruit juice)	70	72	72	74	75	79	79	81	82	83	81
Vegetables (fresh, raw, tinned and frozen)	51	60	54	58	55	62	66	60	61	59	63
Pulses	34	31	29	35	33	34	36	33	30	30	31
Salad	32	35	35	35	36	38	43	33	39	39	38
Vegetables in composites	2	7	7	7	6	5	12	10	6	6	7
Fresh fruit	63	67	66	70	69	72	74	77	77	77	77
Fruit in composites	7	7	6	7	9	11	5	8	7	6	8
Dried fruit	12	13	15	13	11	15	17	17	17	17	16
Frozen fruit	6	5	5	6	4	6	5	5	6	6	5
Fruit juice	42	46	42	45	42	45	49	43	47	50	45
Bases (unweighted)											
Men	*334*	*945*	*647*	*618*	*662*	*733*	*735*	*593*	*1054*	*513*	*541*
Women	*435*	*1152*	*823*	*774*	*869*	*848*	*833*	*790*	*1293*	*681*	*612*
Bases (weighted)											
Men	*347*	*920*	*680*	*605*	*708*	*782*	*1038*	*667*	*1104*	*540*	*564*
Women	*392*	*1002*	*750*	*635*	*792*	*794*	*975*	*775*	*1195*	*636*	*560*

[a] This table provides data for regional analysis both by Government Office Region (GOR) and the new configuration of Strategic Health Authorities (SHAs) in place from July 2006. The first eight columns represent GORs and SHAs of the same name, while the South East GOR (column nine) is divided into South East Coast SHA and South Central SHA, shown in the final two columns.

Table 7.8

Types of fruit and vegetables consumed (age-standardised), by equivalised household income and sex

Aged 16 and over *2006*

Types of fruit and vegetables consumed	Equivalised household income quintile				
	Highest	2nd	3rd	4th	Lowest
	%	%	%	%	%
Men					
Any fruit and vegetables	96	94	92	91	89
Any vegetables (including salad)	77	73	66	65	63
Any vegetables (excluding salad)	63	61	55	54	50
Any fruit (including fruit juice)	86	82	77	72	69
Any fruit (excluding fruit juice)	74	70	67	61	59
Vegetables (fresh, raw, tinned and frozen)	61	59	51	51	47
Pulses	34	35	35	38	37
Salad	39	31	26	24	29
Vegetables in composites	6	6	6	6	5
Fresh fruit	68	65	61	57	52
Fruit in composites	9	7	6	8	7
Dried fruit	12	11	10	6	9
Frozen fruit	3	4	4	5	5
Fruit juice	56	47	41	36	35
Women					
Any fruit and vegetables	99	96	95	95	93
Any vegetables (including salad)	84	82	75	71	68
Any vegetables (excluding salad)	71	67	62	57	55
Any fruit (including fruit juice)	92	86	84	83	78
Any fruit (excluding fruit juice)	85	79	77	74	68
Vegetables (fresh, raw, tinned and frozen)	68	64	59	54	51
Pulses	31	34	32	35	33
Salad	47	39	35	29	30
Vegetables in composites	8	7	7	5	7
Fresh fruit	80	74	72	70	62
Fruit in composites	8	9	7	8	6
Dried fruit	20	16	15	11	12
Frozen fruit	4	5	5	6	6
Fruit juice	52	47	48	40	36
Bases (unweighted)					
Men	*1195*	*1141*	*1054*	*933*	*779*
Women	*1219*	*1267*	*1296*	*1387*	*1076*
Bases (weighted)					
Men	*1322*	*1266*	*1104*	*932*	*827*
Women	*1163*	*1205*	*1198*	*1246*	*983*

Table 7.9

Fat intake, by age and sex

Aged 16 and over *2006*

Fat intake and mean fat score	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
Men								
% Low fat[a] (under 30)	51	60	60	61	60	63	49	58
% Medium fat (30-40)	33	25	27	25	27	24	32	27
% High fat (over 40)	16	14	14	14	13	14	19	14
Mean fat score	30.6	27.8	28.1	27.5	27.6	27.2	30.9	28.3
Standard error of mean	0.66	0.51	0.43	0.44	0.42	0.49	0.58	0.21
Women								
% Low fat[a] (under 30)	76	75	74	77	74	69	60	73
% Medium fat (30-40)	18	18	21	18	20	22	24	20
% High fat (over 40)	6	6	5	5	6	10	16	7
Mean fat score	23.9	23.7	24.0	23.5	23.8	25.1	28.6	24.4
Standard error of mean	0.44	0.37	0.27	0.37	0.34	0.42	0.53	0.15
Bases (unweighted)								
Men	*401*	*556*	*852*	*760*	*835*	*623*	*404*	*4431*
Women	*497*	*741*	*1099*	*912*	*933*	*671*	*528*	*5381*
Bases (weighted)								
Men	*715*	*791*	*956*	*788*	*715*	*483*	*322*	*4769*
Women	*700*	*790*	*969*	*788*	*729*	*532*	*519*	*5028*

[a] Low fat is a score of under 30 on the DINE questionnaire, which is the equivalent to 83g of fat or less.
Medium fat is a score of 30-40 on the DINE questionnaire, which is the equivalent to 84-122g of fat.
High fat is a score of over 40 on the DINE questionnaire, which is the equivalent to over 122g of fat.

Table 7.10

Fat intake (observed and age-standardised), by Government Office Region/Strategic Health Authority[a] and sex

Aged 16 and over *2006*

Fat intake and mean fat score	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
Men											
Observed											
% Low fat[b] (under 30)	60	56	52	58	57	61	65	52	60	60	60
% Medium fat (30-40)	25	29	29	29	26	26	22	31	28	27	29
% High fat (over 40)	15	14	19	13	17	13	13	17	12	12	11
Mean fat score	28.2	28.9	30.4	28.3	28.9	27.7	26.3	29.5	27.8	27.9	27.7
Standard error of mean	0.88	0.51	0.76	0.64	0.61	0.48	0.66	0.77	0.40	0.61	0.49
Standardised											
% Low fat[b] (under 30)	60	56	52	58	57	61	66	53	60	60	60
% Medium fat (30-40)	25	30	29	29	26	26	21	30	29	27	30
% High fat (over 40)	15	14	19	13	18	13	13	17	12	12	11
Mean fat score	28.3	29.1	30.5	28.3	28.8	27.8	26.2	29.4	27.9	27.9	27.7
Standard error of mean	0.88	0.51	0.75	0.66	0.61	0.49	0.68	0.80	0.42	0.62	0.50
Women											
Observed											
% Low fat[b] (under 30)	76	69	71	73	72	74	79	68	74	72	76
% Medium fat (30-40)	17	21	20	20	20	21	15	24	20	22	18
% High fat (over 40)	7	10	8	7	8	5	6	8	6	6	6
Mean fat score	24.1	25.5	25.3	24.3	24.8	23.6	22.6	25.6	24.3	24.6	24.0
Standard error of mean	0.60	0.40	0.47	0.52	0.36	0.44	0.56	0.40	0.32	0.45	0.44
Standardised											
% Low fat[b] (under 30)	76	69	71	73	72	74	77	69	74	72	76
% Medium fat (30-40)	17	21	20	20	20	21	15	24	20	22	18
% High fat (over 40)	7	10	9	7	8	5	7	8	6	6	6
Mean fat score	24.1	25.6	25.3	24.4	24.7	23.6	22.9	25.6	24.2	24.5	24.0
Standard error of mean	0.62	0.41	0.48	0.55	0.36	0.45	0.60	0.42	0.32	0.44	0.45
Bases (unweighted)											
Men	*250*	*643*	*487*	*452*	*475*	*520*	*386*	*440*	*778*	*386*	*392*
Women	*305*	*779*	*604*	*552*	*566*	*587*	*449*	*568*	*971*	*513*	*458*
Bases (weighted)											
Men	*243*	*618*	*480*	*437*	*508*	*544*	*692*	*473*	*775*	*388*	*387*
Women	*256*	*677*	*517*	*441*	*529*	*546*	*668*	*537*	*857*	*456*	*401*

[a] This table provides data for regional analysis both by Government Office Region (GOR) and the new configuration of Strategic Health Authorities (SHAs) in place from July 2006. The first eight columns represent GORs and SHAs of the same name, while the South East GOR (column nine) is divided into South East Coast SHA and South Central SHA, shown in the final two columns.

[b] Low fat is a score of under 30 on the DINE questionnaire, which is the equivalent to 83g of fat or less.
Medium fat is a score of 30-40 on the DINE questionnaire, which is the equivalent to 84-122g of fat.
High fat is a score of over 40 on the DINE questionnaire, which is the equivalent to over 122g of fat.

Table 7.11

Fat intake (age-standardised), by equivalised household income and sex

Aged 16 and over *2006*

Fat intake and mean fat score	Equivalised household income quintile				
	Highest	2nd	3rd	4th	Lowest
Men					
% Low fat[a] (under 30)	63	55	59	49	58
% Medium fat (30-40)	27	29	25	32	27
% High fat (over 40)	11	16	16	19	15
Mean fat score	27.0	29.3	28.3	30.6	28.3
Standard error of mean	0.47	0.48	0.47	0.67	0.62
Women					
% Low fat[a] (under 30)	76	73	71	70	68
% Medium fat (30-40)	15	20	21	23	21
% High fat (over 40)	9	7	7	7	10
Mean fat score	24.3	24.2	24.9	25.1	25.5
Standard error of mean	0.74	0.40	0.34	0.37	0.42
Bases (unweighted)					
Men	*884*	*865*	*789*	*657*	*531*
Women	*891*	*961*	*954*	*950*	*742*
Bases (weighted)					
Men	*961*	*954*	*795*	*656*	*585*
Women	*829*	*894*	*870*	*867*	*693*

[a] Low fat is a score of under 30 on the DINE questionnaire, which is the equivalent to 83g of fat or less.
Medium fat is a score of 30-40 on the DINE questionnaire, which is the equivalent to 84-122g of fat.
High fat is a score of over 40 on the DINE questionnaire, which is the equivalent to over 122g of fat.

Table 7.12

Fat intake (age-standardised), by self-reported doctor-diagnosed CVD, hypertension or diabetes and sex

Aged 16 and over — *2006*

Fat intake and mean fat score	Any CVD[a]	Hypertension or diabetes[b]	None of these diseases
	%	%	%
Men			
% Low fat[c] (under 30)	58	63	57
% Medium fat (30-40)	26	25	29
% High fat (over 40)	16	11	14
Mean fat score	28.5	26.8	28.6
Standard error of mean	0.92	0.47	0.33
Women			
% Low fat[c] (under 30)	73	79	74
% Medium fat (30-40)	19	15	19
% High fat (over 40)	8	6	7
Mean fat score	24.4	23.0	24.4
Standard error of mean	0.55	0.77	0.35
Bases (unweighted)			
Men	*449*	*860*	*1948*
Women	*467*	*802*	*2725*
Bases (weighted)			
Men	*553*	*983*	*2409*
Women	*552*	*901*	*2743*

[a] CVD: self-reported doctor-diagnosed CVD (including angina, heart attack, stroke, heart murmur, irregular heart rhythm)

[b] Hypertension: defined as SBP≥ 140 mmHg or DBP≥ 90 mmHg or on medication to reduce blood pressure. Diabetes: self-reported doctor-diagnosed diabetes, including type 1 and 2 diabetes. Includes those with hypertension and diabetes only and no other CVD.

[c] Low fat is a score of under 30 on the DINE questionnaire, which is the equivalent to 83g of fat or less.
Medium fat is a score of 30-40 on the DINE questionnaire, which is the equivalent to 84-122g of fat.
High fat is a score of over 40 on the DINE questionnaire, which is the equivalent to over 122g of fat.

Table 7.13

Trends in fat intake, 2003 and 2006, by sex

Aged 16 and over — *2006*

Fat intake and mean fat score	Survey year	
	2003	2006
Men		
% Low fat[a] (under 30))	72	58
% Medium fat (30-40)	22	27
% High fat (over 40)	6	14
Mean fat score	24.3	28.3
Standard error of mean	0.13	0.21
Women		
% Low fat[a] (under 30)	84	73
% Medium fat (30-40)	14	20
% High fat (over 40)	3	7
Mean fat score	21.2	24.4
Standard error of mean	0.12	0.15
Bases (unweighted)		
Men	*4742*	*4431*
Women	*5928*	*5381*
Bases (weighted)		
Men	*5144*	*4769*
Women	*5511*	*5028*

[a] Low fat is a score of under 30 on the DINE questionnaire, which is the equivalent to 83g of fat or less.
Medium fat is a score of 30-40 on the DINE questionnaire, which is the equivalent to 84-122g of fat.
High fat is a score of over 40 on the DINE questionnaire, which is the equivalent to over 122g of fat.

Cigarette smoking

8

Heather Wardle

Key findings

- This chapter presents information on cigarette smoking prevalence and information relating to exposure to secondhand smoke, both of which are known risks to health.
- In 2006, 24% of men and 21% of women reported currently smoking cigarettes. Cigarette smoking prevalence varied by sex and by age. Prevalence was highest among men aged 25-34 (34%) and among women aged 16-24 (28%).
- Male smokers also reported smoking more cigarettes on average per day than their female counterparts: 13.8 cigarettes per day for men compared with 12.2 cigarettes per day for women. For both men and women, the average smoker consumed around two-thirds of a standard packet of 20 cigarettes per day. Among male smokers, 30% smoked 20 or more cigarettes per day; the equivalent estimate for women was 22%.
- Among male current smokers, average daily cigarette consumption was highest among those aged 45 -64 (around 16 cigarettes per day), and lowest among those aged 16-24 (around 10 cigarettes per day). Among women who currently smoke, those aged 55-64 reported smoking the most cigarettes per day (about 14 cigarettes per day), with those aged 16-24 and 75 and over smoking the fewest cigarettes (around 10 cigarettes per day).
- Prevalence of current cigarette smoking varied by equivalised household income. For both men and women, those in the lowest income quintile were more than twice as likely to smoke cigarettes as those in the highest quintile. Among men, age-standardised estimates rose from 16% of those in highest income households to 36% of those in lowest income households. Among women, equivalent estimates were 13% rising to 30%.
- For both men and women, cigarette smoking prevalence has decreased since the early 1990s, falling from 28% among men in 1993 to 24% by 2006. For women, cigarette smoking prevalence fell from 26% to 21% over the same time period.
- In earlier HSE reports, there has been no clear evidence that at certain ages one sex is more likely to smoke than the other, with fluctuating patterns across the years. However, there is now an emerging pattern that suggests that men aged 25-34 are much more likely to smoke cigarettes than their female counterparts. The difference between the sexes for this age group has increased from two percentage points (rounded) in 1993 (34% men; 32% women) to five percentage points in 2001 (37% men; 32% women) to nine percentage points in 2006 (34% men, 25% women).
- Multivariate logistic regression was used to examine the factors most associated with smoking cigarettes. Factors associated with being a current cigarette smoker for both men and women were age, living in a deprived area, having a semi-routine or routine occupation, having no educational qualifications, not being overweight or obese, eating no fruit and vegetables, drinking to harmful levels and reporting being in poor health. Among women only, living in a household in the lowest two income quintiles was also associated with cigarette smoking.

- All informants were asked to report how many hours per week they were usually exposed to other people's smoke. Mean hourly exposure per week was higher among men than women: 6.0 hours per week for men and 4.5 hours a week for women. For both sexes, mean hours of exposure were greatest among the youngest age groups and generally decreased with advancing age.
- Informants were also asked if they were exposed to other people's smoke in a variety of places, including their own homes, the homes of others, in pubs and whilst on public transport. Overall, 60% of men and 50% of women reported being exposed to other people's smoke in any one of these venues. 40% of men and 28% of women were exposed to smoke in pubs, 14% of both men and women were exposed in their own home and 12% of men and 14% of women reported exposure to tobacco smoke in other people's homes.
- People who reported they were exposed to smoke in their own home reported higher mean hours of exposure to secondhand smoke than those exposed in any other venue. Estimates were 22.6 hours per week for men and 20.9 hours per week for women; this equates to being exposed to other people's smoke for round three hours per day.

8.1. Introduction

Smoking is recognised to be the greatest single cause of preventable illness and premature death in the United Kingdom. It is estimated that 86,500 deaths in England per year are directly attributable to smoking.[1] The government is committed to reducing the number of people smoking and has set the target that smoking rates among adults should be 21% or less by 2010, with a reduction in prevalence among routine and manual groups to 26% or less.[2] It is widely recognised that levels of smoking vary between different socio-economic groups; the White Paper, *Smoking Kills*, stated that reductions in levels of smoking should occur equitably among manual and non-manual groups.[3] In 2004, the government set out its strategy to tackle smoking and the effects of smoking on other people in the white paper, Choosing Health. This contained a number of initiatives to reduce smoking prevalence and announced a commitment to establishing smoke free public places.[4]

Exposure to other peoples' smoke causes conditions such as heart disease, lung cancer, and, among children, ear and respiratory problems and cot deaths. In June 2006, the Health Act was passed which included legislative provisions for establishing SmokeFree public places and work places. The government's objectives through smoke-free legislation were to reduce the risks to health from exposure to secondhand smoke; to recognise a person's right to be protected from harm from secondhand smoke; to support people trying to give up smoking by creating an environment where social pressures to smoke are reduced; to save lives over the next decade by reducing both exposure to secondhand smoke and overall smoking rates.[5] In December 2006, the date of implementation of the SmokeFree legislation in England was announced as 1st July 2007.

The Health Survey for England 2006 collected data from informants throughout 2006. Analyses in this chapter give baseline information on smoking behaviour and exposure to other people's smoke prior to the full implementation of the SmokeFree legislation. This chapter presents information on smoking prevalence within the English population aged 16 and over and examines how this varies between different socio-demographic groups. Factors associated with cigarette smoking are also considered and trends in smoking prevalence are discussed. Information about exposure to other people's smoke and places of exposure are presented.

8.2. Methods

Informants aged 25 and over were asked about their smoking status within the face to face interview. The interview collected information about use of various tobacco products including cigarettes, cigars and, for men, pipes. Informants who stated that they currently smoked were asked to estimate their daily cigarette consumption. For those aged 16-17, information about smoking status was collected through a self-completion questionnaire. This offered informants privacy, allowing them to reply without disclosing their smoking behaviour to other household members. At the interviewer's discretion, those aged 18-24 could answer the questions either through the face to face interview or through the self-completion questionnaire. 13% of adults aged 18-24 answered the smoking questions through the self-completion questionnaire.

Both the self-completion questionnaire and the interview questions focused on current smoking status, estimated daily consumption of cigarettes among current smokers and use of cigars and pipes. Informants were also asked to estimate the number of hours per week that they were exposed to other people's smoke and to report whether they were exposed to other people's smoke in variety of settings, including their own home, pubs and on public transport.

8.3. Results

8.3.1 Cigarette smoking prevalence and cigarette consumption

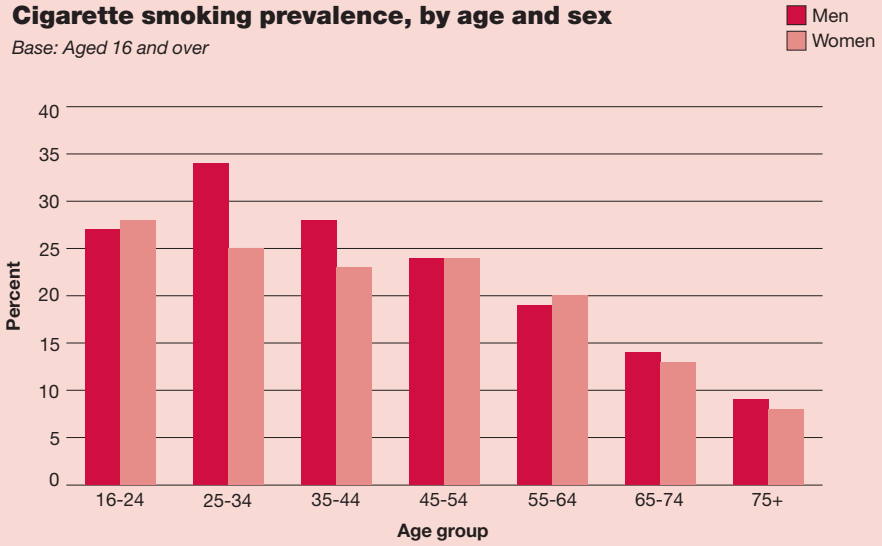
In 2006, 24% of men and 21% of women reported that they were current smokers.

As in previous years, prevalence varied by age group. Among men, cigarette smoking prevalence was highest among those aged 25-34 (34%) and decreased with age thereafter. Among women, prevalence of smoking decreased with age, falling from 28% among those aged 16-24 to 8% among those aged 75 and over.

Figure 8A

Cigarette smoking prevalence, by age and sex

Base: Aged 16 and over



For those aged 16-24 and 45 and over, the proportions of men and women who smoked were similar. However, among those aged 25-44, men were more likely than women to report smoking cigarettes; notably cigarette smoking prevalence was nine percentage points higher among men aged 25-34 than women of the same age (34% compared with 25%). A similar, but less acute difference was observed among those aged 35-44. **Table 8.1**

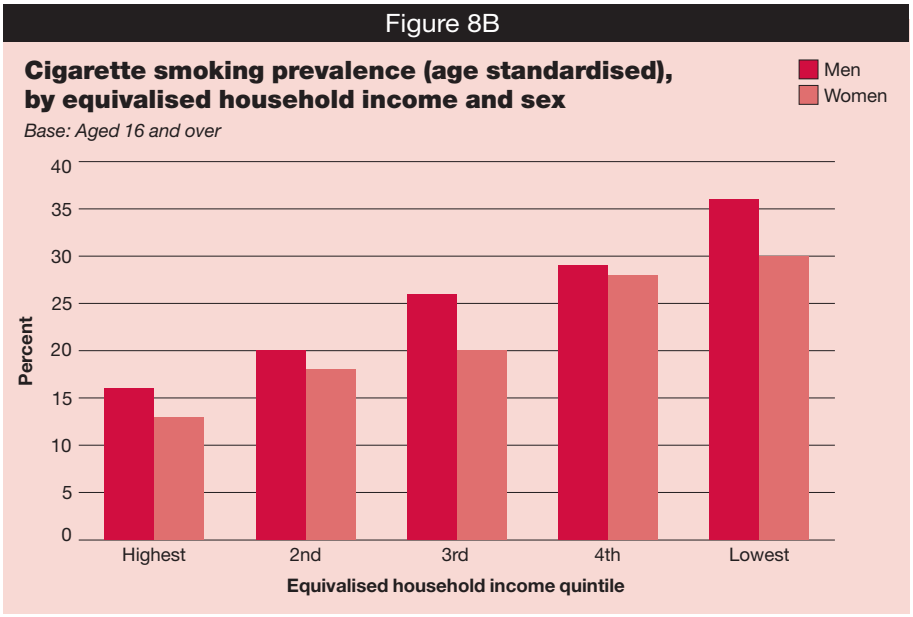
Current smokers were asked to estimate their daily consumption of cigarettes on both weekdays and weekends. Among male smokers, 30% smoked 20 or more cigarettes per day; the equivalent estimate for women was 22%.

Looking at the mean number of cigarettes smoked per day among current smokers, male smokers smoked more cigarettes than female smokers per day; 13.8 cigarettes for men and 12.2 cigarettes for women. For both men and women this represents relatively high consumption of cigarettes, with the average smoker consuming around a two thirds of a standard packet of 20 cigarettes per day. **Table 8.2**

8.3.2 Cigarette smoking prevalence by equivalised household income

Differences among subgroups are pronounced when looking at cigarette smoking prevalence by equivalised household income. Equivalised household income is a measure of income that takes into account the number of persons living in the household. For men and women, those in the lowest income quintile were more than twice as likely to smoke as those in the highest income quintile. Among men, age-standardised estimates rose from 16% of those in highest income households to 36% of those in lowest income households. Among women, equivalent estimates were 13% rising to 30%. **Table 8.4**

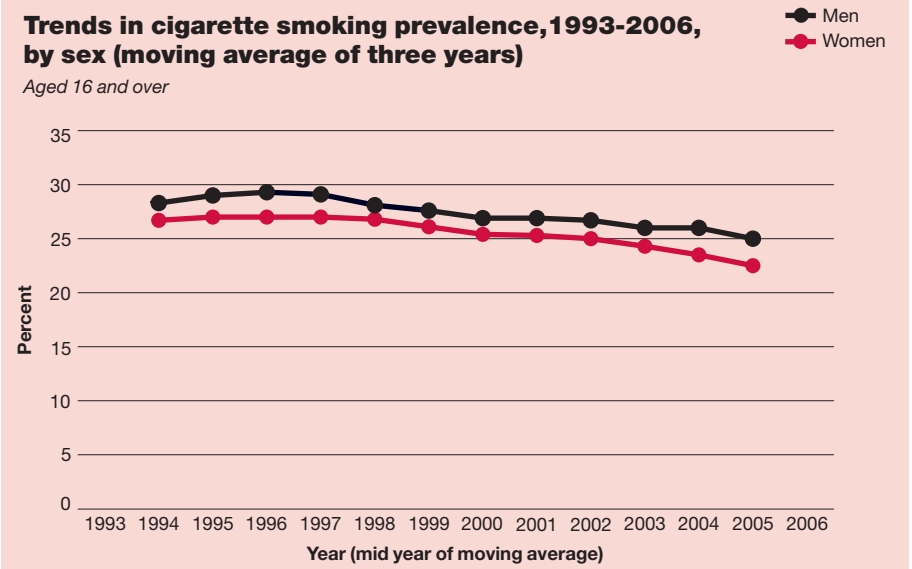
Figure 8B



8.3.3 Trends in cigarette smoking prevalence

Questions about cigarette smoking status have been asked as part of the Health Survey for England since its inception in 1991. Trend data is presented for estimates from 1993 onwards, when the Computer Assisted Personal Interviewing was used to administer the HSE questionnaire. This gives 14 years of data against which to assess changes or continuity in cigarette smoking prevalence. Figure 8C shows trends in smoking prevalence since 1993. In order to smooth out random variation and differences in sample sizes between various survey years, the estimates are presented as three-year moving averages.

Figure 8C



Note: Data from 1993 to 2002 are unweighted, while data from 2003 onwards are weighted for non-response. In these moving averages, some points combine both unweighted and weighted data.

For both men and women, cigarette smoking prevalence has decreased since the early 1990s, falling from 28% among men in 1993 to 24% by 2006. For women, cigarette smoking prevalence fell from 26% to 21% over the same time period. **Table 8.5**

These results can be placed in context by comparisons with the General Household Study, which has traced smoking prevalence since the mid 1970s. From 1974, smoking prevalence has fallen from 51% among men and 41% among women to around 28% in the mid 1990s, declining more gradually thereafter to 25% among men and 23% among women in 2005.[6] This pattern of gradual decline since the mid 1990s is replicated in the HSE results.

Furthermore, as can be seen from table 8.5, the gap between men and women in terms of smoking prevalence has fluctuated since 1993 between one and three percentage points. In previous HSE reports it has been noted that there has been no clear evidence that at certain ages one sex is more likely to smoke than the other.[7] However, there is now an emerging pattern that suggests that men aged 25-34 are much more likely to smoke cigarettes than their female counterparts. The difference between the sexes for this age group has increased from two percentage points (rounded) in 1993 (34% men; 32% women) to five percentage points in 2001 (37% men; 32% women) to nine percentage points in 2006 (34% men, 25% women).[8]

8.3.4 Predictors of current cigarette smoking

Overview

Multivariate logistic regression was used to examine the factors associated with current cigarette smoking. The regression technique adjusts for several explanatory variables simultaneously. Models were run separately for men and women and for each model, key variables of interest were entered. These include a range of socio-demographic variables: age group, government Office Region, equivalised household income, Index of Multiple Deprivation, educational attainment, household type and NS-SEC of household reference person. A range of other variables of interest were also included to look at the associations between current cigarette smoking and other health and lifestyle indicators. These were general health status, fruit and vegetable consumption, alcohol consumption, levels of physical activity and BMI status.

Odds are expressed relative to a reference category, which is given a value of 1. An odds ratio greater than 1 indicates higher odds cigarette smoking and an odds ratio lower than 1 indicates lower odds of cigarette smoking. 95% confidence intervals are shown for each odds ratio. If the interval does not include 1, there is a significant difference between the odds ratio for that category and the reference category.

Socio-demographic factors associated with cigarette smoking

For both men and women, after adjusting for all other variables, age was significantly associated with current cigarette smoking. Among men, those aged 25-44 had significantly higher odds of current cigarette smoking than those aged 16-24 (2.23 for those aged 25-34; 1.66 for those aged 35-44). As observed in previous years, men aged 65 and over had significantly lower odds of cigarette smoking than those aged 16-24, odds being 0.47 times lower among those aged 65-75 and 0.24 times lower among those aged 75 and over.

A similar, though less marked pattern, was observed among women. Compared with those aged 16-24, odds of cigarette smoking were 1.32 times higher among those aged 25-34, 0.42 times lower among those aged 65-74, and 0.23 times lower among those aged 75 and over. For other age groups, the odds were not significantly different from the reference category.

Among both men and women, Index of Multiple Deprivation (IMD), NS-SEC of household reference person, and educational attainment were significantly associated with current cigarette smoking.

NS-SEC is a classification of social position that was introduced in the 2001 census. It has similarities to the Registrar General's Social Class. Among men, odds of cigarette smoking were significantly higher among those in lower supervisory and technical or semi-routine and routine occupations (1.52 and 1.46 respectively) than among those in managerial and professional occupations (the reference category). A similar pattern was observed among women, with odds of smoking 1.61 times higher among those in semi-routine and routine occupations.

IMD ranks areas from the most deprived to the least deprived. Odds of cigarette smoking increased as area deprivation increased. The odds were 1.89 times higher among men and 2.09 times higher among women living in the most deprived areas than those living in the least deprived areas. Likewise, odds of smoking among both men and women were

significantly higher among those who had no educational qualifications compared with those who had a degree or equivalent (3.09 men, 2.59 women).

Equivalised household income was also significantly associated with cigarette smoking among women, though not among men, after taking other variables into account. Odds of smoking cigarettes were significantly higher (1.46 and 1.44) among women living in the lowest two quintiles of income households than the highest income households.

Health and lifestyle behaviours associated with cigarette smoking

For both men and women, a number of health and lifestyle characteristics were significantly associated with current cigarette smoking. Those who reported that their health was less than 'very good' had higher odds of being a current smoker. Among men, odds among those who reported very bad health were 1.83 times higher than those with very good health. Among women, this pattern was more pronounced and equivalent odds were 3.45. Exceeding guideline recommendations for healthy lifestyles (fruit and vegetable consumption, drinking) was also significantly associated with cigarette smoking. For example, those who ate five or more portions of fruit and vegetables a day had lower odds of being a smoker than those who ate no fruit (0.31 men, 0.35 women), and those who had drunk alcohol at harmful levels on the heaviest drinking day in the last week had much higher odds of being a current cigarette smoker than those who did not drink alcohol in the last year (2.80 for men; 4.21 for women). However, those who were either overweight or obese had lower odds of cigarette smoking than those who were not overweight. **Table 8.6**

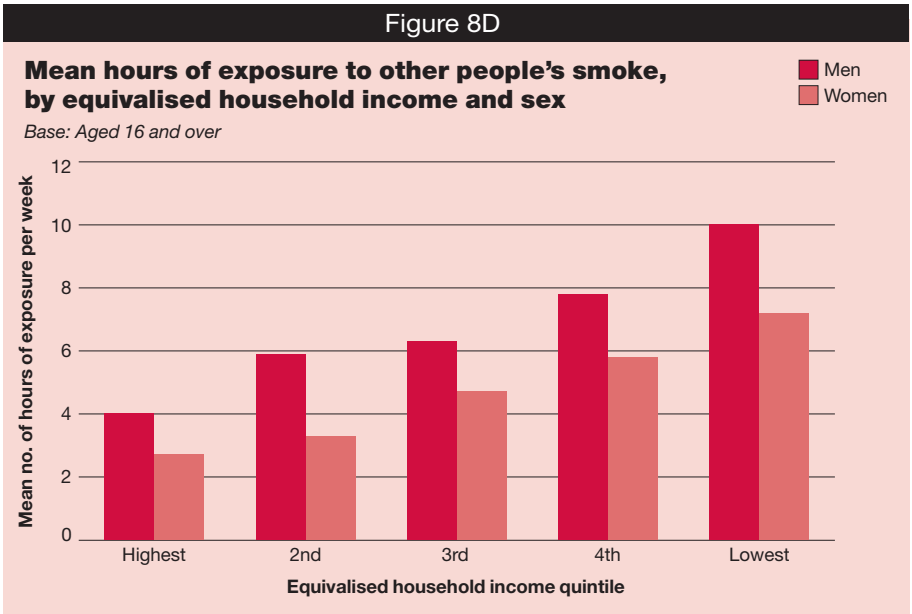
8.3.5 Exposure to other people's smoke

All informants were asked to estimate how many hours per week they were exposed to other people's smoke. Overall, men reported being exposed to other people's smoke more hours per week on average than women. Mean exposure among men was 6.0 hours whereas among women it was 4.5 hours per week. Furthermore, 21% of men reported that they were exposed to other people's smoke for at least seven hours per week (the equivalent of at least one hour a day on average) compared with 16% of women.

For both men and women, mean exposure was highest among the youngest age groups. Men aged 16-24 reported mean exposure of 9.5 hours per week and women 9.3 hours per week. Among those aged 75 and over, this fell to 2.1 hours among men and 1.5 hours among women.

There was a significant association between mean hours of exposure to other people's smoke and equivalised household income, with mean hours of exposure increasing as household income declined. **Tables 8.7- 8.9**

Figure 8D



8.3.6 Places of exposure to other people's smoke

Informants were asked whether they were exposed to other people's smoke in a variety of places. This included pubs, work places, the informant's own home and the homes of other people. Overall 60% of men and 50% of women reported being exposed to other people's smoke in at least one of these places. The proportions reporting exposure in each of these places varied from 40% of men and 28% of women who were exposed to smoke in pubs; 14% of both men and women who were exposed in their own home and 12% of men and 14% of women who reported exposure to tobacco smoke in other people's homes. 14% of men, but only 7% of women, were exposed to other people's smoke at work. As the table below shows, those who were exposed to smoke in their own homes reported more hours of mean exposure per week, 22.6 hours among men and 20.9 hours among women.

Table 8.10

Table 8A

Mean hours of exposure to smoke per week, by place of exposure and sex

Place of exposure	Mean hours per week exposure	
	Men	Women
At home	22.6	20.9
At work	15.9	15.4
At other people's homes	14.3	12.7
At pubs	8.8	7.5

8.4. Discussion

The government's target is to reduce smoking prevalence among adults to 21% by 2010. Latest data from HSE 2006 show that overall prevalence is relatively close to achieving this objective, with 24% of men and 21% of women currently smoking cigarettes. Data from the General Household Survey also supports this picture of a continuing and gradual decline in smoking prevalence.

However, this masks some important differences and there is evidence of some persistent inequalities in smoking prevalence among certain population subgroups. As found in previous reports, it is those people who live within the most deprived areas, have lowest household income and no educational qualifications who are most likely to smoke cigarettes. The importance of ensuring that reductions in levels of smoking occurred

Table 8B

Cigarette smoking prevalence (age standardised), by social class and sex

Cigarette smoking status	Non-manual occupations	Manual occupations
Men		
Current cigarette smoker	17	34
Used to smoke cigarettes regularly	26	28
Never smoked cigarettes	57	38
Women		
Current cigarette smoker	18	30
Used to smoke cigarettes regularly	23	21
Never smoked cigarettes	59	49

equitably among manual and non-manual groups was emphasised in the white paper 'Smoking Kills' and the target was set that smoking prevalence among routine and manual groups should be reduced to 26% by 2010. As the table below illustrates, there is substantial work still to be done in this area. Latest HSE 2006 figures show that 34% of men and 30% of women in manual occupations currently smoked cigarettes. Focusing on the evidence for women, where the overall smoking prevalence target has largely been achieved, it appears that these reductions have not been achieved equitably among socio-economic groups.

Inequalities are not only evident within smoking prevalence but are also persistent in relation to exposure to secondhand smoke. It is unsurprising that mean hours of exposure are greatest among groups where smoking prevalence is also highest, for example among those living within lowest income households. Table 8.11 shows comparisons in mean exposure to secondhand smoke in 1998, 2003 and 2006. Since 1998, mean hours of exposure per week have fallen from 11.0 hours among men and 7.8 hours among women to 6.0 and 4.5 hours respectively in 2006. These data are encouraging, and provide an interesting baseline against which to assess any reported changes in weekly exposure to smoking resulting from the implementation of the SmokeFree legislation in 2007. Furthermore, as seen within this chapter, those who reported being exposed to tobacco smoke in their own home also reported higher mean hours of exposure to other people's smoke per week than those who were exposed to smoke in any other venue. It will be of interest in future HSE reports to assess whether this increases or decreases after the implementation of the SmokeFree legislation as there is the potential for smoking to be displaced from public to private venues. **Table 8.11**

References and notes

1 *Health Profile for England*, Department of Health, 2006, p 23.

2 PSA targets for the Department of Health and smoking are outlined at the following address: http://www.hm-treasury.gov.uk/media//70320/sr04_psa_ch3.pdf

3 *Smoking Kills: A White Paper on Tobacco*, The Stationery Office, London, 1998, p.83,

4 *Choosing health: making healthy choices easier*, Department of Health, London, 2004, p. 98

5 See http://www.statistics.gov.uk/downloads/theme_compendia/GHS05/smoking2005-final.xls

6 Results from the latest General Household Study can be accessed at: http://www.statistics.gov.uk/downloads/theme_compendia/GHS05/smoking2005-final.xls

7 Wardle, H Cigarette smoking in Sproston K and Primetesta P (eds). *Health Survey for England 2003 Risk factors for cardiovascular disease: vol 1*,The Stationery Office, 2004, p. 53.

8 See trend tables for full breakdown of smoking status by age, sex and survey year. www.ic.nhs.uk/pubs/HSE06trends

Tables

8.1 Cigarette smoking status, by age and sex

8.2 Number of cigarettes smoked by current smokers, by age and sex

8.3 Cigarette smoking status (observed and age-standardised), by Government Office Region/Strategic Health Authority and sex

8.4 Cigarette smoking status (age-standardised), by equivalised household income and sex

8.5 Trends in cigarette smoking status, 1993-2006, by sex

8.6 Estimated odds ratios for current cigarette smoking, by associated risk factors and sex

8.7 Number of hours exposed to other people's smoke, by age and sex

8.8 Number of hours exposed to other people's smoke (observed and age-standardised), by Government Office Region/Strategic Health Authority and sex

8.9 Number of hours exposed to other people's smoke (age-standardised), by equivalised household income and sex

8.10 Places of exposure to other people's smoke, by age and sex

8.11 Trends in the number of hours exposed to other people's smoke, 1998 – 2006, by age and sex

Table 8.1

Cigarette smoking status, by age and sex

Aged 16 and over — *2006*

Cigarette smoking status	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Current cigarette smoker	27	34	28	24	19	14	9	24
Used to smoke cigarettes regularly	5	15	20	26	42	51	56	27
Never regularly smoked cigarettes	68	51	52	50	39	36	35	49
Women								
Current cigarette smoker	28	25	23	24	20	13	8	21
Used to smoke cigarettes regularly	6	19	19	22	28	27	35	22
Never regularly smoked cigarettes	67	56	58	54	52	60	57	57
Bases (unweighted)								
Men	*621*	*860*	*1178*	*1046*	*1123*	*852*	*600*	*6280*
Women	*764*	*1147*	*1490*	*1278*	*1269*	*933*	*895*	*7776*
Bases (weighted)								
Men	*996*	*1126*	*1351*	*1116*	*1012*	*694*	*496*	*6791*
Women	*974*	*1158*	*1375*	*1140*	*1050*	*768*	*793*	*7258*

Table 8.2

Number of cigarettes smoked by current smokers, by age and sex

Current smokers aged 16 and over — *2006*

Cigarettes smoked per day	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
Men								
% Under 10 cigarettes per day	48	37	30	26	18	26	41	33
% 10 to under 20 cigarettes per day	38	42	34	32	39	39	35	37
% 20 or more cigarettes per day	13	22	36	42	44	35	24	30
Mean number of cigarettes smoked per day	10.2	12.4	14.8	16.0	16.3	14.8	12.3	13.8
Standard error of the mean	0.52	0.48	0.54	0.64	0.61	0.90	1.27	0.24
Women								
% Under 10 cigarettes per day	51	42	29	32	23	32	50	36
% 10 to under 20 cigarettes per day	39	43	45	41	43	39	34	42
% 20 or more cigarettes per day	11	15	25	27	34	30	16	22
Mean number of cigarettes smoked per day	10.1	10.6	13.5	13.1	14.3	13.0	9.9	12.2
Standard error of the mean	0.51	0.41	0.46	0.52	0.46	0.81	0.75	0.21
Bases (unweighted)								
Men	*176*	*297*	*333*	*255*	*212*	*113*	*51*	*1437*
Women	*206*	*309*	*345*	*314*	*250*	*118*	*76*	*1618*
Bases (weighted)								
Men	*276*	*384*	*381*	*264*	*192*	*94*	*43*	*1633*
Women	*254*	*290*	*319*	*277*	*210*	*96*	*67*	*1513*

Table 8.3

Cigarette smoking status (observed and age-standardised), by Government Office Region/Strategic Health Authority[a] and sex

Aged 16 and over *2006*

Cigarette smoking status	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
	%	%	%	%	%	%	%	%	%	%	%
Men											
Observed											
Current cigarette smoker	28	26	24	28	23	22	25	21	23	23	22
Used to smoke cigarettes regularly	26	27	25	26	29	28	19	34	29	28	30
Never regularly smoked cigarettes	46	47	51	46	48	50	56	45	48	48	48
Standardised											
Current cigarette smoker	29	27	24	28	24	22	24	23	24	25	24
Used to smoke cigarettes regularly	26	27	26	27	28	28	22	31	27	26	28
Never regularly smoked cigarettes	45	47	51	46	48	50	54	46	49	49	49
Women											
Observed											
Current cigarette smoker	28	22	23	25	23	18	19	19	19	20	18
Used to smoke cigarettes regularly	23	22	21	24	21	24	15	24	23	22	25
Never regularly smoked cigarettes	49	56	56	52	57	58	66	57	58	59	58
Standardised											
Current cigarette smoker	28	22	23	25	23	18	18	20	19	20	18
Used to smoke cigarettes regularly	23	21	22	23	20	23	16	24	23	22	24
Never regularly smoked cigarettes	48	57	56	52	56	58	65	56	58	59	58
Bases (unweighted)											
Men	*330*	*939*	*645*	*615*	*658*	*727*	*728*	*591*	*1047*	*511*	*536*
Women	*433*	*1146*	*821*	*771*	*865*	*844*	*827*	*788*	*1281*	*674*	*607*
Bases (weighted)											
Men	*342*	*912*	*678*	*601*	*701*	*773*	*1025*	*663*	*1095*	*537*	*558*
Women	*390*	*995*	*748*	*632*	*787*	*788*	*965*	*772*	*1181*	*627*	*554*

[a] This table provides data for regional analysis both by Government Office Region (GOR) and the new configuration of Strategic Health Authorities (SHAs) in place from July 2006. The first eight columns represent GORs and SHAs of the same name, while the South East GOR (column nine) is divided into South East Coast SHA and South Central SHA, shown in the final two columns.

Table 8.4

Cigarette smoking status (age-standardised), by equivalised household income and sex

Aged 16 and over — *2006*

Cigarette smoking status	Equivalised household income quintile				
	Highest	2nd	3rd	4th	Lowest
	%	%	%	%	%
Men					
Current cigarette smoker	16	20	26	29	36
Used to smoke cigarettes regularly	28	28	28	26	24
Never regularly smoked cigarettes	56	52	46	44	39
Women					
Current cigarette smoker	13	18	20	28	30
Used to smoke cigarettes regularly	23	24	23	21	19
Never regularly smoked cigarettes	64	58	57	51	51
Bases (unweighted)					
Men	*1190*	*1134*	*1053*	*931*	*773*
Women	*1217*	*1264*	*1291*	*1379*	*1069*
Bases (weighted)					
Men	*1316*	*1255*	*1103*	*929*	*819*
Women	*1160*	*1202*	*1191*	*1237*	*974*

Table 8.5

Trends in cigarette smoking status, 1993-2006, by sex

Aged 16 and over — *1993-2006*

Current smoking status	Survey year														
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003[a]	2003[a]	2004	2005	2006
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Men															
Current cigarette smoker	28	28	29	30	29	28	27	28	26	27	25	27	24	27	24
Used to smoke cigarettes regularly	33	32	31	30	31	31	30	30	31	29	31	28	29	28	27
Never regularly smoked cigarettes	39	39	40	40	40	40	42	42	43	44	44	45	47	45	49
Women															
Current cigarette smoker	26	27	27	27	27	27	26	25	25	26	24	24	23	24	21
Used to smoke cigarettes regularly	22	22	21	21	21	21	21	19	22	20	21	20	22	20	22
Never regularly smoked cigarettes	52	51	52	52	52	52	52	56	53	54	55	56	56	56	57
Bases															
Men	*7678*	*7159*	*7321*	*7479*	*3891*	*7163*	*3543*	*3639*	*6919*	*3303*	*6563*	*7148*	*3225*	*3659*	*6791*
Women	*8873*	*8609*	*8706*	*8939*	*4676*	*8694*	*4224*	*4315*	*8642*	*4056*	*8201*	*7599*	*3416*	*3899*	*7258*

[a] Data from 2003-2006 have been weighted for non-response (shaded columns); for 2003 both weighted and unweighted data are shown

Table 8.6

Estimated odds ratios for current cigarette smoking, by associated risk factors and sex

Aged 16 and over *2006*

Variable	N	Odds ratio	95% C.I.[a]	Variable	N	Odds ratio	95% C.I.[a]
Men *Base (weighted) 6854*				**Women** *Base (weighted) 7310*			
Age group (p=0.00)				**Age group (p=0.00)**			
16-24	1041	1		16-24	1014	1	
25-34	1129	2.23	(1.72-2.89)	25-34	1160	1.32	(1.04-1.68)
35-44	1356	1.66	(1.26-2.18)	35-44	1379	1.14	(0.89-1.45)
45-54	1123	1.24	(0.93-1.67)	45-54	1141	1.19	(0.92-1.53)
55-64	1015	0.82	(0.60-1.11)	55-64	1050	0.86	(0.65-1.12)
65-74	694	0.47	(0.33-0.67)	65-74	768	0.42	(0.31-0.56)
75 and over	496	0.24	(0.16-0.36)	75 and over	798	0.23	(0.16-0.33)
Index of multiple deprivation (p=0.00)				**Index of multiple deprivation (p=0.00)**			
1st (least deprived)	1318	1		1st (least deprived)	1416	1	
2nd	1402	1.18	(0.92-1.52)	2nd	1581	1.31	(1.06-1.62)
3rd	1509	1.32	(1.02-1.69)	3rd	1571	1.52	(1.21-1.92)
4th	1379	1.61	(1.25-2.06)	4th	1447	1.92	(1.51-2.43)
5th (most deprived)	1247	1.89	(1.43-2.51)	5th (most deprived)	1295	2.09	(1.63-2.69)
NS-SEC of household reference person (p<0.001)				**NS-SEC of household reference person (p<0.001)**			
Managerial & professional	2891	1		Managerial & professional	2853	1	
Intermediate	465	0.78	(0.56-1.09)	Intermediate	731	1.18	(0.94-1.47)
Small accounts workers & own accounts workers	839	1.16	(0.90-1.49)	Small accounts workers & own accounts workers	762	1.11	(0.89-1.38)
Lower supervisory & technical	791	1.52	(1.21-1.91)	Lower supervisory & technical	698	1.29	(1.05-1.60)
Semi-routine & routine	1704	1.46	(1.19-1.79)	Semi-routine & routine	1999	1.61	(1.34-1.94)
Other/not known	164	1.07	(0.63-1.85)	Other/not known	266	1.19	(0.81-1.74)
Equivalised household income (p=0.06)				**Equivalised household income (p=0.04)**			
Highest	1322	1		Highest	1163	1	
2nd	1267	1.14	(0.90-1.44)	2nd	1205	1.24	(0.97-1.57)
3rd	1104	1.30	(1.02-1.65)	3rd	1199	1.12	(0.86-1.45)
4th	933	1.37	(1.05-1.79)	4th	1246	1.46	(1.11-1.91)
Lowest	827	1.54	(1.17-2.04)	Lowest	983	1.44	(1.08-1.92)
Not known	1401	1.24	(0.97-1.58)	Not known	1503	1.21	(0.93-1.57)
Highest educational attainment (p=0.00)				**Highest educational attainment (p=0.00)**			
Degree or equivalent	1488	1		Degree or equivalent	1332	1	
Other	3793	2.23	(1.77-2.81)	Other	3903	1.96	(1.59-2.42)
No qualifications	1541	3.09	(2.32-4.11)	No qualifications	2054	2.59	(1.99-3.36)
Not answered	32	1.54	(0.37-6.37)	Not answered	20	1.13	(0.33-3.91)
General Health Status (p<0.01)				**General Health Status (p=0.00)**			
Very good	2297	1		Very good	2314	1	
Good	2961	1.41	(1.19-1.67)	Good	3165	1.53	(1.31-1.78)
Fair	1138	2.24	(1.82-2.76)	Fair	1351	2.07	(1.73-2.48)
Bad	346	2.25	(1.69-3.01)	Bad	371	2.52	(1.91-3.33)
Very bad	112	1.83	(1.13-2.96)	Very bad	109	3.45	(2.28-5.21)
BMI status (p=0.00)				**BMI status (p=0.00)**			
Not overweight (BMI <25)	1978	1		Not overweight (BMI <25)	2666	1	
Overweight (BMI 25-29.9)	2612	0.68	(0.57-0.80)	Overweight (BMI 25-29.9)	1938	0.66	(0.55-0.78)
Obese (BMI >30)	1425	0.43	(0.35-0.54)	Obese (BMI >30)	1470	0.58	(0.48-0.70)
Not known	840	0.65	(0.52-0.81)	Not known	1236	0.69	(0.57-0.84)
Fruit and vegetable consumption per day (p=0.00)				**Fruit and vegetable consumption per day (p=0.00)**			
No portions	485	1		No portions	330	1	
Less than 1 – less than 5	4465	0.56	(0.44-0.71)	Less than 1 – less than 5	4676	0.64	(0.50-0.82)
Five or more	1904	0.31	(0.23-0.41)	Five or more	2303	0.35	(0.27-0.47)

Continued…

Table 8.6 continued

Aged 16 and over *2006*

Variable	N	Odds ratio	95% C.I.[a]	Variable	N	Odds ratio	95% C.I.[a]
Men *Base (weighted) 6854*				**Women** *Base (weighted) 7310*			
Alcohol consumption (p=0.00)				**Alcohol consumption (p=0.00)**			
Did not drink in last 12 months	728	1		Did not drink in last 12 months	1136	1	
No alcohol in last week or up to 4 units on heaviest day	3426	1.60	(1.24-2.07)	No alcohol in last week or up to 4 units on heaviest day	3757	1.94	(1.56-2.41)
More than 4 units up to 8 units on heaviest day last week	1075	2.05	(1.55-2.70)	More than 4 units up to 8 units on heaviest day last week	1243	2.19	(1.68-2.85)
More than 8 units on heaviest day last week	1536	2.80	(2.09-3.74)	More than 8 units on heaviest day last week	1092	4.21	(3.29-5.38)
Not answered	89	0.77	(0.27-2.19)	Not answered	82	1.22	(0.57-2.62)

[a] Confidence interval.

Table 8.7

Number of hours exposed to other people's smoke, by age and sex

Aged 16 and over *2006*

Number of hours exposed to other people's smoke per week	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
Men								
% 0 hours a week	29	33	46	47	55	64	76	47
% 1 – 6 hours a week	33	42	34	32	29	24	18	32
% 7- 13 hours a week	14	10	8	6	6	6	3	8
% 14 – 27 hours a week	13	6	5	7	4	3	1	6
% 28 hours or more a week	11	9	6	8	6	3	2	7
Mean number of hours exposed to other people's smoke	9.5	7.5	5.5	6.2	4.9	3.3	2.1	6.0
Standard error of the mean	0.68	0.53	0.41	0.44	0.39	0.38	0.39	0.22
Women								
% 0 hours a week	31	46	60	58	68	74	83	58
% 1 – 6 hours a week	34	36	25	26	21	20	14	26
% 7- 13 hours a week	13	7	5	5	5	2	1	6
% 14 – 27 hours a week	11	6	4	4	3	2	1	5
% 28 hours or more a week	11	5	6	6	3	2	1	5
Mean number of hours exposed to other people's smoke	9.3	4.7	4.3	4.9	3.2	2.2	1.5	4.5
Standard error of the mean	0.60	0.32	0.30	0.37	0.30	0.29	0.27	0.17
Bases (unweighted)								
Men	*642*	*856*	*1174*	*1038*	*1119*	*851*	*598*	*6278*
Women	*787*	*1140*	*1479*	*1268*	*1266*	*933*	*893*	*7766*
Bases (weighted)								
Men	*1029*	*1121*	*1347*	*1108*	*1009*	*693*	*494*	*6801*
Women	*1004*	*1152*	*1364*	*1131*	*1047*	*768*	*791*	*7258*

Table 8.8

Number of hours exposed to other people's smoke, (observed and age-standardised), by Government Office Region/Strategic Health Authority[a] and sex

Aged 16 and over — *2006*

Number of hours exposed to other people's smoke per week	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
Men											
Observed											
% 0 hours a week	33	43	39	45	43	50	50	53	54	53	55
% 1 – 6 hours a week	35	34	37	29	35	30	32	30	29	28	29
% 7- 13 hours a week	9	10	8	10	9	9	8	7	6	7	5
% 14 – 27 hours a week	11	6	8	7	6	6	6	4	5	6	5
% 28 hours or more a week	12	8	9	8	6	5	5	6	6	7	6
Mean number of hours exposed to other people's smoke	9.3	6.6	7.6	6.8	6.2	5.3	4.9	4.9	5.2	5.6	4.8
Standard error of the mean	1.00	0.64	0.77	0.81	0.78	0.59	0.52	0.59	0.48	0.81	0.58
Standardised											
% 0 hours a week	34	42	40	46	42	49	53	51	51	50	53
% 1 – 6 hours a week	35	34	36	30	36	31	30	31	29	28	30
% 7- 13 hours a week	9	10	8	9	10	9	7	8	6	7	6
% 14 – 27 hours a week	10	6	8	7	6	6	6	4	6	6	5
% 28 hours or more a week	12	8	9	8	7	5	5	7	7	8	6
Mean number of hours exposed to other people's smoke	9.4	6.7	7.5	6.8	6.3	5.3	4.6	5.4	5.6	6.1	5.1
Standard error of the mean	1.05	0.66	0.77	0.78	0.77	0.59	0.51	0.69	0.56	0.93	0.62
Women											
Observed											
% 0 hours a week	44	55	49	58	58	62	60	65	65	63	66
% 1 – 6 hours a week	34	29	32	24	26	25	26	20	22	22	22
% 7- 13 hours a week	7	6	6	7	6	4	6	6	4	5	3
% 14 – 27 hours a week	8	5	5	6	5	5	3	4	5	6	4
% 28 hours or more a week	7	5	8	5	6	3	4	5	4	4	4
Mean number of hours exposed to other people's smoke	6.8	4.5	6.0	4.9	4.6	3.3	3.6	4.3	3.9	4.2	3.6
Standard error of the mean	0.93	0.41	0.57	0.46	0.57	0.47	0.44	0.64	0.32	0.46	0.47
Standardised											
% 0 hours a week	45	54	50	56	57	61	63	64	64	63	66
% 1 – 6 hours a week	34	29	32	25	26	26	24	21	22	22	23
% 7- 13 hours a week	7	6	6	7	6	4	6	6	4	5	3
% 14 – 27 hours a week	8	5	5	6	5	5	3	4	5	6	4
% 28 hours or more a week	7	6	8	6	6	3	4	5	4	4	4
Mean number of hours exposed to other people's smoke	6.8	4.6	5.9	5.2	4.7	3.5	3.5	4.3	3.9	4.2	3.6
Standard error of the mean	0.92	0.43	0.55	0.52	0.58	0.49	0.46	0.64	0.32	0.45	0.47
Bases (unweighted)											
Men	*330*	*940*	*643*	*607*	*656*	*730*	*732*	*592*	*1048*	*511*	*537*
Women	*431*	*1146*	*820*	*760*	*857*	*845*	*830*	*789*	*1288*	*678*	*610*
Bases (weighted)											
Men	*342*	*914*	*676*	*594*	*700*	*779*	*1032*	*666*	*1098*	*537*	*561*
Women	*387*	*997*	*747*	*622*	*779*	*790*	*971*	*773*	*1191*	*633*	*558*

[a] This table provides data for regional analysis both by Government Office Region (GOR) and the new configuration of Strategic Health Authorities (SHAs) in place from July 2006. The first eight columns represent GORs and SHAs of the same name, while the South East GOR (column nine) is divided into South East Coast SHA and South Central SHA, shown in the final two columns.

Table 8.9

Number of hours exposed to other people's smoke (age-standardised), by equivalised household income and sex

Aged 16 and over — *2006*

Number of hours exposed to other people's smoke per week	Equivalised household income quintile				
	Highest	2nd	3rd	4th	Lowest
Men					
% 0 hours a week	48	43	47	45	42
% 1 – 6 hours a week	36	35	31	30	27
% 7- 13 hours a week	8	8	7	9	11
% 14 – 27 hours a week	4	7	6	6	8
% 28 hours or more a week	4	7	9	10	12
Mean number of hours exposed to other people's smoke	4.0	5.9	6.3	7.8	10.0
Standard error of the mean	0.41	0.45	0.49	0.71	0.88
Women					
% 0 hours a week	62	58	58	54	54
% 1 – 6 hours a week	28	30	24	26	22
% 7- 13 hours a week	5	5	6	7	7
% 14 – 27 hours a week	4	4	5	6	8
% 28 hours or more a week	2	4	6	7	9
Mean number of hours exposed to other people's smoke	2.7	3.3	4.7	5.8	7.2
Standard error of the mean	0.29	0.29	0.35	0.49	0.58
Bases (unweighted)					
Men	*1189*	*1135*	*1052*	*927*	*772*
Women	*1219*	*1258*	*1294*	*1374*	*1069*
Bases (weighted)					
Men	*1317*	*1259*	*1101*	*925*	*818*
Women	*1163*	*1196*	*1196*	*1235*	*977*

Table 8.10

Places of exposure to other people's smoke, by age and sex

Aged 16 and over — *2006*

Place of exposure	Sex		Total
	Men	Women	
	%	%	%
Often near people who smoke:			
At home	14	14	14
At work	14	7	10
In other people's homes	12	14	13
On public transport	2	2	2
In pubs	40	28	34
In other places	12	11	12
Any of these places	60	50	55
Bases (unweighted)	*6786*	*7260*	*14045*
Bases (weighted)	*6277*	*7777*	*14054*

Table 8.11

Trends in the number of hours exposed to other people's smoke, 1998 – 2006, by age and sex

Aged 16 and over *1998, 2003, 2006*

Number of hours exposed to other people's smoke per week	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
Men								
1998								
Mean number of hours exposed to other people's smoke	18.4	13.5	11.4	11.4	9.2	5.2	3.2	11.0
Standard error of the mean	0.7	0.5	0.5	0.5	0.6	0.5	0.5	0.2
2003								
Mean number of hours exposed to other people's smoke	14.2	9.2	8.5	8.0	6.9	4.3	2.1	7.8
Standard error of the mean	0.69	0.49	0.45	0.45	0.42	0.48	0.36	0.21
2003[a]								
Mean number of hours exposed to other people's smoke	14.2	9.3	8.9	8.1	6.9	4.4	2.1	8.4
Standard error of the mean	0.72	0.51	0.48	0.45	0.41	0.49	0.37	0.23
2006								
Mean number of hours exposed to other people's smoke	9.5	7.5	5.5	6.2	4.9	3.3	2.1	6.0
Standard error of the mean	0.68	0.53	0.41	0.44	0.39	0.38	0.39	0.22
Women								
1998								
Mean number of hours exposed to other people's smoke	16.4	8.9	8.1	8.1	6.0	3.7	1.9	7.8
Standard error of the mean	0.7	0.4	0.4	0.4	0.4	0.4	0.2	0.2
2003								
Mean number of hours exposed to other people's smoke	12.6	7.9	6.2	6.2	4.6	2.7	1.4	6.0
Standard error of the mean	0.64	0.44	0.32	0.41	0.33	0.29	0.22	0.19
2003[a]								
Mean number of hours exposed to other people's smoke	12.4	7.7	6.3	6.3	4.7	2.7	1.4	6.3
Standard error of the mean	0.66	0.43	0.33	0.41	0.35	0.29	0.23	0.20
2006								
Mean number of hours exposed to other people's smoke	9.3	4.7	4.3	4.9	3.2	2.2	1.5	4.5
Standard error of the mean	0.60	0.32	0.30	0.37	0.30	0.29	0.27	0.17
Bases (unweighted)								
Men								
Men 1998	*869*	*1329*	*1302*	*1282*	*980*	*833*	*559*	*7154*
Men 2003	*746*	*1025*	*1263*	*1101*	*1103*	*807*	*557*	*6602*
Men 2006	*642*	*856*	*1174*	*1038*	*1119*	*851*	*598*	*6278*
Women 1998	*1005*	*1627*	*1568*	*1480*	*1145*	*966*	*902*	*8693*
Women 2003	*890*	*1285*	*1618*	*1279*	*1307*	*952*	*903*	*8234*
Women 2006	*787*	*1140*	*1479*	*1268*	*1266*	*933*	*893*	*7766*
Bases (weighted)[a]								
Men 2003	*1047*	*1274*	*1416*	*1185*	*1043*	*731*	*507*	*7202*
Men 2006	*1029*	*1121*	*1347*	*1108*	*1009*	*693*	*494*	*6801*
Women 2003	*1034*	*1285*	*1440*	*1200*	*1074*	*816*	*785*	*7634*
Women 2006	*1004*	*1152*	*1364*	*1131*	*1047*	*768*	*791*	*7258*

[a] Data from 2003 and 2006 have been weighted for non-response (shaded rows); for 2003 both weighted and unweighted data are shown.

Alcohol consumption

9

Elizabeth Fuller

Key findings

- This chapter covers alcohol consumption by men and women aged 16 and over. It measures drinking in the last week, including the number of drinking days and the maximum amount drunk on a single day. Trends in the proportions of adults drinking more than the recommended daily amount and more than twice the recommended amount are shown. There is also an analysis of the risk factors associated with drinking above recommendations. The method of converting actual drinks into units of alcohol consumed has been revised this year and the implications of this are discussed.
- 89% of men and 84% of women said they drank alcohol at least occasionally.
- 72% of men and 58% of women had drunk alcohol in the past week, including 23% of men and 13% of women who had drunk alcohol on five or more days. The average number of drinking days in the past week increased with income; men and women in higher income households were more likely to have drunk on five or more days in the past week.
- Current government recommendations for sensible drinking are that men should regularly drink no more than three to four units in a day and that women should regularly drink no more than two to three units in a day. 41% of all men and 33% of all women had drunk more than the recommended amounts (more than four units for men and more than three units for women) on at least one day in the past week.
- Men who drank within the past seven days consumed an average of 8.1 units on the day they drank most; women consumed an average of 5.5 units. Average consumption among men and women decreased with age.
- More than half of those who drank alcohol in the last week drank above recommended amounts at least once (57% of men and women).
- Within the past week, 34% of men and 28% of women who had drunk alcohol had consumed more than twice the recommended amounts on at least one day.
- Groups with increased odds of exceeding recommended levels on at least one day in the past week included younger drinkers, those in higher income households, and smokers (including ex-smokers). Men and women in minority ethnic groups, those who assessed their health as poor or very poor, and those with high physical activity levels had reduced odds of drinking above recommended levels.
- Younger drinkers, those in higher income households, and smokers (including ex-smokers) also had relatively high odds of drinking more than twice the recommended amounts on at least one day in the last week. Odds of drinking at this level were higher for those who lived in households with no children. Men and women in minority ethnic groups and those who assessed their health as poor or very poor had reduced odds of drinking more than twice the recommended amounts.
- The proportions of men and women drinking more than the recommended amounts and the proportions drinking more than twice the recommended amounts on at least one day have remained at similar levels since 1998.

9.1 Introduction

The damage caused by alcohol misuse to individuals and society has become an increasing focus of public concern in recent years. The government's *Alcohol Harm Reduction Strategy*, published in 2004 and updated in 2007, acknowledged the positive role that alcohol plays in British life, but also identified ways in which alcohol misuse contributes to poor health.[1,2] One positive health outcome has been reliably linked to alcohol consumption; there is evidence that, for men over 40 and post-menopausal women, moderate daily alcohol intake may confer a protective effect against coronary heart disease and stroke.[3] Otherwise, alcohol is more likely to harm rather than enhance health. Drinking alcohol has been linked to increased risks of hypertension, stroke, coronary heart disease, liver cirrhosis and some cancers.[4,5] Between 1995/1996 and 2005/2006 the number of admissions to hospital in England of adults with a primary diagnosis specifically related to alcohol, including mental and behavioural disorders and alcoholic liver disease, rose by 51%.[6] Alcohol-related death rates also increased substantially between 1991 and 2004.[7]

Alcohol misuse does not only harm those who drink. It is implicated in around half of violent assaults in England and Wales,[8] and, although the numbers of people hurt or killed in road accidents involving a driver over the legal limit for alcohol has fallen since 1980, 6% of road casualties and 17% of fatalities in Britain in 2006 involved someone driving while over the limit.[9] In 2003, the costs of alcohol misuse to the NHS were estimated to be up to £1.7 billion a year.[5]

The nature and the extent of these alcohol-related harms is linked to the amount drunk, both on single occasions and cumulatively. Current Department of Health advice, which has remained consistent since 1995, is that men should not regularly drink more than three to four units of alcohol per day, and women should not regularly drink more than two to three units of alcohol per day.[2] (Pregnant women are advised to avoid alcohol altogether.)[10] The National Alcohol Strategy highlights two patterns of hazardous drinking among adults. Binge drinking is defined as drinking large amounts of alcohol in a short period; binge drinkers usually, and often intentionally, become drunk, and are at immediate risk of being involved in accidents, violent assaults (as attacker or victim), or other hazardous behaviour (for example, unprotected sex). Although binge drinking tends to be defined in surveys as drinking at least twice the recommended daily amounts on a single occasion (more than eight units for men, six units for women), in practice many binge drinkers drink substantially more than this.[2] Harmful drinking is defined as 'drinking at levels that lead to significant harm to physical and mental health and at levels that may be causing substantial harm to others'. These harms include liver disease, dependence and family problems. Individuals identified as at highest risk of alcohol-related harm are those who regularly drink at least twice the recommended daily amount or the equivalent of 50 units a week (men) or 35 units a week (women).[2]

This chapter covers alcohol consumption by men and women aged 16 and over. It measures drinking in the last week, including the number of drinking days and the maximum amount drunk on a single day. Trends in the proportions of adults drinking more than the recommended daily amount and twice the recommended amount are shown. There is also an analysis of the risk factors associated with drinking above the recommended levels. The method of converting actual drinks into units of alcohol consumed has recently been under review and has been revised this year; the implications of this are discussed.

9.2 Methods and definitions

9.2.1 Methods

The Health Survey for England has asked about drinking alcohol since its inception in 1991. Information on drinking alcohol is generally collected from adults as part of the main survey interview. In 2006, as in previous years, there were two exceptions to this, designed to

provide greater privacy for younger informants. Teenagers aged 16 and 17 – below the legal age for buying alcohol – were asked to fill in a self-completion questionnaire covering smoking and drinking; young adults aged between 18 and 24 were offered this questionnaire as an alternative to the interview.[11]

The questionnaire was revised between 1998 and 2003 to reflect changes in government guidelines, specifically the move from recommended limits for weekly consumption to those based on daily consumption.[12] In 2006, the HSE questionnaire covered the following areas:

- Frequency of drinking in the last 12 months (including those who never drink)
- Number of drinking days in the past week
- For those who drank in the past week, the amounts of different types of alcohol drunk on the day they drank most.

9.2.2 Measuring alcohol intake

Alcohol consumption is reported in terms of units of alcohol; one unit of alcohol is 10ml by volume of pure alcohol. Daily consumption is calculated by recording the amounts drunk using the day in the past week when the informant drank most. Those who drank bottled or canned beer, lager, stout or cider were asked in detail about what they drank, and this information was used to estimate the amount in pints.[13]

The method used by the HSE to convert drinks to units remained essentially unchanged from 1991 until 2005. The assumptions were similar to those which have been used by other major surveys since they were introduced by the General Household Survey (GHS) in 1990.[14] In recent years, it has become clear that these assumptions were no longer valid. The average strengths of beers and wines have increased in the intervening years, and pubs, bars and restaurants now serve drinks in a broader range of measures; specifically, standard glasses of wine, formerly 125ml, are likely to be 175ml or even 250ml.[15] From 2006, changes have been made in the way HSE and other surveys estimate alcohol consumption.[15,16]

The table below shows the original conversion factors used by the HSE until 2005 as well as the revised conversion factors used in this report.

Type of drink	Measure	Original equivalent units of alcohol	Revised equivalent units of alcohol
Normal strength beer, lager, stout, cider, shandy (less than 6% ABV)	Pint	2	2
	Can or bottle	Amount in pints multiplied by 2	Amount in pints multiplied by 2.5
	Small cans (size unknown)	1	1.5
	Large cans or bottles (size unknown)	2	2
Strong beer, lager, stout, cider (6% ABV or more)	Pint	3	4
	Can or bottle	Amount in pints multiplied by 3	Amount in pints multiplied by 4
	Small cans (size unknown)	1.5	2
	Large cans or bottles (size unknown)	3	3
Spirits and liqueurs	Glass (single measure)	1	1
Sherry, vermouth and other fortified wines	Glass	1	1
Wine	Glass	1	2
Alcopops	Small can or bottle	1	1.5

The changes have an impact on the estimated consumption of beer, wine and alcopops; the most significant of these is the revision to the unit equivalent of a glass of wine from one unit to two units.[17] The implications of this and the other revisions are discussed in Section 9.6 below.

Several tables in this report present summary data for the number of men and women who drank above the recommended daily amounts and also those who drank more than twice recommended amounts on the day they drank most. Until 2005, findings based on the Health Survey for England defined drinking within recommendations as up to, but not including four units for men and three units for women. In 2006, the HSE has changed its definitions to correspond to those used by the GHS and other surveys, so that drinking within recommendations is shown as up to and including four units for men and three units for women.

9.2.3 Measuring alcohol consumption in surveys

Survey measures of alcohol consumption are generally acknowledged to underestimate consumption. There are several reasons why this is so; the most significant are believed to be the under-representation of heavy drinkers in survey samples and the difficulty of accurately recalling amounts drunk, particularly where drinking is in informal settings. Comparisons of survey measures with HM Revenue and Customs data on alcohol taxed for sale suggest that survey estimates of consumption represent between 55% and 60% of the true figure.[18] However, survey data provide a reliable means of comparing drinking between different groups and of measuring trends in drinking over time.

9.3 Results

9.3.1 Frequency of drinking

Most adults drink alcohol, at least occasionally; 89% of men and 84% of women had drunk alcohol in the past year. The majority of informants reported drinking during the past week (72% of men and 58% of women).

Around one in four men (23%) and one in seven women (13%) drank on five or more days in the week. Those who did so were more likely to be aged 45 or over and to live in higher income households. **Tables 9.1-9.4**

Figure 9A

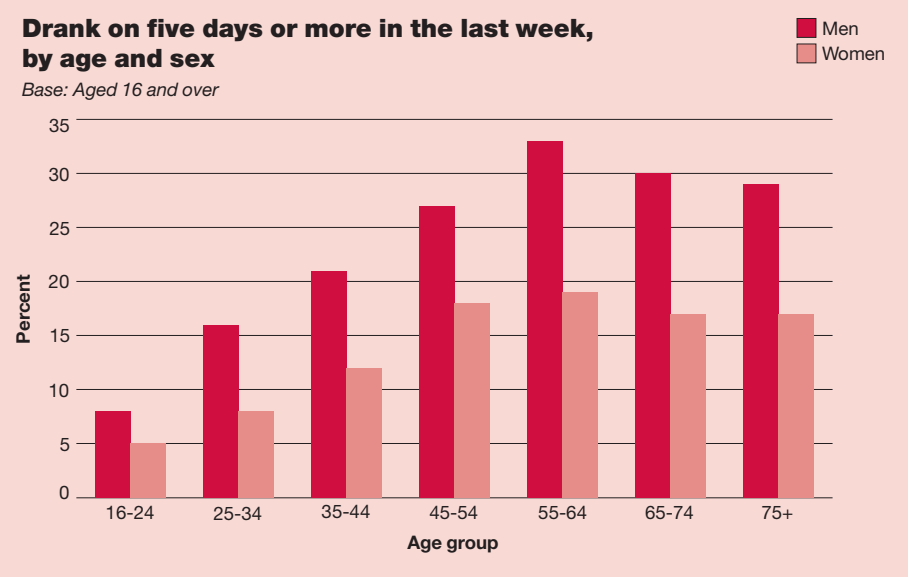
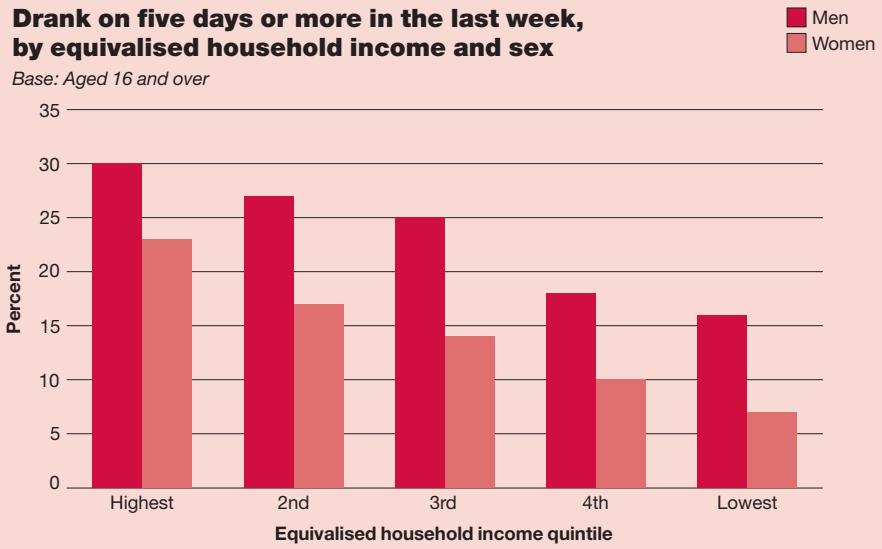


Figure 9B

Drank on five days or more in the last week, by equivalised household income and sex

Base: Aged 16 and over



9.3.2 Maximum daily alcohol consumption in the past week

Current government recommendations are for men to drink no more than three to four units and women two to three units daily on a regular basis.[2] 41% of all men and 33% of all women had drunk more than recommended amounts (more than four units for men and more than three units for women) on at least one day in the past week. **Table 9.5**

Consumption was measured for the day when most was drunk in the past seven days, so these estimates represent the maximum consumed in a day. Among those who had drunk alcohol in the past week, men drank more than women (on average, 8.1 units and 5.5 units respectively), and, on average, the amount drunk decreased with age.

More than half of men and women who had drunk in the past week drank more than the recommended amounts at least once. A third (34%) of men and more than a quarter (28%) of women who had drunk in the past week had drunk more than twice the recommended amounts at least once. **Table 9.6**

Figure 9C

Drank more than recommended amounts in the last week, by age and sex

Base: Aged 16 and over

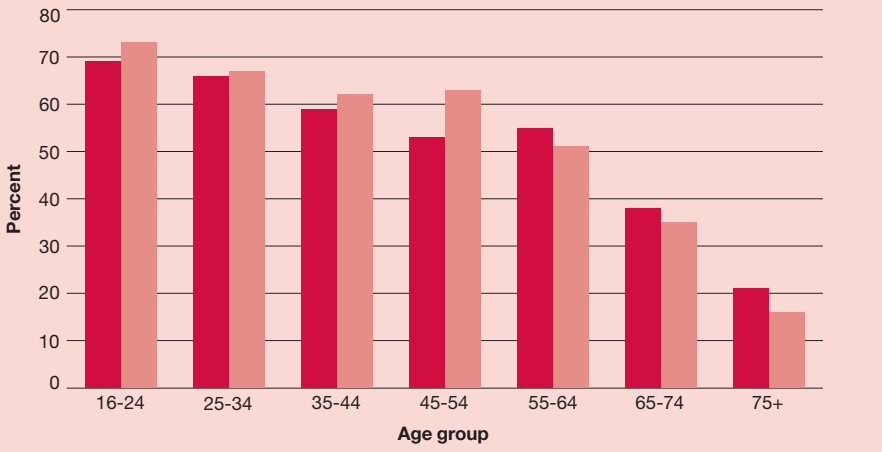
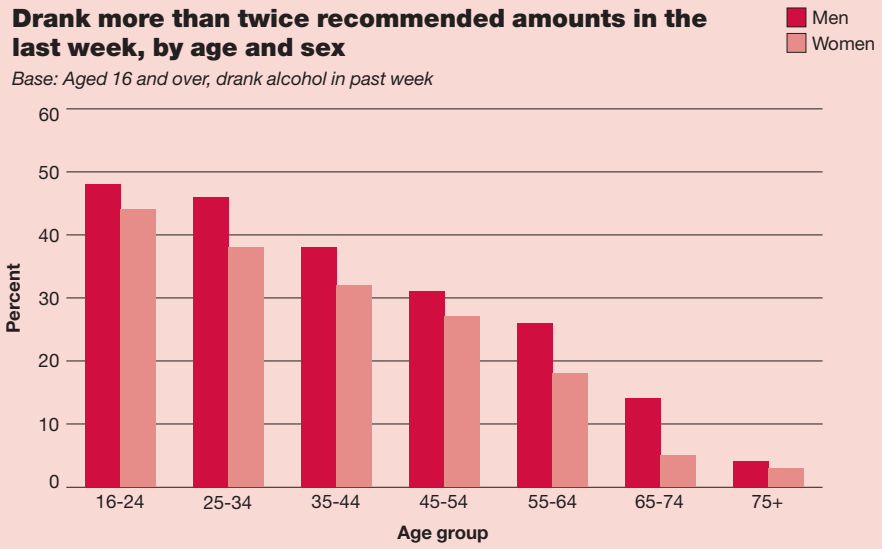


Figure 9D

Drank more than twice recommended amounts in the last week, by age and sex

Base: Aged 16 and over, drank alcohol in past week



9.3.3 Predictors of excessive drinking

Analytical approach

Multivariate logistic regression was used to explore the risk factors associated with drinking above government guidelines. The same approach was used to model the factors associated with drinking above the recommended daily levels (more than four units in a day for men, three units for women) and those associated with drinking more than twice the recommended daily levels (more than eight units for men, six units for women). Separate models were constructed for men and women. The analyses excluded those who had not drunk alcohol in the last seven days.

The regression technique adjusts for several explanatory variables simultaneously. The initial models included classificatory variables at the individual, household and area level, as well as indicators of health status and lifestyle. These included a range of socio-demographic variables: age group, ethnicity, Government Office Region, equivalised household income, area Index of Multiple Deprivation, educational attainment, marital status, household type and NS-SEC of household reference person. Other variables of interest were included to look at the associations between drinking more than recommended and health and lifestyle indicators: general health status, smoking, fruit and vegetable consumption, levels of physical activity and BMI status.

Initial iterations identified variables with no significant link to the outcomes of interest and these were excluded from the final regression models.[19]

Risk factors indicate associations, not causes. These variations in risk are expressed as odds ratios, the degree to which the probability of the key outcome increases or decreases relative to the reference category. Odds ratios greater than 1 indicate an increased risk compared to the reference category; odds ratios less than 1 indicate a decreased risk. 95% confidence intervals are shown; odds are significantly different from the reference category if the limits of the confidence interval do not include 1.

Drinking over the recommended amounts

More than half of adults who had drunk alcohol in the past week had drunk more than the recommended amounts on at least one day.

For both men and women, consuming more than recommended was strongly related to age and ethnicity. The odds reduced with age; men aged 45 or more and women aged 55 or more were less likely than younger drinkers to have exceeded recommendations on the day they drank most. Adults in most minority ethnic groups had reduced odds of having exceeded recommendations compared with white men and women.[20]

Income and region were also linked to how much adults drank. Men and women in lower income households had reduced odds of drinking more than recommended amounts. Men in the North West and Yorkshire and Humberside and women in the North East were more likely than men and women living in London to drink over the recommended amounts.

Other demographic characteristics related to drinking over recommendations were not consistent for men and women. Compared with married people, widows had reduced odds and widowers increased odds of drinking more than recommended. Women whose households included children (compared with those who lived alone or only with other adults) and those with no educational qualifications (compared with those with degree-level qualifications) had reduced odds.

Some indicators of health status and lifestyle were also related to how much adults drank. Men who assessed their health as poor or very poor and women whose health was fair, poor or very poor were less likely than those in good or very good health to have drunk more than the recommended amounts. There was a strong relationship between smoking and drinking above recommended limits, with both current and ex-smokers having increased odds of drinking more than the recommended amounts. Men and women with high physical activity levels had a reduced risk of drinking more than recommended. For men but not women, being overweight or obese was linked to an increased likelihood of having drunk more than recommended amounts in the past week. **Table 9.9**

Drinking more than twice the recommended amounts

A third of men and over a quarter of women who drank in the past week had drunk more than twice the recommended amounts on the day they drank most.

As with drinking over the recommended limits, the odds of drinking more than twice the recommended daily amounts at least once in the last week were reduced for older men and women and those from most minority ethnic groups. The regional pattern was also similar; compared with adults living in London, men and women in the North East and the North West and women in Yorkshire and Humberside had increased odds of drinking more than twice the recommended daily amounts. Men and women who lived in households with no children had increased odds of having drunk more than twice the recommended amount, compared with adults whose households included children aged under 16.

As with drinking more than recommended amounts, those who assessed their general health as poor or very poor had reduced odds of drinking more than twice the recommended amounts. Current and former smokers had increased odds of drinking more than twice the daily recommended limits.

Other risk factors varied according to sex. The odds of drinking at this level were reduced for men in low income households compared with those in the highest income group, and for women with no educational qualifications compared with those with degrees. The odds increased for obese men compared with those who were not overweight, and for single women compared with married women. **Table 9.10**

9.3.4 Trends in the amounts of alcohol drunk by men and women

Methods

Questions about the maximum amount consumed on any day in the last week were first asked in 1998.

The trend data shown in the tables reflect two changes from the practice in previous years, both discussed in Section 9.2.2. The thresholds shown here for drinking more than the recommended daily limits and more than twice the recommended daily limits are not the same as in previous HSE reports. Previous years' data have been recalculated using these revised thresholds to enable comparisons between years since 1998. Consequently, the trend data shown here differ from those published in previous years.

Again, to facilitate comparisons over time, 2006 consumption is shown using both the original and revised methods of conversion from drinks to units of alcohol (see Section

9.2.2). Where 2006 consumption levels are mentioned in the discussion of trends, this refers to units of alcohol calculated using the original conversion method.

Trends

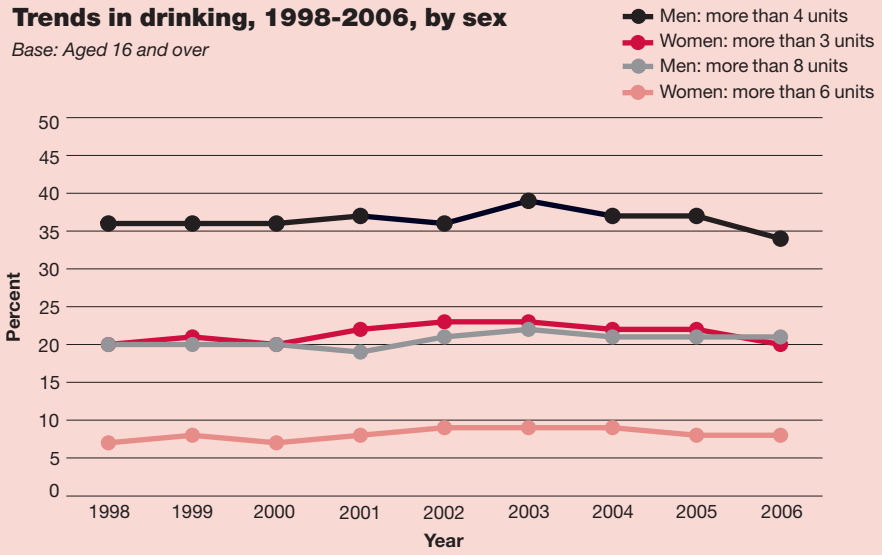
The proportion of men drinking above the recommended limits on at least on day in the past week remained at a similar level between 1998 and 2005. In 2006, this was lower than in previous years, particularly among men aged 16 to 24. There has been no significant change over time in the proportion of women drinking at this level.

The proportions of men and women drinking more than twice recommended levels on at least one day have also remained steady since 1998. **Tables 9.11, 9.12**

Figure 9E

Trends in drinking, 1998-2006, by sex

Base: Aged 16 and over



9.4 Discussion

Although the proportions of men and women drinking more than the recommended sensible levels have remained steady in recent years, the revised measures of consumption used in this analysis have had a disproportionate impact on the estimated consumption of certain groups. It should be emphasised that these differences do not reflect sudden changes in actual consumption between 2005 and 2006, though it is probable that they represent broad trends in what people have been drinking since the early 1990s (see Section 9.2.2).

The original and revised estimates of the proportions of men and women drinking above recommended amounts (see Table 9.11) and more than twice recommended amounts (see Table 9.12) show relatively small differences among men aged 16 to 24, but relatively large differences among older men, and women of all ages, the groups most likely to drink wine.

The proportions of those who drank wine on the day they drank most in the past week in each age group are presented in the table below.

Table 9A

Adults who drank wine on the day they drank most in the past week

	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men	12	26	34	33	40	40	36	33
Women	37	55	60	66	68	59	45	58

Because the key measures of consumption discussed here are thresholds rather than averages, the impact on daily estimates is also greatest among those groups whose consumption is likely to be modest. The threshold for sensible drinking for men has changed from the equivalent of four glasses of wine to two, and for women from three glasses of wine to one and a half. This has the least impact on the estimates of the proportions of young men drinking more than recommended amounts (who, as a group, drink a lot of alcohol, but very little wine), and a relatively large impact on middle-aged and older women (who drink quite small amounts of alcohol, but are more likely than not to have drunk wine). In comparison, changes to the unit equivalents of beers and alcopops have had relatively small impacts on estimates, even for those groups (for example, young men) who drink the most of these drinks.

The individuals identified in this analysis which should cause concern are those drinking at least twice the recommended amounts, the levels defined as binge drinking (see Section 9.1). If this pattern is repeated on most days – something the HSE does not measure – these drinkers may also be drinking at harmful levels. The overall pattern of this potentially hazardous drinking is the same using the original and revised conversion methods, but, again, higher proportions of women are now shown to be drinking at these levels. Overall, 16% of women recorded drinking at binge levels according to the revised conversion method, compared with 8% using the original method. (The corresponding proportions for men were 24% and 19%.)

Revising the way surveys calculate adults' alcohol consumption enables a better understanding of how much adults in England currently drink. Again, it should be stressed that the difference between the original and revised measures do not reflect actual changes in consumption. As the trend data show, consumption levels have not changed dramatically in recent years. However, the revised survey estimates now correspond more closely to the information about the alcoholic content of drinks available to consumers. As a result, the Health Survey for England should better reflect the objective, emphasised in the National Alcohol Strategy, of equipping those who drink alcohol to make informed choices about how much they consume.[1,2]

References and notes

1 Strategy Unit *Alcohol Harm Reduction Strategy*. Cabinet Office, 2004. http://www.cabinetoffice.gov.uk/upload/assets/www.cabinetoffice.gov.uk/strategy/caboffce%20alcoholhar.pdf

2 Department of Health et al Safe. *Sensible. Social. The next steps in the National Alcohol Strategy*. Department of Health, 2007. http://www.homeoffice.gov.uk/documents/Alcohol-strategy.pdf?view=Binary

3 See Department of Health *Sensible drinking; the report of an inter-departmental working group*. 1995 for a review of the evidence. http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4084701

4 See Department of Health (1995), cited above.

5 Strategy Unit *Interim analytical report, 2003*. http://www.pm.gov.uk/files/pdf/SU%20interim_report2.pdf

6 Hospital Episode Statistics, quoted in The Information Centre *Statistics on Alcohol: England 2007*. www.ic.nhs.uk/pubs/alcohol06

7 Breakwell C, Baker A et al *Trends and geographical variations in alcohol-related deaths in the United Kingdom, 1991-2004* in *Health Statistics Quarterly 33*. National Statistics, 2007. http://www.statistics.gov.uk/downloads/theme_health/hsq33web.pdf

8 Nicholas S, Kershaw C and Walker A *Crime in England and Wales 2006/2007*. Home Office, 2007. http://www.homeoffice.gov.uk/rds/pdfs07/hosb1107.pdf

9 Department for Transport et al *Road Casualties: Great Britain 2006*. Department for Transport, 2007. http://www.dft.gov.uk/162259/162469/221412/221549/227755/rcgb2006v1.pdf

10 Updated on 23rd May 2007, see http://www.gnn.gov.uk/environment/fullDetail.asp?ReleaseID=287152&NewsAreaID=2

11 In 2006, 13% of this age group chose to complete the questionnaire rather than be interviewed about their drinking. They were most likely to be at the young end of the age range; 29% of 18 year olds requested the booklet, compared with 6% of 24 year olds.

12 See Department of Health (1995), cited above. Questions about average daily consumption, which enabled the estimation of weekly consumption, were last asked by the Health Survey for England in 2002.

13 One pint is equivalent to 0.568 litres.

14 Smyth M and Browne F *General Household Survey 1990*. HMSO, 1992.

15 Goddard E *Estimating alcohol consumption from survey data: improved method of coverting volume to units*. ONS, 2007. http://www.statistics.gov.uk/statbase/product.asp?vlnk=15067

16 Goddard E. *General Household Survey: Smoking and Drinking among adults*. ONS, 2006 http://www.statistics.gov.uk/downloads/theme_compendia/GHS06/SmokingandDrinkingamong adults2006.pdf

17 One unit is equivalent to a 125ml glass of wine of 8% ABV (average volume by alcohol); two units is roughly equivalent to a 175ml glass of wine at 12% ABV. From 2007, the HSE questionnaire includes more detailed questions on the quantity of wine drunk.

18 Goddard E *Obtaining information about drinking through surveys of the general population*. ONS, 2001

19 There were some variables included in the initial models that were not significant for men or women, and were therefore excluded from the final models; NS-SEC (socio-economic class) of the household reference person, area Index of Multiple Deprivation and level of social support from family and friends.

20 Adults in minority ethnic groups were less likely than the general population to have drunk alcohol at all in the past week. See Becker E, Hills A and Erens B *Alcohol consumption* in Sproston K and Mindell J *Health Survey for England 2004: the health of minority ethnic groups: vol 1*. The Information Centre, 2006 www.ic.nhs.uk/pubs/hse04ethnic.

21 Other groups disproportionately affected, not compared here, include those in professional and managerial households, those in high income households and those living in southern and eastern England. See Goddard (2007), cited above.

Tables

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Table 9.1

Usual frequency of drinking alcohol in past year, by age and sex

Aged 16 and over *2006*

Frequency of drinking	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Almost every day	4	9	13	18	24	24	26	16
Five or six days a week	3	4	8	7	8	6	4	6
Three or four days a week	16	20	18	19	18	12	9	17
Once or twice a week	37	33	30	27	26	27	20	29
Once or twice a month	13	13	11	10	8	8	10	11
Once every couple of months	7	5	5	5	5	4	7	5
Once or twice a year	4	4	4	5	5	8	10	5
Not at all	17	11	9	9	6	11	14	11
Women								
Almost every day	2	5	7	12	13	15	15	9
Five or six days a week	1	2	5	6	5	3	2	4
Three or four days a week	9	14	13	16	12	8	3	11
Once or twice a week	34	31	30	25	24	21	16	26
Once or twice a month	20	16	14	12	12	11	9	14
Once every couple of months	11	8	10	8	8	9	9	9
Once or twice a year	6	6	10	9	13	15	21	11
Not at all	16	18	12	11	13	19	25	16
Bases (unweighted)								
Men	*615*	*860*	*1178*	*1046*	*1122*	*852*	*599*	*6272*
Women	*763*	*1146*	*1489*	*1278*	*1268*	*932*	*896*	*7772*
Bases (weighted)								
Men	*988*	*1126*	*1351*	*1116*	*1011*	*694*	*495*	*6781*
Women	*973*	*1158*	*1373*	*1140*	*1049*	*768*	*794*	*7253*

Table 9.2

Number of days on which drank alcohol in past week, by age and sex

Aged 16 and over *2006*

Number of days	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
0	38	28	24	25	22	30	38	28
1	21	17	18	15	15	14	15	17
2	16	17	16	15	12	12	9	14
3	9	13	11	11	11	9	7	11
4	8	9	9	7	7	5	3	8
5	3	5	5	5	7	4	2	5
6	2	3	4	5	5	4	4	4
7	4	7	12	16	20	22	23	14
Drank on five or more days in past week	*8*	*16*	*21*	*27*	*33*	*30*	*29*	*23*
Mean number of days	1.6	2.3	2.5	2.8	3.1	2.8	2.6	2.5
Standard error of mean	0.09	0.08	0.07	0.09	0.08	0.09	0.11	0.04
Women								
0	44	41	38	33	38	47	61	42
1	26	23	20	17	17	18	12	19
2	14	14	14	15	12	9	5	12
3	8	10	10	10	8	5	3	8
4	4	5	7	7	6	4	2	5
5	2	3	4	5	4	3	1	3
6	1	2	2	4	3	2	1	2
7	2	3	6	9	11	13	14	8
Drank on five or more days in past week	*5*	*8*	*12*	*18*	*19*	*17*	*17*	*13*
Mean number of days	1.2	1.5	1.8	2.2	2.1	1.8	1.5	1.7
Standard error of mean	0.06	0.05	0.05	0.07	0.07	0.08	0.08	0.03
Bases (unweighted)								
Men	*616*	*860*	*1178*	*1046*	*1123*	*852*	*600*	*6275*
Women	*761*	*1146*	*1488*	*1278*	*1269*	*932*	*896*	*7770*
Bases (weighted)								
Men	*989*	*1126*	*1351*	*1116*	*1012*	*694*	*496*	*6784*
Women	*970*	*1157*	*1372*	*1140*	*1050*	*768*	*794*	*7250*

Table 9.3

Number of days on which drank alcohol in past week (observed and age-standardised), by Government Office Region/Strategic Health Authority[a] and sex

Aged 16 and over *2006*

Number of days	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
	%	%	%	%	%	%	%	%	%	%	%
Men											
Observed											
0	29	27	26	25	28	26	38	25	26	25	26
1	16	18	17	20	18	16	15	15	18	18	17
2	15	15	15	16	14	13	14	13	14	15	14
3	12	10	15	9	12	11	9	11	10	9	11
4	8	7	7	8	7	7	6	8	8	7	9
5	3	6	4	6	4	6	4	6	4	4	4
6	4	3	5	2	3	5	4	5	5	7	3
7	13	13	12	14	13	17	10	17	15	15	15
Drank on five or more days in past week	*21*	*22*	*21*	*22*	*21*	*27*	*18*	*28*	*24*	*26*	*22*
Mean number of days	2.5	2.5	2.5	2.5	2.4	2.7	2.1	2.8	2.6	2.7	2.6
Standard error of mean	0.17	0.10	0.10	0.13	0.13	0.09	0.11	0.13	0.10	0.13	0.14
Standardised											
0	28	27	26	25	28	26	37	26	26	25	27
1	16	19	16	19	18	17	15	15	18	18	18
2	15	16	15	16	14	13	14	13	15	15	14
3	12	10	15	9	12	11	9	11	10	9	11
4	8	8	7	8	7	7	6	8	8	7	9
5	3	6	4	6	4	6	4	6	4	4	5
6	5	3	5	2	3	4	4	5	5	7	3
7	13	13	12	14	13	16	12	16	14	14	14
Drank on five or more days in past week	*21*	*21*	*21*	*23*	*20*	*27*	*20*	*26*	*23*	*25*	*21*
Mean number of days	2.5	2.4	2.5	2.5	2.4	2.7	2.2	2.8	2.6	2.7	2.5
Standard error of mean	0.17	0.10	0.10	0.13	0.13	0.09	0.11	0.13	0.10	0.14	0.14

[a] This table provides data for regional analysis both by Government Office Region (GOR) and the new configuration of Strategic Health Authorities (SHAs) in place from July 2006. The first eight columns represent GORs and SHAs of the same name, while the South East GOR (column nine) is divided into South East Coast SHA and South Central SHA, shown in the final two columns.

Continued…

Table 9.3 continued

Aged 16 and over *2006*

Number of days	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
	%	%	%	%	%	%	%	%	%	%	%
Women											
Observed											
0	40	40	42	46	43	39	52	38	37	37	37
1	25	20	18	17	19	22	16	19	21	21	20
2	11	13	14	11	14	12	9	11	13	14	13
3	8	9	8	8	6	7	9	9	7	7	8
4	5	6	5	6	6	5	4	5	5	5	5
5	2	2	3	3	2	4	4	3	5	4	5
6	3	2	2	2	2	3	1	3	3	3	3
7	7	8	7	8	8	8	5	10	10	9	10
Drank on five or more days in past week	*11*	*12*	*12*	*13*	*12*	*15*	*10*	*17*	*17*	*16*	*18*
Mean number of days	1.6	1.7	1.7	1.6	1.6	1.8	1.4	2.0	2.0	2.0	2.0
Standard error of mean	0.12	0.07	0.08	0.09	0.09	0.08	0.10	0.09	0.08	0.11	0.12
Standardised											
0	40	41	42	46	43	38	53	38	37	37	37
1	25	20	18	17	19	22	15	20	21	21	20
2	11	13	14	11	14	12	9	12	13	14	13
3	8	9	8	8	6	7	8	9	7	7	8
4	5	5	5	6	6	6	3	5	5	5	5
5	2	2	3	3	2	4	4	4	5	4	5
6	3	1	3	2	2	3	1	3	3	3	3
7	7	8	7	8	8	7	6	10	9	9	10
Drank on five or more days in past week	*11*	*12*	*12*	*12*	*12*	*14*	*11*	*16*	*17*	*16*	*17*
Mean number of days	1.6	1.7	1.7	1.6	1.6	1.8	1.4	2.0	1.9	1.9	2.0
Standard error of mean	0.12	0.07	0.08	0.10	0.09	0.07	0.10	0.08	0.08	0.11	0.12
Bases (unweighted)											
Men	*330*	*936*	*644*	*615*	*657*	*727*	*728*	*591*	*1047*	*511*	*536*
Women	*433*	*1146*	*821*	*770*	*862*	*844*	*823*	*788*	*1283*	*675*	*608*
Bases (weighted)											
Men	*342*	*908*	*676*	*601*	*700*	*773*	*1025*	*663*	*1095*	*537*	*558*
Women	*390*	*995*	*748*	*631*	*783*	*788*	*959*	*772*	*1183*	*628*	*555*

[a] This table provides data for regional analysis both by Government Office Region (GOR) and the new configuration of Strategic Health Authorities (SHAs) in place from July 2006. The first eight columns represent GORs and SHAs of the same name, while the South East GOR (column nine) is divided into South East Coast SHA and South Central SHA, shown in the final two columns.

Table 9.4

Number of days on which drank alcohol in past week (age-standardised), by equivalised household income and sex

Aged 16 and over *2006*

Number of days	Equivalised household income quintile				
	Highest	2nd	3rd	4th	Lowest
	%	%	%	%	%
Men					
0	16	19	26	38	45
1	15	19	18	17	15
2	15	15	15	14	13
3	14	12	10	9	6
4	11	8	7	4	5
5	6	7	6	3	3
6	6	5	4	3	2
7	18	15	15	11	11
Drank on five or more days in past week	*30*	*27*	*25*	*18*	*16*
Mean number of days	3.2	2.9	2.6	2.0	1.8
Standard error of mean	0.09	0.08	0.09	0.10	0.11
Women					
0	28	31	40	46	59
1	17	22	19	23	17
2	13	15	14	11	10
3	11	8	8	7	4
4	7	7	6	3	2
5	6	4	3	2	1
6	5	3	2	1	2
7	12	10	9	7	5
Drank on five or more days in past week	*23*	*17*	*14*	*10*	*7*
Mean number of days	2.5	2.1	1.8	1.4	1.1
Standard error of mean	0.11	0.08	0.06	0.06	0.06
Bases (unweighted)					
Men	*1190*	*1134*	*1053*	*930*	*770*
Women	*1216*	*1262*	*1290*	*1379*	*1070*
Bases (weighted)					
Men	*1316*	*1255*	*1103*	*927*	*815*
Women	*1158*	*1200*	*1190*	*1237*	*976*

Table 9.5

Summary of maximum alcohol consumption on any day in the past week, by age and sex

Aged 16 and over *2006*

Number of units	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Did not drink in past week	39	28	24	25	22	30	38	28
Up to and including 4 units	18	24	29	34	34	43	49	31
More than 4, up to and including 8 units	13	15	17	17	23	17	10	17
More than 8 units	31	34	29	24	21	10	3	24
Women								
Did not drink in past week	45	41	37	33	38	47	61	42
Up to and including 3 units	14	19	23	24	30	34	32	25
More than 3, up to and including 6 units	14	17	19	24	20	16	5	17
More than 6 units	28	23	20	18	11	3	1	16
Bases (unweighted)								
Men	*606*	*860*	*1178*	*1045*	*1123*	*851*	*600*	*6263*
Women	*745*	*1144*	*1490*	*1276*	*1268*	*931*	*894*	*7748*
Bases (weighted)								
Men	*972*	*1126*	*1351*	*1115*	*1012*	*693*	*496*	*6766*
Women	*951*	*1156*	*1375*	*1138*	*1049*	*767*	*792*	*7228*

Table 9.6

Maximum alcohol consumption on any day in the past week[a], by age and sex, based on adults who drank alcohol in the past week

Aged 16 and over, drank alcohol in past seven days *2006*

Number of units	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
2 units or less	17	17	23	23	23	35	55	25
More than 2, up to and including 3 units	4	5	4	6	5	7	6	5
More than 3, up to and including 4 units	8	11	11	16	15	20	18	13
More than 4, up to and including 5 units	3	3	3	3	3	3	1	3
More than 5, up to and including 6 units	7	8	10	12	14	13	8	10
More than 6, up to and including 8 units	11	10	10	9	13	8	7	10
More than 8 units	50	47	39	32	26	14	5	34
More than 4 units	*71*	*67*	*61*	*55*	*56*	*38*	*21*	*57*
More than 8 units	*50*	*47*	*39*	*32*	*26*	*14*	*5*	*34*
Mean number of units	11.6	10.4	8.8	7.5	6.9	4.9	3.4	8.1
Standard error of the mean	0.53	0.38	0.26	0.24	0.19	0.15	0.14	0.14
Women								
2 units or less	19	26	33	32	45	60	78	38
More than 2, up to and including 3 units	6	6	5	4	4	5	5	5
More than 3, up to and including 4 units	9	16	16	19	18	19	10	16
More than 4, up to and including 5 units	7	4	2	3	3	3	2	3
More than 5, up to and including 6 units	9	8	12	14	12	8	3	10
More than 6, up to and including 8 units	10	9	11	10	9	3	2	9
More than 8 units	40	30	21	17	9	2	1	19
More than 3 units	*75*	*67*	*63*	*64*	*51*	*35*	*17*	*57*
More than 6 units	*50*	*39*	*32*	*27*	*18*	*5*	*3*	*28*
Mean number of units	8.4	7.1	5.9	5.4	4.3	3.0	2.2	5.5
Standard error of the mean	0.36	0.28	0.16	0.15	0.12	0.09	0.10	0.09
Bases (unweighted)								
Men	373	624	897	795	878	595	375	4537
Women	407	664	935	860	784	494	347	4491
Bases (weighted)								
Men	597	814	1024	838	793	482	309	4857
Women	528	682	859	758	646	403	307	4182

[a] Unit categories differ from those reported in previous years.

Table 9.7

Maximum alcohol consumption on any day in the past week[a] (observed and age-standardised), by Government Office Region/Strategic Health Authority[b] and sex, based on adults who drank alcohol in the past week

Aged 16 and over, drank alcohol in past seven days — *2006*

Number of units	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
	%	%	%	%	%	%	%	%	%	%	%
Men											
Observed											
2 units or less	19	20	18	24	28	25	28	28	28	26	29
Over 2, up to and including 3 units	3	6	4	5	5	6	4	4	7	7	7
Over 3, up to and including 4 units	14	11	12	12	13	15	14	15	16	14	17
Over 4, up to and including 5 units	3	3	4	3	3	1	3	2	2	2	2
Over 5, up to and including 6 units	10	8	11	12	8	10	12	11	12	14	9
Over 6, up to and including 8 units	11	11	12	10	8	11	7	10	10	9	11
More than 8 units	40	41	39	35	35	33	32	30	26	28	25
More than 4 units	*64*	*63*	*66*	*60*	*54*	*55*	*54*	*53*	*50*	*53*	*47*
More than 8 units	*40*	*41*	*39*	*35*	*35*	*33*	*32*	*30*	*26*	*28*	*25*
Mean number of units	9.8	9.0	9.7	8.8	8.3	7.7	7.3	7.4	6.9	7.3	6.5
Standard error of the mean	0.44	0.41	0.44	0.65	0.42	0.35	0.33	0.34	0.37	0.62	0.41
Standardised											
2 units or less	19	21	19	24	28	25	30	27	26	25	29
Over 2, up to and including 3 units	3	6	4	5	5	6	5	4	7	7	8
Over 3, up to and including 4 units	14	10	12	12	13	14	15	13	15	14	17
Over 4, up to and including 5 units	3	3	3	3	2	1	3	2	2	1	2
Over 5, up to and including 6 units	10	8	11	12	8	10	12	11	11	14	9
Over 6, up to and including 8 units	11	10	12	10	9	11	8	10	10	9	10
More than 8 units	40	41	38	35	36	33	28	33	28	30	26
More than 4 units	*64*	*64*	*64*	*59*	*54*	*55*	*51*	*56*	*51*	*54*	*47*
More than 8 units	*40*	*41*	*38*	*35*	*36*	*33*	*28*	*33*	*28*	*30*	*26*
Mean number of units	9.7	9.2	9.5	8.6	8.4	7.8	6.9	8.0	7.2	7.7	6.5
Standard error of the mean	0.45	0.47	0.45	0.60	0.45	0.37	0.30	0.46	0.45	0.73	0.48

[a] Unit categories differ from those reported in previous years.

[b] This table provides data for regional analysis both by Government Office Region (GOR) and the new configuration of Strategic Health Authorities (SHAs) in place from July 2006. The first eight columns represent GORs and SHAs of the same name, while the South East GOR (column nine) is divided into South East Coast SHA and South Central SHA, shown in the final two columns.

Continued…

Table 9.7 continued

Aged 16 and over, drank alcohol in past seven days *2006*

Number of units	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
	%	%	%	%	%	%	%	%	%	%	%
Women											
Observed											
2 units or less	30	34	33	35	40	42	40	40	40	39	41
Over 2, up to and including 3 units	4	4	5	6	5	6	4	5	4	4	5
Over 3, up to and including 4 units	12	17	14	16	18	16	17	13	17	18	17
Over 4, up to and including 5 units	4	4	5	4	3	3	4	3	3	3	3
Over 5, up to and including 6 units	11	12	11	10	9	8	10	11	11	11	11
Over 6, up to and including 8 units	13	9	10	8	6	8	10	9	8	9	8
More than 8 units	26	21	22	21	20	17	15	20	16	17	15
More than 3 units	*66*	*62*	*62*	*58*	*55*	*52*	*56*	*55*	*56*	*57*	*54*
More than 6 units	*38*	*30*	*31*	*29*	*26*	*25*	*25*	*29*	*24*	*25*	*23*
Mean number of units	7.4	5.9	5.9	5.7	5.6	4.9	5.0	5.6	5.0	5.1	5.0
Standard error of the mean	0.70	0.24	0.24	0.28	0.36	0.23	0.24	0.30	0.17	0.25	0.21
Standardised											
2 units or less	32	35	35	36	40	43	45	40	41	40	42
Over 2, up to and including 3 units	5	4	5	7	5	5	4	6	5	4	5
Over 3, up to and including 4 units	13	16	14	15	17	16	17	12	17	18	16
Over 4, up to and including 5 units	4	4	5	4	3	3	4	3	3	3	3
Over 5, up to and including 6 units	10	11	11	10	9	8	10	10	10	10	10
Over 6, up to and including 8 units	12	8	9	8	6	8	9	9	8	8	8
More than 8 units	24	21	20	21	21	17	13	21	16	16	15
More than 3 units	*63*	*60*	*60*	*58*	*55*	*52*	*52*	*54*	*55*	*55*	*53*
More than 6 units	*35*	*29*	*30*	*29*	*26*	*25*	*21*	*29*	*24*	*25*	*23*
Mean number of units	7.0	5.8	5.7	5.8	5.6	4.9	4.6	5.6	5.0	5.0	4.9
Standard error of the mean	0.67	0.28	0.23	0.31	0.37	0.23	0.22	0.31	0.17	0.24	0.22
Bases (unweighted)											
Men	*236*	*689*	*474*	*448*	*470*	*530*	*464*	*439*	*787*	*386*	*401*
Women	*256*	*677*	*467*	*406*	*488*	*508*	*394*	*486*	*809*	*424*	*385*
Bases (weighted)											
Men	*242*	*660*	*501*	*446*	*499*	*569*	*632*	*493*	*814*	*404*	*410*
Women	*230*	*585*	*425*	*335*	*445*	*480*	*458*	*478*	*746*	*395*	*351*

[a] Unit categories differ from those reported in previous years.

[b] This table provides data for regional analysis both by Government Office Region (GOR) and the new configuration of Strategic Health Authorities (SHAs) in place from July 2006. The first eight columns represent GORs and SHAs of the same name, while the South East GOR (column nine) is divided into South East Coast SHA and South Central SHA, shown in the final two columns.

Table 9.8

Maximum alcohol consumption on any day in the past week[a] (age-standardised), by equivalised household income and sex, based on adults who drank alcohol in the past week

Aged 16 and over, drank alcohol in past seven days *2006*

Number of units	Equivalised household income quintile				
	Highest	2nd	3rd	4th	Lowest
	%	%	%	%	%
Men					
2 units or less	20	23	26	28	25
Over 2, up to and including 3 units	4	5	5	4	6
Over 3, up to and including 4 units	16	13	11	13	13
Over 4, up to and including 5 units	3	3	3	3	2
Over 5, up to and including 6 units	11	8	11	10	11
Over 6, up to and including 8 units	10	12	11	9	8
More than 8 units	36	36	34	33	35
More than 4 units	*60*	*59*	*58*	*56*	*56*
More than 8 units	*36*	*36*	*34*	*33*	*35*
Mean number of units	8.4	8.7	8.3	8.0	8.9
Standard error of the mean	0.29	0.33	0.36	0.41	0.62
Women					
2 units or less	37	40	38	39	38
Over 2, up to and including 3 units	5	5	6	5	7
Over 3, up to and including 4 units	18	16	14	15	13
Over 4, up to and including 5 units	4	3	4	5	3
Over 5, up to and including 6 units	10	10	10	9	7
Over 6, up to and including 8 units	8	8	9	10	10
More than 8 units	18	18	20	18	21
More than 3 units	*58*	*56*	*56*	*56*	*55*
More than 6 units	*26*	*26*	*29*	*27*	*32*
Mean number of units	5.4	5.3	5.5	5.4	6.3
Standard error of the mean	0.22	0.19	0.21	0.23	0.40
Bases (unweighted)					
Men	*1023*	*932*	*778*	*583*	*427*
Women	*898*	*900*	*781*	*702*	*436*
Bases (weighted)					
Men	*1128*	*1021*	*811*	*575*	*445*
Women	*852*	*854*	*717*	*629*	*395*

[a] Unit categories differ from those reported in previous years.

Table 9.9

Estimated odds ratios for drinking more than recommended amounts[a] on at least one day in the past week, by associated risk factors and sex

Aged 16 and over, drank alcohol in past seven days *2006*

Variable	N	Odds ratio	95% C.I.[b]	Variable	N	Odds ratio	95% C.I.[b]
Men *Base (weighted) 6038*				**Women** *Base (weighted) 6091*			
Age group (p<0.001)				**Age group (p<0.001)**			
16-24	805	1		6-24	792	1	
25-34	1000	1.00	(0.76-1.33)	25-34	948	0.90	(0.70-1.15)
35-44	1227	0.89	(0.68-1.17)	35-44	1215	0.82	(0.63-1.06)
45-54	1016	0.66	(0.50-0.87)	45-54	1007	0.89	(0.70-1.14)
55-64	949	0.69	(0.51-0.94)	55-64	917	0.60	(0.45-0.79)
65-74	614	0.35	(0.25-0.50)	65-74	621	0.42	(0.30-0.59)
75+	426	0.16	(0.10-0.25)	75+	591	0.18	(0.12-0.29)
Ethnicity (p<0.001)				**Ethnicity (p<0.001)**			
White	5654	1		White	5755	1	
Mixed	42	0.48	(0.23-1.01)	Mixed	61	0.61	(0.34-1.10)
Asian	147	0.34	(0.21-0.56)	Asian	86	0.23	(0.12-0.42)
Black	141	0.38	(0.24-0.61)	Black	127	0.30	(0.20-0.47)
Other/not known	53	0.16	(0.07-0.40)	Other/not known	63	0.17	(0.08-0.40)
Marital status (p=0.043)				**Marital status (p=0.011)**			
Married/civil partnership	3279	1		Married/civil partnership	3073	1	
Cohabiting	763	1.03	(0.84-1.26)	Cohabiting	728	0.96	(0.79-1.17)
Separated/divorced	370	1.22	(0.96-1.55)	Separated/divorced	530	1.18	(0.96-1.43)
Widowed	184	1.53	(1.10-2.14)	Widowed	610	0.69	(0.54-0.89)
Single	1442	1.11	(0.90-1.37)	Single	1151	1.13	(0.93-1.38)
Household type (p=0.157)				**Household type (p=0.001)**			
Family with children	1228	1		Family with children	1511	1	
Adults, no children	4810	1.13	(0.95-1.34)	Adults, no children	4581	1.27	(1.10-1.48)
Educational qualifications (p=0.342)				**Educational qualifications (p<0.001)**			
Degree-level	1349	1		Degree-level	1171	1	
Other qualifications	3405	1.01	(0.86-1.18)	Other qualifications	3408	0.90	(0.77-1.04)
No qualifications	1284	0.89	(0.73-1.09)	No qualifications	1512	0.57	(0.47-0.70)
Equivalised household income (p<0.001)				**Equivalised household income quintile (p<0.001)**			
Highest quintile	1255	1		Highest quintile	1064	1	
2nd quintile	1197	0.88	(0.72-1.06)	2nd quintile	1123	0.80	(0.67-0.96)
3rd quintile	1016	0.76	(0.62-0.93)	3rd quintile	1046	0.70	(0.59-0.84)
4th quintile	807	0.56	(0.45-0.71)	4th quintile	1007	0.71	(0.58-0.87)
Lowest quintile	646	0.54	(0.41-0.70)	Lowest quintile	721	0.54	(0.43-0.68)
Not known	1117	0.63	(0.50-0.79)	Not known	1130	0.68	(0.55-0.83)
Government Office Region (p<0.001)				**Government Office Region (p=0.054)**			
London	810	1		London	679	1	
North East	318	1.29	(0.92-1.80)	North East	334	1.40	(1.02-1.91)
North West	801	1.41	(1.09-1.82)	North West	856	1.26	(0.98-1.63)
Yorkshire and the Humber	614	1.38	(1.03-1.85)	Yorkshire and the Humber	624	1.20	(0.92-1.58)
East Midlands	552	1.21	(0.91-1.62)	East Midlands	535	1.00	(0.77-1.31)
West Midlands	626	0.92	(0.68-1.23)	West Midlands	651	1.08	(0.82-1.42)
East of England	705	0.94	(0.72-1.22)	East of England	676	0.95	(0.72-1.26)
South East	996	0.81	(0.62-1.06)	South East	1047	1.04	(0.81-1.34)
South West	616	0.89	(0.66-1.19)	South West	689	0.97	(0.73-1.28)

[a] Recommended drinking amounts are no more than four units for men and three units for women in a day. Note that until 2005, findings based on the Health Survey for England showed these thresholds as up to, but not including four units for men and three units for women. In 2006, the HSE definitions changed to correspond to those used by the GHS and other surveys, so that drinking within recommended amounts is shown as up to and including four units for men and three units for women.

[b] Confidence interval.

Continued…

Table 9.9 continued

Aged 16 and over, drank alcohol in past seven days *2006*

Variable	N	Odds ratio	95% C.I.[b]	Variable	N	Odds ratio	95% C.I.[b]
Men *Base (weighted) 6038*				**Women** *Base (weighted) 6091*			
Self-assessed general health (p=0.020)				**Self-assessed general health (p<0.001)**			
Very good/good	4684	1		Very good/good	4727	1	
Fair	1003	0.95	(0.80-1.12)	Fair	1059	0.82	(0.70-0.95)
Poor/very poor	351	0.69	(0.53-0.89)	Poor/very poor	305	0.55	(0.40-0.75)
Smoking status (p<0.001)				**Smoking status (p<0.001)**			
Never smoked	2553	1		Never smoked	2957	1	
Ex-smoker	2005	1.73	(1.50-2.00)	Ex-smoker	1779	1.44	(1.26-1.64)
Current smoker	1481	1.88	(1.59-2.22)	Current smoker	1355	1.63	(1.42-1.88)
BMI (p<0.001)				**BMI (p=0.320)**			
Not overweight (up to 25)	1697	1		Not overweight (up to 25)	2286	1	
Overweight (over 25, up to 30)	2363	1.18	(1.01-1.37)	Overweight (over 25, up to 30)	1686	1.07	(0.93-1.24)
Obese (over 30)	1299	1.43	(1.20-1.71)	Obese (over 30)	1217	0.95	(0.82-1.11)
Not known	679	0.92	(0.75-1.13)	Not known	902	0.73	(0.60-0.87)
Physical activity level (p=0.016)				**Physical activity level (p<0.001)**			
Low	2355	1		Low	1766	1	
Medium	1688	1.06	(0.91-1.23)	Medium	1989	0.97	(0.85-1.12)
High	1454	0.83	(0.71-0.98)	High	1695	0.75	(0.65-0.87)
Not known	540	0.96	(0.72-1.29)	Not known	641	0.81	(0.59-1.10)

[a] Recommended drinking amounts are no more than four units for men and three units for women in a day. Note that until 2005, findings based on the Health Survey for England showed these thresholds as up to, but not including four units for men and three units for women. In 2006, the HSE definitions changed to correspond to those used by the GHS and other surveys, so that drinking within recommended amounts is shown as up to and including four units for men and three units for women.

[b] Confidence interval.

Table 9.10

Estimated odds ratios for drinking more than twice the recommended amounts[a] on at least one day in the past week, by associated risk factors and sex

Aged 16 and over, drank alcohol in past seven days *2006*

Variable	N	Odds ratio	95% C.I.[b]
Men *Base (weighted) 6038*			
Age group (p<0.001)			
16-24	805	1	
25-34	1000	1.06	(0.80-1.41)
35-44	1227	0.88	(0.66-1.17)
45-54	1016	0.61	(0.45-0.83)
55-64	949	0.47	(0.33-0.65)
65-74	614	0.21	(0.13-0.32)
75+	426	0.06	(0.03-0.13)
Ethnicity (p<0.001)			
White	5654	1	
Mixed	42	0.70	(0.32-1.52)
Asian	147	0.32	(0.16-0.64)
Black	141	0.49	(0.26-0.91)
Other/not known	53	0.18	(0.05-0.64)
Marital status (p=0.332)			
Married/civil partnership	3279	1	
Cohabiting	763	1.05	(0.85-1.30)
Separated/divorced	370	1.16	(0.89-1.52)
Widowed	184	1.12	(0.67-1.88)
Single	1442	1.24	(0.99-1.54)
Household type (p=0.034)			
Family with children	1228	1	
Adults, no children	4810	1.22	(1.02-1.47)
Educational qualifications (p=0.537)			
Degree-level	1349	1	
Other qualifications	3405	1.11	(0.92-1.34)
No qualifications	1284	1.08	(0.84-1.38)
Equivalised household income (p<0.001)			
Highest quintile	1255	1	
2nd quintile	1197	0.89	(0.72-1.10)
3rd quintile	1016	0.75	(0.60-0.94)
4th quintile	807	0.56	(0.42-0.75)
Lowest quintile	646	0.59	(0.44-0.79)
Not known	1117	0.68	(0.54-0.86)
Government Office Region (p<0.001)			
London	810	1	
North East	318	1.42	(1.02-1.99)
North West	801	1.61	(1.24-2.08)
Yorkshire and the Humber	614	1.31	(0.97-1.78)
East Midlands	552	1.21	(0.88-1.68)
West Midlands	626	1.15	(0.84-1.56)
East of England	705	1.04	(0.77-1.40)
South East	996	0.79	(0.58-1.07)
South West	616	0.92	(0.66-1.29)

Variable	N	Odds ratio	95% C.I.[b]
Women *Base (weighted) 6091*			
Age group (p<0.001)			
16-24	792	1	
25-34	948	0.90	(0.70-1.16)
35-44	1215	0.77	(0.58-1.01)
45-54	1007	0.56	(0.42-0.75)
55-64	917	0.34	(0.24-0.47)
65-74	621	0.12	(0.06-0.21)
75+	591	0.07	(0.03-0.16)
Ethnicity (p<0.001)			
White	5755	1	
Mixed	61	0.67	(0.33-1.38)
Asian	86	0.27	(0.11-0.69)
Black	127	0.23	(0.10-0.50)
Other/not known	63	0.17	(0.05-0.59)
Marital status (p=0.008)			
Married/civil partnership	3073	1	
Cohabiting	728	0.97	(0.77-1.23)
Separated/divorced	530	1.23	(0.95-1.60)
Widowed	610	0.60	(0.36-1.01)
Single	1151	1.35	(1.08-1.69)
Household type (p<0.001)			
Family with children	1511	1	
Adults, no children	4581	1.55	(1.29-1.86)
Educational qualifications (p=0.005)			
Degree-level	1171	1	
Other qualifications	3408	0.92	(0.77-1.10)
No qualifications	1512	0.65	(0.50-0.86)
Equivalised household income quintile (p=0.227)			
Highest quintile	1064	1	
2nd quintile	1123	0.88	(0.71-1.09)
3rd quintile	1046	0.90	(0.72-1.14)
4th quintile	1007	0.77	(0.60-0.98)
Lowest quintile	721	0.77	(0.58-1.01)
Not known	1130	0.82	(0.64-1.05)
Government Office Region (p=0.051)			
London	679	1	
North East	334	1.85	(1.23-2.78)
North West	856	1.46	(1.06-2.00)
Yorkshire and the Humber	624	1.45	(1.02-2.05)
East Midlands	535	1.24	(0.84-1.82)
West Midlands	651	1.21	(0.85-1.73)
East of England	676	1.22	(0.86-1.72)
South East	1047	1.11	(0.81-1.54)
South West	689	1.33	(0.94-1.88)

[a] Recommended drinking amounts are no more than four units for men and three units for women in a day. Note that until 2005, findings based on the Health Survey for England showed these thresholds as up to, but not including four units for men and three units for women. In 2006, the HSE definitions changed to correspond to those used by the GHS and other surveys, so that drinking within recommended amounts is shown as up to and including four units for men and three units for women.

[b] Confidence interval.

Continued…

Table 9.10 continued

Aged 16 and over, drank alcohol in past seven days *2006*

Variable	N	Odds ratio	95% C.I.[b]	Variable	N	Odds ratio	95% C.I.[b]
Men *Base (weighted) 6038*				**Women** *Base (weighted) 6091*			
Self-assessed general health (p=0.005)				**Self-assessed general health (p=0.020)**			
Very good/good	4684	1		Very good/good	4727	1	
Fair	1003	1.01	(0.82-1.23)	Fair	1059	0.89	(0.72-1.08)
Poor/very poor	351	0.54	(0.37-0.78)	Poor/very poor	305	0.58	(0.39-0.87)
Smoking status (p<0.001)				**Smoking status (p<0.001)**			
Never smoked	2553	1		Never smoked	2957	1	
Ex-smoker	2005	1.89	(1.60-2.23)	Ex-smoker	1779	1.66	(1.40-1.97)
Current smoker	1481	2.09	(1.74-2.51)	Current smoker	1355	2.40	(2.00-2.88)
BMI (p=0.004)				**BMI (p=0.151)**			
Not overweight (up to 25)	1697	1		Not overweight (up to 25)	2286	1	
Overweight (over 25, up to 30)	2363	1.14	(0.97-1.35)	Overweight (over 25, up to 30)	1686	1.13	(0.94-1.36)
Obese (over 30)	1299	1.38	(1.15-1.67)	Obese (over 30)	1217	1.20	(0.99-1.46)
Not known	679	1.04	(0.81-1.35)	Not known	902	0.84	(0.67-1.06)
Fruit and vegetable consumption (p=0.011)				**Fruit and vegetable consumption (p=0.231)**			
None in previous day	410	1		None in previous day	259	1	
Less than five portions	3963	0.92	(0.69-1.22)	Less than five portions	3885	0.91	(0.67-1.24)
Five or more portions	1665	0.72	(0.52-0.99)	Five or more portions	1947	0.80	(0.58-1.11)
Physical activity level (p=0.081)				**Physical activity level (p=0.018)**			
Low	2355	1		Low	1766	1	
Medium	1688	1.04	(0.88-1.22)	Medium	1989	0.90	(0.76-1.06)
High	1454	0.83	(0.68-1.01)	High	1695	0.77	(0.64-0.92)
Not known	540	1.02	(0.65-1.60)	Not known	641	0.74	(0.37-1.46)

[a] Recommended drinking amounts are no more than four units for men and three units for women in a day. Note that until 2005, findings based on the Health Survey for England showed these thresholds as up to, but not including four units for men and three units for women. In 2006, the HSE definitions changed to correspond to those used by the GHS and other surveys, so that drinking within recommended amounts is shown as up to and including four units for men and three units for women.

[b] Confidence interval.

Table 9.11

Trends in the proportions of adults drinking more than the recommended amounts[a] on at least one day in the past week, 1998-2006[b], by age and sex

Aged 16 and over *1998-2006*

	Age group									
	1998	1999	2000	2001	2002	2003[b]	2004	2005	2006 (original)[c]	2006 (revised)[c]
	%	%	%	%	%	%	%	%	%	%
Men										
16-24	49	47	46	52	55	49	50	50	40	44
25-34	47	49	47	44	45	49	46	44	42	49
35-44	41	43	43	43	39	43	41	42	39	47
45-54	40	39	40	42	36	41	39	39	33	41
55-64	31	29	33	34	34	35	34	33	35	44
65-74	18	19	17	21	21	21	17	23	20	27
75+	9	9	10	9	11	11	12	8	9	13
Total	36	36	36	37	36	39	37	37	34	41
Women										
16-24	33	41	36	41	43	39	39	36	33	42
25-34	32	29	31	32	32	31	29	28	28	40
35-44	26	26	26	29	29	28	27	26	25	39
45-54	22	20	22	22	21	24	24	25	24	42
55-64	12	11	12	15	16	17	17	18	15	32
65-74	6	6	5	6	6	7	6	6	5	18
75+	2	2	2	3	2	3	2	4	2	6
Total	20	21	20	22	23	23	22	22	20	33

[a] Recommended drinking amounts are no more than four units for men and three units for women in a day. Note that until 2005, findings based on the Health Survey for England showed these thresholds as up to, but not including four units for men and three units for women. In 2006, the HSE definitions changed to correspond to those used by the GHS and other surveys, so that drinking within recommended amounts is shown as up to and including four units for men and three units for women.

[b] From 2003, data have been weighted for non-response; data from 1998-2002 are unweighted.

[c] In 2006, the method of calculating units has been reviewed (see Section 9.2.2 for a list of the changes). Results for 2006 are presented in the table calculated both using the original and the revised unit assumptions.

Continued…

Table 9.11 continued

Aged 16 and over *1998-2006*

	Age group									
	1998	1999	2000	2001	2002	2003[b]	2004	2005	2006 (original)[c]	2006 (revised)[c]
	%	%	%	%	%	%	%	%	%	%
Bases (unweighted)										
Men										
16-24	*725*	*318*	*360*	*675*	*433*	*706*	*265*	*386*	*606*	*606*
25-34	*1332*	*609*	*641*	*1136*	*505*	*1023*	*449*	*521*	*860*	*860*
35-44	*1302*	*671*	*718*	*1313*	*686*	*1261*	*533*	*586*	*1178*	*1178*
45-54	*1286*	*625*	*577*	*1206*	*527*	*1094*	*438*	*613*	*1045*	*1045*
55-64	*985*	*513*	*531*	*1053*	*493*	*1100*	*504*	*585*	*1123*	*1123*
65-74	*834*	*432*	*439*	*880*	*379*	*806*	*379*	*424*	*851*	*851*
75+	*561*	*268*	*301*	*549*	*267*	*554*	*275*	*297*	*600*	*600*
Total	*7025*	*3436*	*3567*	*6812*	*3290*	*6544*	*2843*	*3412*	*6263*	*6263*
Women										
16-24	*915*	*437*	*386*	*886*	*488*	*846*	*336*	*451*	*745*	*745*
25-34	*1630*	*734*	*792*	*1445*	*613*	*1283*	*549*	*640*	*1144*	*1144*
35-44	*1571*	*818*	*867*	*1712*	*835*	*1615*	*748*	*781*	*1490*	*1490*
45-54	*1483*	*764*	*730*	*1479*	*661*	*1276*	*625*	*719*	*1276*	*1276*
55-64	*1147*	*512*	*580*	*1155*	*581*	*1304*	*621*	*677*	*1268*	*1268*
65-74	*966*	*471*	*497*	*1027*	*451*	*949*	*486*	*463*	*931*	*931*
75+	*904*	*423*	*433*	*882*	*420*	*901*	*427*	*405*	*894*	*894*
Total	*8616*	*4159*	*4285*	*8586*	*4049*	*8174*	*3792*	*4136*	*7748*	*7748*
Bases (weighted)										
Men										
16-24						*989*	*440*	*519*	*972*	*972*
25-34						*1271*	*561*	*623*	*1126*	*1126*
35-44						*1413*	*645*	*725*	*1351*	*1351*
45-54						*1176*	*528*	*603*	*1115*	*1115*
55-64						*1041*	*474*	*541*	*1012*	*1012*
65-74						*730*	*330*	*371*	*693*	*693*
75+						*504*	*231*	*266*	*496*	*496*
Total						*7124*	*3209*	*3648*	*6766*	*6766*
Women										
16-24						*984*	*437*	*507*	*951*	*951*
25-34						*1283*	*562*	*633*	*1156*	*1156*
35-44						*1437*	*655*	*739*	*1375*	*1375*
45-54						*1198*	*540*	*611*	*1138*	*1138*
55-64						*1071*	*491*	*562*	*1049*	*1049*
65-74						*814*	*367*	*410*	*767*	*767*
75+						*783*	*351*	*424*	*792*	*792*
Total						*7570*	*3401*	*3887*	*7228*	*7228*

[a] Recommended drinking amounts are no more than four units for men and three units for women in a day. Note that until 2005, findings based on the Health Survey for England showed these thresholds as up to, but not including four units for men and three units for women. In 2006, the HSE definitions changed to correspond to those used by the GHS and other surveys, so that drinking within recommended amounts is shown as up to and including four units for men and three units for women.

[b] From 2003, data have been weighted for non-response; data from 1998-2002 are unweighted.

[c] In 2006, the method of calculating units has been reviewed (see Section 9.2.2 for a list of the changes). Results for 2006 are presented in the table calculated both using the original and the revised unit assumptions.

Table 9.12

Trends in the proportions of adults drinking more than twice the recommended amounts[a] on at least one day in the past week, 1998-2006[b], by age and sex:

Aged 16 and over *1998-2006*

	Age group									
	1998	1999	2000	2001	2002	2003[b]	2004	2005	2006 (original)[c]	2006 (revised)[c]
	%	%	%	%	%	%	%	%	%	%
Men										
16-24	37	32	33	39	41	36	36	34	28	31
25-34	31	35	32	29	30	33	32	29	29	34
35-44	22	23	24	22	23	24	23	24	22	29
45-54	19	19	18	20	19	22	19	19	19	24
55-64	12	12	13	13	13	15	14	14	15	21
65-74	5	5	5	6	7	7	4	7	7	10
75+	1	2	2	1	2	2	2	1	2	3
Total	20	20	20	19	21	22	21	21	19	24
Women										
16-24	17	25	17	23	27	22	22	20	19	28
25-34	14	12	15	14	15	14	13	12	14	23
35-44	8	9	7	9	11	10	11	10	10	20
45-54	6	4	6	6	6	7	8	7	7	18
55-64	2	3	2	2	3	3	3	5	3	11
65-74	1	1	0	1	1	1	0	1	1	3
75+	0	0	0	0	0	0	1	0	0	1
Total	7	8	7	8	9	9	9	8	8	16

[a] Recommended drinking amounts are no more than four units for men and three units for women in a day. Note that until 2005, findings based on the Health Survey for England showed these thresholds as up to, but not including four units for men and three units for women. In 2006, the HSE definitions changed to correspond to those used by the GHS and other surveys, so that drinking within recommended amounts is shown as up to and including four units for men and three units for women.

[b] From 2003, data have been weighted for non-response; data from 1998-2002 are unweighted.

[c] In 2006, the method of calculating units has been reviewed (see Section 9.2.2 for a list of the changes). Results for 2006 are presented in the table calculated both using the original and the revised unit assumptions.

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Table 9.12 continued

Aged 16 and over *1998-2006*

	Age group									
	1998	1999	2000	2001	2002	2003[b]	2004	2005	2006 (original)[c]	2006 (revised)[c]
	%	%	%	%	%	%	%	%	%	%
Bases (unweighted)										
Men										
16-24	*725*	*318*	*360*	*675*	*433*	*706*	*265*	*386*	*606*	*606*
25-34	*1332*	*609*	*641*	*1136*	*505*	*1023*	*449*	*521*	*860*	*860*
35-44	*1302*	*671*	*718*	*1313*	*686*	*1261*	*533*	*586*	*1178*	*1178*
45-54	*1286*	*625*	*577*	*1206*	*527*	*1094*	*438*	*613*	*1045*	*1045*
55-64	*985*	*513*	*531*	*1053*	*493*	*1100*	*504*	*585*	*1123*	*1123*
65-74	*834*	*432*	*439*	*880*	*379*	*806*	*379*	*424*	*851*	*851*
75+	*561*	*268*	*301*	*549*	*267*	*554*	*275*	*297*	*600*	*600*
Total	*7025*	*3436*	*3567*	*6812*	*3290*	*6544*	*2843*	*3412*	*6263*	*6263*
Women										
16-24	*915*	*437*	*386*	*886*	*488*	*846*	*336*	*451*	*745*	*745*
25-34	*1630*	*734*	*792*	*1445*	*613*	*1283*	*549*	*640*	*1144*	*1144*
35-44	*1571*	*818*	*867*	*1712*	*835*	*1615*	*748*	*781*	*1490*	*1490*
45-54	*1483*	*764*	*730*	*1479*	*661*	*1276*	*625*	*719*	*1276*	*1276*
55-64	*1147*	*512*	*580*	*1155*	*581*	*1304*	*621*	*677*	*1268*	*1268*
65-74	*966*	*471*	*497*	*1027*	*451*	*949*	*486*	*463*	*931*	*931*
75+	*904*	*423*	*433*	*882*	*420*	*901*	*427*	*405*	*894*	*894*
Total	*8616*	*4159*	*4285*	*8586*	*4049*	*8174*	*3792*	*4136*	*7748*	*7748*
Bases (weighted)										
Men										
16-24						*989*	*440*	*519*	*972*	*972*
25-34						*1271*	*561*	*623*	*1126*	*1126*
35-44						*1413*	*645*	*725*	*1351*	*1351*
45-54						*1176*	*528*	*603*	*1115*	*1115*
55-64						*1041*	*474*	*541*	*1012*	*1012*
65-74						*730*	*330*	*371*	*693*	*693*
75+						*504*	*231*	*266*	*496*	*496*
Total						*7124*	*3209*	*3648*	*6766*	*6766*
Women										
16-24						*984*	*437*	*507*	*951*	*951*
25-34						*1283*	*562*	*633*	*1156*	*1156*
35-44						*1437*	*655*	*739*	*1375*	*1375*
45-54						*1198*	*540*	*611*	*1138*	*1138*
55-64						*1071*	*491*	*562*	*1049*	*1049*
65-74						*814*	*367*	*410*	*767*	*767*
75+						*783*	*351*	*424*	*792*	*792*
Total						*7570*	*3401*	*3887*	*7228*	*7228*

[a] Recommended drinking amounts are no more than four units for men and three units for women in a day. Note that until 2005, findings based on the Health Survey for England showed these thresholds as up to, but not including four units for men and three units for women. In 2006, the HSE definitions changed to correspond to those used by the GHS and other surveys, so that drinking within recommended amounts is shown as up to and including four units for men and three units for women.

[b] From 2003, data have been weighted for non-response; data from 1998-2002 are unweighted.

[c] In 2006, the method of calculating units has been reviewed (see Section 9.2.2 for a list of the changes). Results for 2006 are presented in the table calculated both using the original and the revised unit assumptions.

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Blood analytes

10

Kerina Tull

Key findings

- This chapter presents findings on total and HDL-cholesterol and C-reactive protein (CRP), which were taken from a non-fasting blood sample collected during the nurse visit. These three blood analytes are explored because of their independent association with cardiovascular diseases (CVD). Total and HDL-cholesterol are used in predicting risk of developing CVD. Total cholesterol can be reduced by drug treatment, while the beneficial HDL-cholesterol is increased by exercise and reduced alcohol consumption. CRP is a marker for inflammation, a process involved in atherosclerosis ('furring' of the arteries due to a build up of calcium and fats in the artery wall).
- Mean levels of total cholesterol values were 5.3mmol/l for men and 5.4mmol/l for women. These levels increased from the ages of 16-64. After the age of 65, mean levels decreased, more so in men than in women. Since 1994, there has been a small but significant decrease in mean total cholesterol levels (by 0.5mmol/l in men and 0.6mmol/l in women).
- The proportion of men and women with raised cholesterol levels (5.0mmol/l or above) has decreased from 66% in men and women in 2003, to 57% in men and 61% in women in 2006.
- Mean levels of HDL-cholesterol have not changed significantly since 2003 in men or women (1.3mmol/l and 1.6mmol/l respectively in 2006). Men continue to have a significantly higher prevalence of low HDL-cholesterol (below 1.0mmol/l) than women. Since 2003, the prevalence of low HDL-cholesterol levels has increased significantly in men (from 6.3% to 9.4%) although there has been no significant change in women (1.8% in 2006).
- Mean HDL-cholesterol levels did not vary significantly across quintiles of equivalised household income in either sex. However, prevalence of low HDL-cholesterol levels rose as income fell, especially in women. Since 2003, the prevalence of low HDL-cholesterol levels in men in the lowest quintile has increased significantly from 9% to 14%, but remained at 4% in women.
- Mean CRP levels in men and women were 3.1 and 3.6 mg/l, respectively. Levels increased with age in men, ranging from 1.8mg/l in those aged 16-24 to 6.8mg/l in those aged 75 and over. The pattern was more varied in women.
- Mean CRP levels have not changed significantly between 2003 and 2006. However, the proportion of women with the highest levels (>4.9mg/l) decreased significantly from 21% to 19%. Raised CRP levels were found in 19% of men in 2006, unchanged since 2003.
- Mean CRP levels generally increased as income levels decreased. This pattern was clearer in men, whose levels increased by 2.2mg/l (from 2.3mg/l to 4.5mg/l from the highest to the lowest income quintiles), than in women, whose levels increased by 1.6mg/l (from 2.8mg/l to 4.4mg/l).
- Blood analyte levels were compared in those with CVD, in those with diabetes and/or hypertension (who are at high risk of developing CVD), and in those with none of these

diseases, among informants aged 35 and over. Mean total cholesterol levels in those with CVD and in those with hypertension and/or diabetes were highest in men aged 35-54 and in women aged 55-64.

- Looking at the newly revised treatment threshold for high CVD-risk individuals with cholesterol levels of 4mmol/l, it was those who had not been diagnosed with CVD, diabetes and/or hypertension who were most likely to have cholesterol levels over this threshold. This was especially the case for those aged 55 and over.
- For men, mean CRP was higher in those with CVD (5.5mg/l) than in those with hypertension and/or diabetes but no CVD (3.5mg/l) or those with none of these diseases (2.8mg/l). There were no significant differences in CRP levels in women according to disease status.

10.1 Introduction

This chapter presents findings on three of the blood analytes measured from a non-fasting blood sample collected during the nurse visit. Information about glycated haemoglobin, a measure of longer-term glucose levels, has been presented in Chapter 4 of this volume, alongside information on diabetes. Among the analytes measured in HSE 2006 were total cholesterol, high-density lipoprotein cholesterol (HDL-cholesterol), and C-reactive protein (CRP).

10.1.1 Total and HDL-Cholesterol

Total cholesterol comprises three components: LDL-cholesterol (low density lipoprotein); VLDL-cholesterol (very low density lipoprotein), and HDL-cholesterol (high density lipoprotein). The majority of the cholesterol in the blood is carried as LDL-cholesterol. It is this that contributes to atherosclerosis ('furring' of the arteries). VLDL-cholesterol is involved in clearing fat from the bowel after eating. HDL-cholesterol carries cholesterol away from the arteries back to the liver and is considered to be beneficial or 'good' cholesterol. These are some of the principal fats in the blood, which are also referred to as lipids.

High total and LDL-cholesterol as well as low HDL-cholesterol are widely documented as risk factors for cardiovascular disease (CVD, i.e. angina, heart attack, stroke or other heart condition).[1,2,3] The development of statins (lipid-lowering drugs) has enabled effective reduction in LDL-, and therefore total, cholesterol levels, with resulting reductions not only in cardiovascular but also in overall mortality.[4] Cholesterol reduction is of benefit in both primary[5] and secondary[6,7] prevention of ischaemic heart disease (IHD, angina or heart attack) and strokes.[8]

In 2000 the National Institute of Health and Clinical Excellence (NICE) published guidelines for those with, or at high risk of developing, cardiovascular disease, giving a treatment threshold for total cholesterol of 5.0mmol/l.[9] The Joint British Societies produced their second national treatment guidelines (JBS 2) for those at risk of CVD in December 2005.[10] A lower cholesterol value was recommended for high risk individuals (at or below 4.0mmol/l, instead of 5.0mmol/l). Therefore the analysis presented here explores cholesterol levels in relation to both these thresholds in those already diagnosed with CVD, as well as those at particular risk of CVD because they have other conditions, specifically hypertension and/or diabetes.

10.1.2 C-reactive protein (CRP)

The search for greater understanding of the aetiology of CVD, particularly in epidemiological studies, has produced multiple serum markers as candidates for indicating 'non-traditional' risk. Several are part of the process of inflammation, a process now understood to be central to atherosclerotic disease.[11] Recently, better understanding of the role of inflammation in atherosclerosis has prompted many to propose the measurement of various inflammatory markers to identify more effectively those who are at increased risk of CVD.[12] Therefore, results are reported for one such marker, C-reactive protein (CRP), which was first measured in HSE 1998.

CRP is an acute-phase reactant which is synthesized in the liver in response to the pro-inflammatory protein interleukin 6 (IL-6). Research has also implicated CRP in the development of diabetes[13] and hypertension,[14] despite differences in mean CRP levels in men and women. CRP also appears to bind LDL-cholesterol in vitro, which suggests a direct interaction with the atherogenic lipids.[15] In the US, the first set of guidelines endorsing use of high-specificity CRP (hsCRP) in risk factor screening for CVD were produced in 2003,[16] but CRP is not currently included in screening in the UK.[10]

10.2 Methods and definitions

10.2.1 Methods

Following written consent from eligible informants, three non-fasting blood samples (6 ml plain, 4 ml EDTA, and 4.5 ml citrate tubes) were collected for adults aged 16 and over by survey nurses. After collection the tubes were despatched to the Department of Clinical Biochemistry at the Royal Victoria Infirmary (RVI) Newcastle for analysis and storage, where relevant. In addition to the three analytes discussed in this chapter, and glycated haemoglobin reported in Chapter 4 of this volume, blood was also analysed for fibrinogen, ferritin and total haemoglobin. Details of laboratory techniques and Internal and External Quality Control tables can be found in Chapter 9, Volume 3, Methodology and documentation of this report. Information on other analytes analysed but not reported (ferrritin, fibrinogen, haemoglobin) is available from the Data Archive at the University of Essex.[17]

All blood data from 2003 onwards have been weighted for non-response, with a weight specifically applied to those who gave a blood sample (see Chapter 7, Volume 3 for more information).

10.2.2 Definitions

For total cholesterol the definition of raised cholesterol was 5.0mmol/l or above.[9] For those at high risk of CVD, or those with established CVD, the new recommended cut-off of 4.0mmol/l or above has also been used.[10]

A low HDL-cholesterol level was defined as less than 1.0mmol/l.

To identify men and women with particularly high or low levels of CRP, sex-specific quintiles based on the quintile thresholds from HSE 1998 have been used. 'High' CRP is defined as a level greater than the sex-specific threshold for the top quintile in 1998, i.e. above 3.7mg/l in men and above 4.9mg/l in women, and is indicative of increased risk of CVD.

The results for cholesterol generally include the informants who were taking lipid-lowering drugs. The analysis by disease category shows the cholesterol levels for all informants and also results excluding those currently taking lipid-lowering drugs.

10.3 Results

10.3.1 Response to non-fasting blood samples and proportion of valid samples for each analyte

A valid non-fasting blood sample was obtained from 74% of men and 71% of women who had a nurse visit. The remainder of the informants either refused to give a blood sample or the nurse was unable to obtain a sample from them. As in previous surveys, the proportion who gave a blood sample was lower in informants aged 16-24 (65% in men and 57% in women) than in older informants. **Tables 10.1, 10.2**

10.3.2 Cholesterol and CRP levels by age and sex

Mean levels of total and HDL-cholesterol and of CRP, along with prevalence of raised total cholesterol, low HDL-cholesterol, and CRP above the sex-specific threshold for the highest quintile are given in Tables 10.3-10.5, 10.8-10.10 and 10.12-10.14. Prevalence of raised levels for these analytes is shown in figures A, B, and C.

Figure 10A

Prevalence of raised total cholesterol (5mmol/l or above), by age and sex

Base: Aged 16 and over with a valid total cholesterol measurement

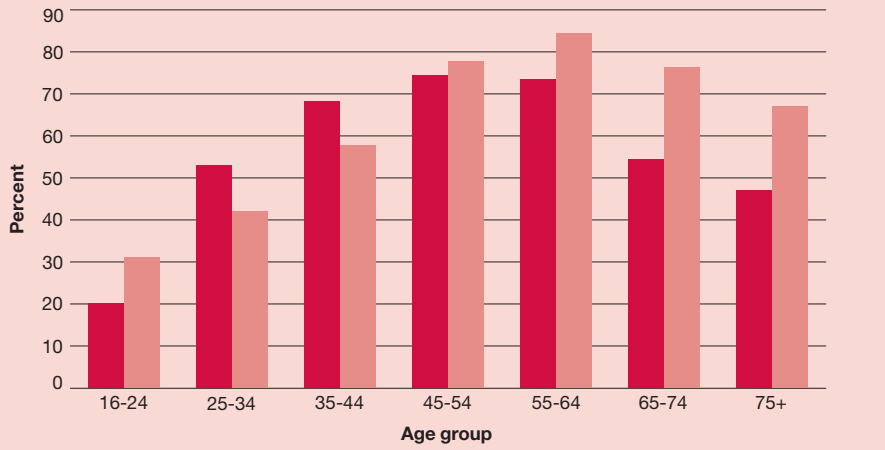


Figure 10B

Prevalence of HDL-cholesterol below 1mmol/l, by age and sex

Base: Aged 16 and over with a valid HDL-cholesterol measurement

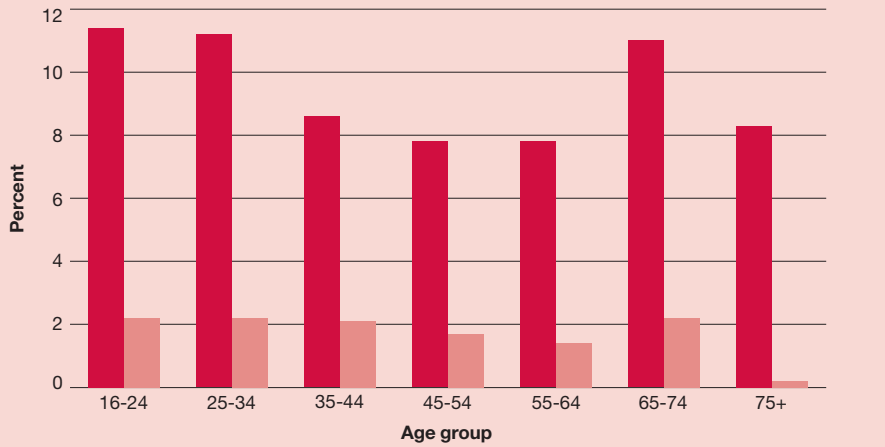
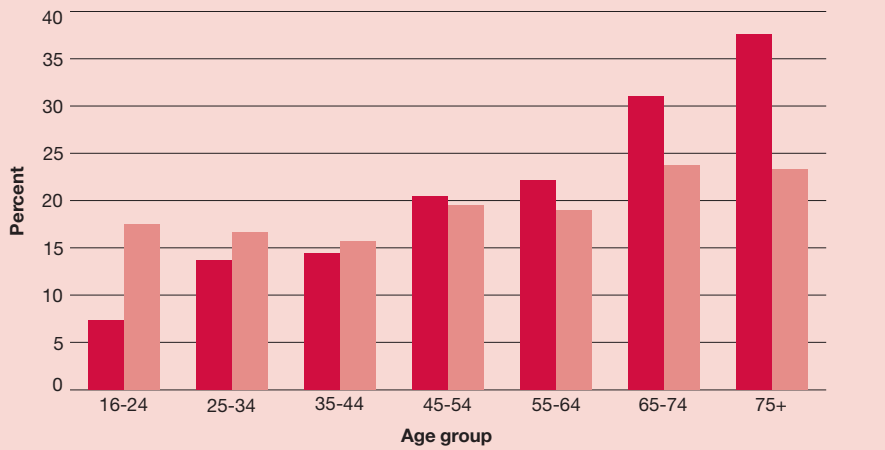


Figure 10C

Prevalence of C-reactive protein above sex-specific threshold for highest quintile, by age and sex

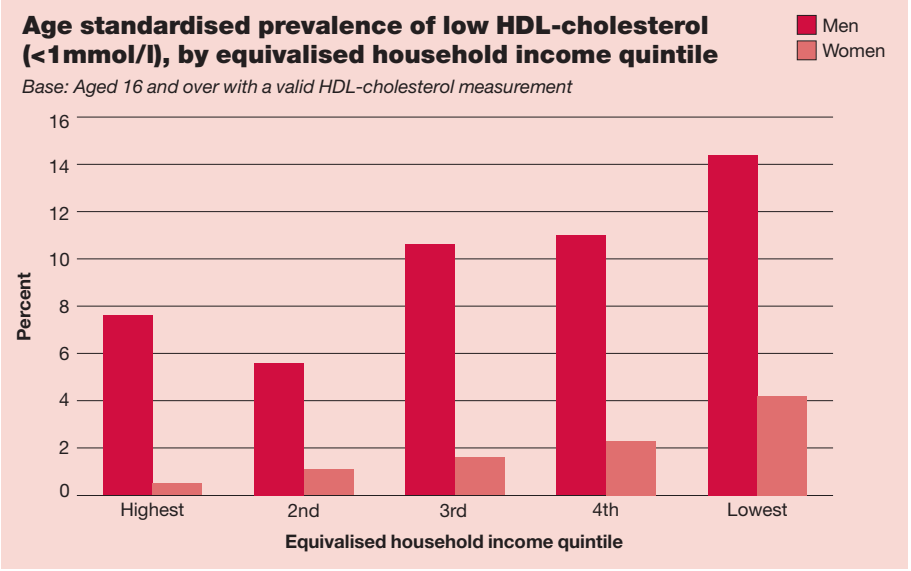
Base: Aged 16 and over with a valid C-reactive protein measurement



10.3.3 Cholesterol and CRP levels by equivalised household income

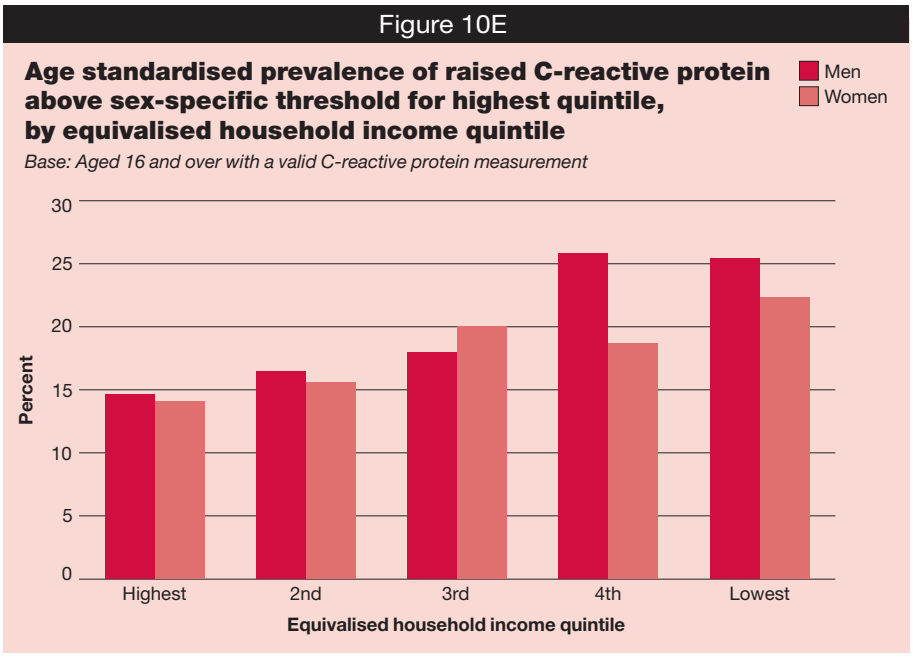
There were variations according to quintile of equivalised household income for both HDL-cholesterol and CRP. While mean HDL-cholesterol levels were similar across income quintiles, the prevalence of low HDL-cholesterol increased in both sexes as income levels decreased, although the relationship was seen more strongly in women. However, no clear pattern was found for either sex for the relationship between mean or raised total cholesterol levels and income.

Figure 10D



Mean CRP was inversely related to equivalised household income quintile. This pattern was clearer in men, whose levels increased by 2.2mg/l (from 2.3mg/l to 4.5mg/l from the highest to the lowest income quintiles), than in women, whose levels increased by 1.6mg/l (from 2.8mg/l to 4.4mg/l). The same pattern was apparent with prevalence of raised CRP levels, with the highest proportions with raised levels in the lowest two income quintiles in men, and in the lowest quintile in women.

Figure 10E



10.3.4 Relationship between blood analyte levels and disease status

Blood analyte levels were compared in those with CVD, in those with diabetes and/or hypertension (who are at high risk of developing CVD), and in those with none of these

diseases, among informants aged 35 and over. Prevalence of the diseases examined is low among those under 35, and therefore the results are not presented here.

Informants were divided into three groups. The first group was those reporting existing doctor-diagnosed CVD (see Chapter 2). This group is at the highest risk of experiencing further episodes of the same or another CVD and of dying from CVD. The National Service Framework for Coronary Heart Disease (CHD, heart attack including myocardial infarction) pays particular attention to secondary prevention in those with existing disease.[18] For this analysis, individuals with self-reported diabetes or survey-defined hypertension were excluded from that first group. The second group were those with self-reported doctor-diagnosed diabetes (see Chapter 4) and/or survey-defined hypertension (see Chapter 3) but no other CVD. Such individuals are also at high risk of CVD although they are at lower risk than those who have already developed CVD. The third group had none of these diseases. These analyses therefore excluded informants who had not been asked the cardiovascular disease module in the interview; the first and third group also excluded informants who did not have a valid blood pressure measurement. Thus not all informants were included in this analysis. The three groups were defined in this way to highlight differences in blood analytes and effects of lipid-lowering drug use on the two specific high risk groups in comparison with each other and with those without these diseases.

Total cholesterol

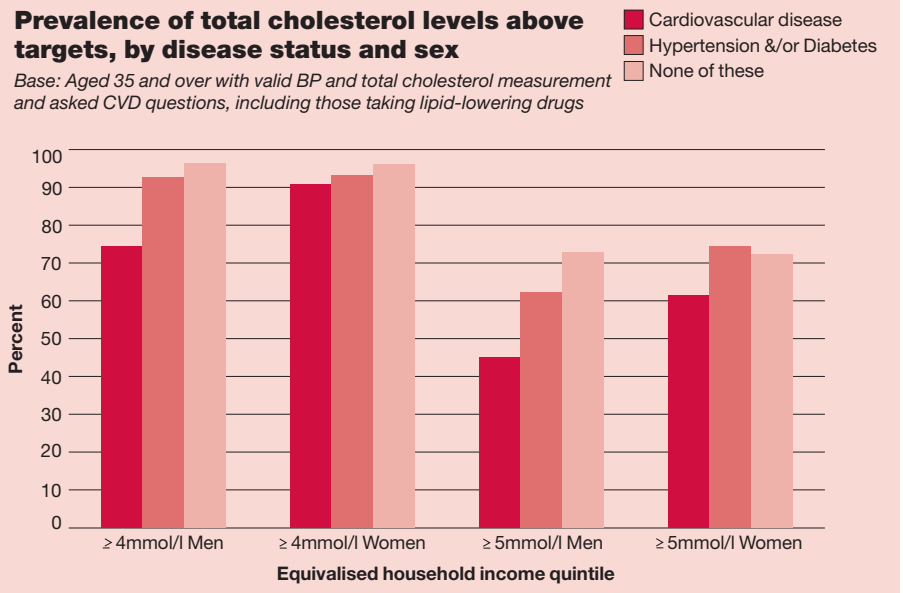
Mean total cholesterol levels in those with CVD and in those with hypertension and/or diabetes were highest in men aged 35-54 and in women aged 55-64. This reflects the known mortality patterns of CVD: men develop and die from CVD at an earlier age than women, so the fall in mean cholesterol is probably due to a combination of premature death occurring soonest in those with the highest cholesterol levels and targeted use of statins in those with or at high risk of developing CVD.

If those taking lipid-lowering drugs are included in the analyses, the proportion with cholesterol levels at or above the newly revised treatment threshold of 4mmol/l was highest among informants without doctor-diagnosed CVD, hypertension or diabetes, for both sexes. Again this probably reflects selective use of statins.

Figure 10F

Prevalence of total cholesterol levels above targets, by disease status and sex

Base: Aged 35 and over with valid BP and total cholesterol measurement and asked CVD questions, including those taking lipid-lowering drugs



If those on lipid-lowering drugs are excluded, there was little difference in the proportion with cholesterol levels above the threshold of 4mmol/l, whether informants had CVD, hypertension or diabetes, or none of these conditions. **Table 10.7**

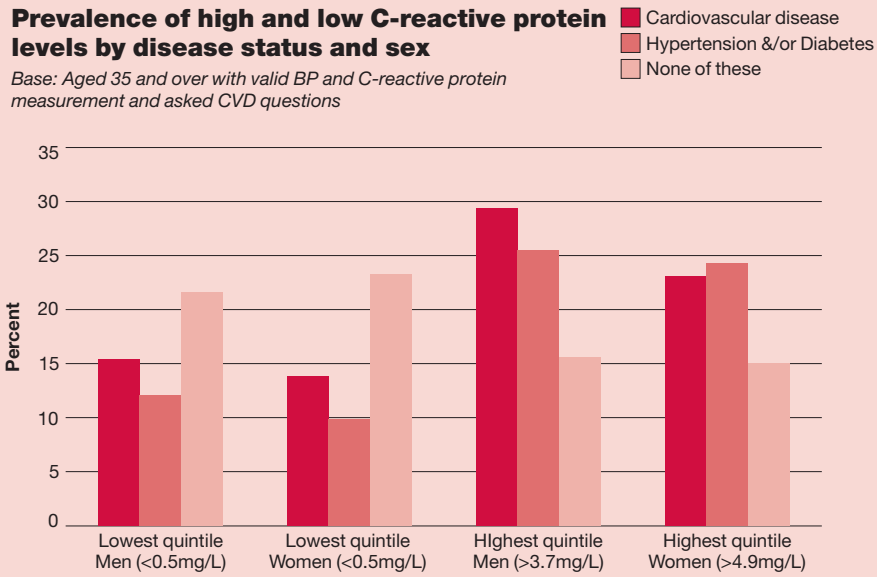
CRP

As levels of CRP have been indicated in predicting CVD, similar analyses were also conducted for CRP. For men, mean CRP was highest in those with CVD (5.5mg/l), lower in those with hypertension and/or diabetes (3.5mg/l), and lowest in those without these diseases (2.8mg/ml). Although levels in women were highest in those with hypertension and/or diabetes (4.3mg/l), the differences between groups were not significant. **Table 10.16**

Figure 10G

Prevalence of high and low C-reactive protein levels by disease status and sex

Base: Aged 35 and over with valid BP and C-reactive protein measurement and asked CVD questions



10.4 Discussion

10.4.1 Trends over time

From 2003 to 2006 mean CRP values have remained the same in men (3.1mg/l in both years). The prevalence of HDL-cholesterol levels below 1.0mmol/l has increased significantly in men since 2003 (from 6.3% to 9.4%). Among women, both mean CRP level and prevalence of low HDL-cholesterol have not changed significantly.

Since 1994, although mean total cholesterol levels have not changed significantly in HSE participants, the prevalence of levels above 5.0mmol/l has decreased significantly in both sexes (from 74% to 57% in men, and from 77% to 61% in women). This may be due to other lifestyle changes, such as increased physical activity (Chapter 6) and improved diet (Chapter 7), although this is unlikely, given the rise in obesity (Chapter 5). However, as CRP and HDL-cholesterol levels have not changed, the more likely explanation is the large increase in the use of lipid-lowering drugs, discussed in Chapter 3 and in section 10.4.3 below.

10.4.2 Income inequalities

The most likely explanation for the lack of pattern in mean or raised total cholesterol levels by equivalised household income is that lipid-lowering treatment is affecting the relationship. In 2003, there were no clear differences in the prevalence of raised total cholesterol or in mean HDL-cholesterol by income. However, the age-standardised prevalence of low HDL-cholesterol among men and women increased as income decreased and was highest in the lowest income quintile. These results show that those from lower income groups are more susceptible to risk of CVD, possibly due to their diet and lifestyle choices. The same conclusions can be made using results from the HSE 2006. Similarly, CRP levels were higher in those with lower incomes, mirroring the pattern found for CVD (Chapter 2 of this volume).

10.4.3 Use of lipid-lowering drugs

Coronary heart disease is a preventable disease that kills more than 110,000 people in England every year.[19] More than 1.4 million people suffer from angina and 275,000 people have a heart attack annually.[19] The Government is aiming to reduce the death rate from coronary heart disease, stroke and related diseases in people aged under 75 by at least 40% (to 83.8 deaths per 100,000 population) by 2010.[19]

Since the HSE 2003, guidelines have changed. Previous advice was to use lipid-lowering drugs and dietary advice to lower total cholesterol concentrations to less than 5.0mmol/l, or LDL-cholesterol by 30% (whichever is greater), in people with or at high risk of developing ischaemic heart disease. Current advice, introduced in 2005, is to reduce total cholesterol to less than 4.0mmol/l or achieve a 25% reduction in LDL-cholesterol, and to increase HDL-cholesterol to above 1.15mmol/l, in people with or at high risk of developing CVD.[10] This change in treatment guidance was due to increasing evidence of the benefits of cholesterol reduction without evidence of a lower threshold.[20] NICE is currently developing Clinical Guidance for the primary and secondary prevention of CVD. This is due for publication in January 2008.[21]

Use of lipid-lowering drugs, primarily statin therapy, is recommended for adults with clinical evidence of CVD. This acts as part of the management strategy of their disease, as well as for the primary prevention of CVD for adults who have a 20% or greater 10-year risk of developing CVD.[9] This level of CVD risk should be estimated using an appropriate risk-calculator, or by clinical assessment for people for whom an appropriate risk-calculator is not available (for example, older people, those with diabetes or people in high-risk ethnic groups such as those from the South Asian population).[9]

HSE 2006 results for prevalence of total cholesterol of 4mmol/l or above by disease category show that the lowest prevalence occurred among those reporting existing CVD conditions. Prevalence was higher among informants with hypertension or diabetes who did not have CVD but were at higher risk of developing CVD, and the highest prevalence was among the informants without these diseases. These results show that there is already some targeting of those at risk of CVD with statins, as differences in the prevalence of raised levels and in mean values of cholesterol disappear when those taking lipid-lowering drugs are excluded. The use of statin therapy appears to be effective in lowering cholesterol levels.

The prevalence of the use of lipid-lowering drugs by disease category is shown elsewhere (see Chapter 2: CVD, Table 2.8 in this volume). Use of these drugs has been increasing steadily in recent years. Routine data from general practices in 2004-2005 also found an increase in prescribing statins in areas of greater deprivation.[22] The Heart Protection Study showed that the benefits of statins extended to a wide range of patients at risk from cardiovascular events, including hypertension and diabetes in men aged 65 and over.[23,24] In January 2006, NICE published its Health Technology Appraisal (HTA) of statins which found that they were both clinically and cost effective for patients at risk of developing CVD. This may encourage GPs to identify and treat people at moderate risk, with the potential for cutting the incidence of CVD in their local populations.[25] NICE estimates that the HTA made a further 3.3 million people eligible for statin treatment on the NHS.

However, there is controversy about use of lipid-lowering drugs, although a recent review confirmed that statins decrease mortality without increasing deaths from other causes.[26] Experts argue that research evidence does not show any particular benefit for certain low-risk groups, e.g. women without history of heart disease. Side-effects, such as damage to muscles or the kidneys,[27] are also a concern but are infrequent.

HSE 2006 results presented here show that although the prevalence of raised cholesterol levels is falling, cholesterol levels remain higher than recommended among many with, or at high risk of developing, CVD. While support needs to be provided for lifestyle changes, drugs budgets will need to reflect the potential benefits from greater use of statins among these high risk groups, such as those with existing IHD or stroke, and those with hypertension and/or diabetes. More effective nutritional policies to reduce serum

cholesterol at a population level, and to reduce the requirement for statins in primary prevention, should also be considered.

10.4.4 CRP as a predictor of CVD risk

Since 2003, mean CRP levels have remained constant in men and women. The lack of change in this inflammatory marker during this timeframe may reflect the fact that overall risk is determined by a combination of factors, including smoking (Chapter 8) or obesity (Chapter 5), as well as having hypertension (Chapter 3) or diabetes (Chapter 4).

CRP levels are affected by long-term use of lipid-lowering drugs.[28] A systematic review exploring the effect of statins on non-lipid markers has found that all statins significantly lower CRP levels, regardless of the dose used.[29] The American Heart Association and the Centers for Disease Control (AHA/CDC) released new recommendations in 2003 for doctors in the United States on the testing of CRP levels. Since then, there has been a call for CRP to be used as a global risk predictor in both men and women.[30] The AHA/CDC recommendations specify that 'high-specificity CRP' (hsCRP) levels should be assessed, with high levels indicating an increased risk of cardiovascular events.

Although national guidelines regarding the clinical utility of hsCRP in primary and secondary prevention settings have been issued in the United States, the same is not the case in the United Kingdom at present. Debate as to whether it should be included as a predictive tool arises from three major points:

- It is not known whether CRP levels themselves are causing a problem, or instead whether they are merely a marker for increased risk;
- Therapy that clearly and reliably reduces CRP levels has yet to be identified; and
- It is not clear that reducing CRP levels reduce the risk of cardiovascular events.

In HSE 2006, mean CRP levels were high for both men and women overall, but considerably higher in men with CVD. The mean CRP level in men with CVD was 5.5mg/l (above the threshold for the highest quintile of CRP levels, 3.7mg/l). In women with CVD, the mean CRP level was 3.6mg/l, the same as the mean for all women (which lies within the fourth highest CRP quintile for women). American follow-up research on 20,000 participants of the Women's Health Survey compared use of CRP and LDL-cholesterol in diagnosing those at risk of CVD. Women with high CRP but normal LDL-cholesterol apparently had a higher risk than those with normal CRP and high LDL-cholesterol. These findings suggest that high CRP levels may help to identify high-risk patients who would be 'missed' by measuring cholesterol levels alone.[31] Despite the findings of the Women's Health Survey, a recent critical review of literature of risk prediction[32] concluded that more research is necessary before this decision can be made, as CRP levels were found to contribute little further risk discrimination than the established score for risk prevention derived from the long-running American Framingham Heart Study cohort.[33]

References and notes

1 Kannel WB, Dawber TR, Friedman GD et al. *Risk factors in coronary heart disease. An evaluation of several serum lipids as predictors of coronary heart disease; the Framingham study*. Ann Intern Med. 1964; 61: 888-899.

2 Stamler J, Vaccaro O, Neaton JD, Wentworth D, for the Multiple Risk Factor Intervention Trial Group. *Diabetes, other risk factors, and 12-year cardiovascular mortality for men screened in the Multiple Risk Factor Intervention Trial*. Diabetes Care. 1993; **16**: 434-444.

3 Smith GD, Shipley MJ, Marmot MG, Rose G. *Plasma cholesterol concentration and mortality*. The Whitehall Study. JAMA. 1992; **267**: 70-6.

4 Law MR, Thompson SG, Wald NJ. *Assessing possible hazards of reducing serum cholesterol*. BMJ. 1994; **308**: 373-379.

5 Shepherd J, Cobbe SM, Ford I et al for the West of Scotland Coronary Prevention Study Group (WOSCOPS). *Prevention of coronary heart disease with pravastatin in men with hypercholesterolaemia*. N.Engl.J.Med. 1995; **333**:1301-1307.

6 Scandinavian Simvastatin Survival Study Group. *Randomised trial of cholesterol lowering in 4444 patients with coronary heart disease: the Scandinavian Simvastatin Survival Study (4S)*. Lancet. 1994: **344**: 1383-1389.

7 Heart Protection Study Collaborative Group. *Effect of cholesterol-lowering with simvastatin on stroke and other major vascular events in 20,536 people with cerebrovascular disease or other high-risk conditions*. Lancet. 2004; **363**: 757-767.

8 Cholesterol Treatment Trialists' Collaborators. *Efficacy and safety of cholesterol-lowering treatment: prospective meta-analysis of data from 90,056 participants in 14 randomised trials of statins*. Lancet. 2005; **366**: 1267-1278.

9 National Institute for Health and Clinical Excellence. *Statins for the prevention of cardiovascular events. Technical appraisal 094*. NICE, London, 2006.

10 British Cardiac Society, British Hypertension Society, Diabetes UK, HEART UK, Primary Care Cardiovascular Society, The Stroke Association. JBS 2: *Joint British Societies' guidelines on prevention of cardiovascular disease in clinical practice.* Heart. 2005; 91 (Suppl V):v1-v52.

11 Libby P, Ridker PM, Maseri A. *Inflammation and Atherosclerosis*. Circulation. 2002; **105**:1135.

12 de Ferranti S, Rifai N. *C-reactive protein and cardiovascular disease: a review of risk prediction and interventions*. Clin Chim Acta. 2002; **317**: 1-15.

13 Laaksonen DE, Niskanen L, Nyyssönen K et al. *C-reactive protein and the development of the metabolic syndrome and diabetes in middle-aged men*. Diabetologia. 2004; **47**: 1403–1410.

14 Sesso HD, Buring JE, Rifai N et al. *C-reactive protein and the risk of developing hypertension*. JAMA. 2003; **290**: 2945-2951.

15 Zhang YX, Cliff WJ, Schoefl GI, Higgins G. *Coronary C-reactive protein distribution: its relation to development of atherosclerosis*. Atherosclerosis. 1999; **145**: 375-379.

16 Pearson TA, Mensah GA, Alexander RW et al. *Markers of inflammation and cardiovascular disease: application to clinical and public health practice. A statement for healthcare professionals from the Centers for Disease Control and Prevention and the American Heart Association*. Circulation. 2003; **107**: 499–511.

17 Data Archive at the University of Essex: www.dataarchive.ac.uk

18 National Service Framework for Coronary Heart Disease. *Modern Standards and Service Models*. Department of Health, London, 2000.

19 Department of Health. *Coronary Heart Disease*. Department of Health, London, 2006 [Online http://www.dh.gov.uk/en/Policyandguidance/Healthandsocialcaretopics/Coronaryheartdisease/index.htm] [Accessed August 2007].

20 Chen Z, Peto R, Collins R et al. *Serum cholesterol concentration and coronary heart disease in population with low cholesterol concentrations*. BMJ. 1991; **303**: 276-282.

21 National Institute for Health and Clinical Excellence (NICE). *Quick reference guide. MI: secondary prevention. Secondary prevention in primary and secondary care for patients following a myocardial infarction*. NICE, London, 2007.

22 Ashworth M, Lloyd D, Smith RS et al. *Social deprivation and statin prescribing: a cross-sectional analysis using data from the new UK general practitioner 'Quality and Outcomes Framework'*. J Public Health. 2007; **29**(1): 40-47.

23 MRC/BHF Heart Protection Study Collaborative Group. *MRC/BHF Heart Protection Study of cholesterol-lowering therapy and of antioxidant vitamin supplementation in a wide range of patients at increased risk of coronary heart disease death: early safety and efficacy experience*. Eur Heart J. 1999; **20**: 725-741.

24 MRC/BHF Heart Protection Study Collaborative Group. *MRC/BHF Heart protection Study of cholesterol lowering with simvastatin in 20536 high risk individuals: a randomised controlled trial*. Lancet. 2002; **360**: 7-22.

25 National Service Framework for Coronary Heart Disease. *Shaping the Future- Progress report for 2006*. Department of Health, London, 2007.

26 Cheung BMY, Lauder IJ, Lau C-P, Kumana CR. *Meta-analysis of large randomized controlled trials to evaluate the impact of statins on cardiovascular outcomes*. Br J Clin Pharmacol. 2004; **57**(5): 640-651.

27 Maron DJ, Fazio S, Linton MF. *Current perspectives on statins*. Circulation. 2000; **101**: 207-213.

28 Ridker PM, Rifai N, Pfeffer MA et al. *Long-term effects of Pravastatin on plasma concentration of C-reactive protein*. Circulation. 1999; **100**: 230-235.

29 Balk EM, Lau J, Goudas LC et al. *Effects of statins on nonlipid serum markers associated with cardiovascular disease*. Ann Intern Med. 2003; **139**: 670-682.

30 Ridker PM, Wilson PWF, Grundy SM. *Should C-reactive protein be added to metabolic syndrome and to assessment of global cardiovascular risk?* Circulation. 2004; **109**: 2818-2825.

31 Ridker PM, Rifai N, Rose L et al. *Comparison of c-reactive protein and low-density lipoprotein cholesterol levels in the prediction of first cardiovascular events*. N Engl J Med. 2002; **347**(20): 1557-1565.

32 Lloyd-Jones DM, Liu K, Tian L, Greenland P. *Narrative review: assessment of C-reactive protein in risk prediction for cardiovascular disease*. Ann Intern Med. 2006; **145**(1): 35-42.

33 Dawber TR, Meadors GF, Moore FE. *Epidemiological approaches to heart disease: The Framingham Study*. Am. J. Public Health. 1951; **41**(3): 279–281.

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Table 10.1

Response rates to blood sample, by age and sex

Aged 16 and over who had a nurse visit *2006*

Response to blood sample	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Valid non-fasting blood sample taken	65	75	78	78	79	74	64	74
Agreed, not obtained	3	3	3	4	4	5	6	4
Refused	28	19	15	14	11	11	12	16
Not applicable[a]	4	4	5	4	6	10	17	6
Women								
Valid non-fasting blood sample taken	57	66	73	80	80	78	65	71
Agreed, not obtained	6	4	5	6	5	6	6	6
Refused	31	18	14	11	10	11	18	16
Not applicable[a]	6	12	7	3	5	5	11	7
Bases (unweighted)								
Men	*431*	*585*	*889*	*797*	*882*	*666*	*458*	*4708*
Women	*536*	*800*	*1158*	*972*	*996*	*717*	*602*	*5781*
Bases (weighted)								
Men	*769*	*833*	*1005*	*832*	*754*	*516*	*368*	*5076*
Women	*752*	*858*	*1023*	*843*	*778*	*569*	*594*	*5418*

[a] Pregnant, on anticoagulants or had fits in the past.

Table 10.2

Proportion providing valid samples for each analyte, by age and sex

Aged 16 and over who had a nurse visit *2006*

Blood analytes	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Total cholesterol	62	72	76	75	77	72	61	72
HDL-cholesterol	62	72	76	75	77	72	61	72
C-reactive protein	62	72	76	75	77	72	61	72
Glycated haemoglobin	61	71	74	74	76	71	62	71
Fibrinogen	60	70	72	72	75	70	60	69
Women								
Total cholesterol	55	64	70	78	77	76	63	69
HDL-cholesterol	55	64	70	78	77	76	63	69
C-reactive protein	55	64	70	78	77	76	63	69
Glycated haemoglobin	54	62	69	77	76	75	63	68
Fibrinogen	52	62	67	75	74	72	61	66
Bases (unweighted)								
Men	*431*	*585*	*889*	*797*	*882*	*666*	*458*	*4708*
Women	*536*	*800*	*1158*	*972*	*996*	*717*	*602*	*5781*
Bases (weighted)								
Men	*769*	*833*	*1005*	*832*	*754*	*516*	*368*	*5076*
Women	*752*	*858*	*1023*	*843*	*778*	*569*	*594*	*5418*

Table 10.3

Total cholesterol levels, by age and sex

Aged 16 and over with a valid total cholesterol measurement *2006*

Blood cholesterol (mmol/l)	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
Men								
Mean[a] (mmol/l)	4.4	5.1	5.6	5.7	5.6	5.2	4.9	5.3
Standard error of the mean	0.05	0.05	0.04	0.05	0.04	0.06	0.07	0.02
10th percentile (mmol/l)	3.4	3.9	4.3	4.3	4.2	3.6	3.5	3.9
90th percentile (mmol/l)	5.5	6.6	7.0	7.2	7.1	6.8	6.5	6.8
% ≥5.0 mmol/l	20	53	68	74	73	54	47	57
Women								
Mean[a] (mmol/l)	4.6	4.9	5.2	5.7	6.1	5.9	5.6	5.4
Standard error of the mean	0.05	0.04	0.03	0.04	0.04	0.05	0.07	0.02
10th percentile (mmol/l)	3.6	3.8	4.1	4.5	4.6	4.2	4.0	4.0
90th percentile (mmol/l)	5.6	6.2	6.4	6.9	7.5	7.4	7.2	6.9
% ≥5.0 mmol/l	31	42	58	78	84	76	67	61
Bases (unweighted)								
Men	*265*	*417*	*681*	*604*	*682*	*480*	*281*	*3410*
Women	*291*	*512*	*817*	*753*	*764*	*545*	*379*	*4061*
Bases (weighted)								
Men	*549*	*589*	*727*	*593*	*537*	*366*	*257*	*3618*
Women	*525*	*620*	*721*	*606*	*554*	*408*	*417*	*3850*

[a] Including those taking lipid-lowering drugs.

Table 10.4

Total cholesterol (observed and age-standardised), by Government Office Region/Strategic Health Authority[a] and sex

Aged 16 and over with a valid total cholesterol measurement — *2006*

Total cholesterol (mmol/l)	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
Men											
Observed											
Mean[b] (mmol/l)	5.3	5.3	5.4	5.2	5.2	5.3	5.1	5.3	5.3	5.3	5.4
Standard error of the mean	0.10	0.05	0.07	0.10	0.08	0.07	0.06	0.08	0.05	0.08	0.06
10th percentile (mmol/l)	3.8	3.8	3.9	3.8	3.8	3.8	3.7	3.9	4.0	3.9	4.1
90th percentile (mmol/l)	6.8	6.9	6.9	6.7	6.6	7.1	6.7	6.8	6.8	6.8	6.8
% ≥5.0 mmol/l	58	59	62	52	59	58	50	58	61	59	63
Standardised											
Mean[b] (mmol/l)	5.3	5.3	5.4	5.2	5.2	5.3	5.2	5.2	5.3	5.2	5.3
Standard error of the mean	0.10	0.06	0.07	0.08	0.08	0.07	0.06	0.09	0.06	0.08	0.07
10th percentile (mmol/l)	3.8	3.8	3.9	3.8	3.8	3.8	3.8	3.8	4.0	3.9	4.0
90th percentile (mmol/l)	6.8	6.9	6.9	6.7	6.5	7.2	6.7	6.8	6.8	6.8	6.7
% ≥5.0 mmol/l	59	57	62	54	60	58	52	56	59	59	59
Women											
Observed											
Mean[b] (mmol/l)	5.5	5.4	5.3	5.5	5.3	5.5	5.1	5.5	5.5	5.5	5.4
Standard error of the mean	0.09	0.04	0.05	0.06	0.05	0.05	0.07	0.07	0.05	0.07	0.07
10th percentile (mmol/l)	4.0	4.0	4.0	4.0	4.0	4.0	3.9	4.1	4.0	4.1	4.0
90th percentile (mmol/l)	7.1	7.0	6.8	6.9	6.9	7.1	6.6	7.0	7.0	7.1	6.9
% ≥5.0 mmol/l	62	62	59	63	60	62	54	68	64	64	64
Standardised											
Mean[b] (mmol/l)	5.4	5.4	5.4	5.4	5.3	5.4	5.3	5.4	5.4	5.5	5.4
Standard error of the mean	0.10	0.05	0.05	0.06	0.05	0.05	0.08	0.08	0.05	0.07	0.07
10th percentile (mmol/l)	3.9	4.0	4.0	4.0	4.0	4.0	3.9	4.1	4.0	4.1	4.0
90th percentile (mmol/l)	7.1	7.0	6.8	6.9	6.9	7.0	6.7	7.0	7.0	7.1	6.8
% ≥5.0 mmol/l	61	61	61	60	60	61	58	66	63	65	62
Bases (unweighted)											
Men	*190*	*521*	*383*	*328*	*378*	*410*	*296*	*303*	*601*	*312*	*289*
Women	*224*	*639*	*448*	*387*	*477*	*411*	*334*	*404*	*737*	*419*	*318*
Bases (weighted)											
Men	*178*	*475*	*363*	*339*	*375*	*435*	*536*	*343*	*575*	*312*	*263*
Women	*197*	*549*	*389*	*323*	*425*	*393*	*530*	*401*	*644*	*374*	*269*

[a] This table provides data for regional analysis both by Government Office Region (GOR) and the new configuration of Strategic Health Authorities (SHAs) in place from July 2006. The first eight columns represent GORs and SHAs of the same name, while the South East GOR (column nine) is divided into South East Coast SHA and South Central SHA, shown in the final two columns.

[b] Including those taking lipid-lowering drugs.

Table 10.5

Total cholesterol (age-standardised), by equivalised household income and sex

Aged 16 and over with a valid total cholesterol measurement *2006*

Total cholesterol (mmol/l)	Equivalised household income quintile				
	Highest	2nd	3rd	4th	Lowest
Men					
Mean[a] (mmol/l)	5.3	5.4	5.2	5.3	5.2
Standard error of the mean	0.06	0.05	0.05	0.06	0.07
10th percentile (mmol/l)	3.8	4.0	3.9	3.9	3.8
90th percentile (mmol/l)	6.9	6.8	6.7	6.9	6.7
% ≥5.0 mmol/l	59	60	57	58	53
Women					
Mean[a] (mmol/l)	5.5	5.4	5.5	5.3	5.4
Standard error of the mean	0.07	0.05	0.05	0.05	0.05
10th percentile (mmol/l)	4.1	4.1	4.0	3.9	4.0
90th percentile (mmol/l)	7.1	6.9	7.0	6.9	7.0
% ≥5.0 mmol/l	64	60	64	58	64
Bases (unweighted)					
Men	*720*	*697*	*605*	*488*	*376*
Women	*708*	*724*	*732*	*731*	*515*
Bases (weighted)					
Men	*721*	*737*	*601*	*494*	*430*
Women	*636*	*659*	*662*	*692*	*533*

[a] Including those taking lipid-lowering drugs.

Table 10.6

Trends in total cholesterol levels 1994-2006, by sex

Aged 16 and over with a valid total cholesterol measurement *1994, 1998, 2003, 2006*

Total cholesterol (mmol/l)	Survey year				
	1994	1998	2003	2003[a]	2006
Men					
Mean[b] (mmol/l)	5.8	5.5	5.6	5.5	5.3
Standard error of the mean	0.02	0.02	0.05	0.02	0.02
10th percentile (mmol/l)	4.3	4.1	4.1	4.0	3.9
90th percentile (mmol/l)	7.4	6.9	7.1	7.0	6.8
% ≥5.0 mmol/l	74	66	70	66	57
Women					
Mean[b] (mmol/l)	6.0	5.6	5.7	5.6	5.4
Standard error of the mean	0.02	0.02	0.05	0.02	0.02
10th percentile (mmol/l)	4.4	4.1	4.3	4.1	4.0
90th percentile (mmol/l)	7.8	7.2	7.3	7.2	6.9
% ≥5.0 mmol/l	77	67	71	66	61
Bases (unweighted)					
Men	*5345*	*5001*	*3814*	*3814*	*3410*
Women	*5817*	*5568*	*4460*	*4460*	*3618*
Bases (weighted)[a]					
Men	-	-	-	*4020*	*4061*
Women	-	-	-	*4249*	*3850*

[a] Data since 2003 have been weighted for non-response; for 2003 both unweighted and weighted data (shaded columns) are shown

[b] Including those taking lipid-lowering drugs.

Table 10.7

Total cholesterol levels and effect of lipid-lowering drugs (LLD) by disease status, by age and sex

Aged 35 and over with a valid total cholesterol measurement [a] *2006*

Blood cholesterol (mmol/l)	Age group				Total
	35-54	55-64	65-74	75+	
Men					
CVD[b] including those taking LLD					
Mean (mmol/l)	5.8	4.9	4.5	4.5	4.9
Standard error of the mean	0.15	0.10	0.14	0.15	0.08
10th percentile (mmol/l)	4.2	3.5	3.3	3.1	3.4
90th percentile (mmol/l)	7.6	6.4	6.3	6.0	6.5
% ≥4.0 mmol/l	93	81	63	63	75
% ≥5.0 mmol/l	72	45	32	33	45
CVD[b] and not taking LLD					
Mean (mmol/l)	6.1	[5.6]	e	e	5.7
Standard error of the mean	0.17	[0.11]	e	e	0.11
10th percentile (mmol/l)	4.5	[4.5]	e	e	4.2
90th percentile (mmol/l)	8.0	6.4]	e	e	7.3
% ≥4.0 mmol/l	99	[98]	e	e	92
% ≥5.0 mmol/l	76	[80]	e	e	74
HT[c] and/or DM[d] but not CVD, including those taking LLD					
Mean (mmol/l)	5.7	5.7	5.2	4.9	5.4
Standard error of the mean	0.07	0.07	0.13	0.13	0.05
10th percentile (mmol/l)	4.3	4.3	3.9	3.8	4.1
90th percentile (mmol/l)	7.2	7.0	6.9	6.1	7.0
% ≥4.0 mmol/l	95	95	89	88	93
% ≥5.0 mmol/l	69	74	53	38	62
HT[c] and/or DM[d] but not CVD and not taking LLD					
Mean (mmol/l)	5.9	5.9	5.7	[5.2]	5.7
Standard error of the mean	0.08	0.07	0.15	[0.17]	0.05
10th percentile (mmol/l)	4.6	4.7	4.4	[4.0]	4.4
90th percentile (mmol/l)	7.2	7.2	7.2	[6.8]	7.2
% ≥4.0 mmol/l	98	98	98	[93]	97
% ≥5.0 mmol/l	76	84	68	[58]	74
None of these, including those taking LLD					
Mean (mmol/l)	5.6	5.9	5.6	e	5.6
Standard error of the mean	0.04	0.06	0.12	e	0.03
10th percentile (mmol/l)	4.3	4.8	4.3	e	4.3
90th percentile (mmol/l)	7.1	7.2	6.7	e	7.1
% ≥4.0 mmol/l	96	99	97	e	96
% ≥5.0 mmol/l	70	84	73	e	73
None of these and not taking LLD					
Mean (mmol/l)	5.6	5.9	5.7	e	5.7
Standard error of the mean	0.04	0.06	0.12	e	0.03
10th percentile (mmol/l)	4.3	4.8	4.4	e	4.4
90th percentile (mmol/l)	7.1	7.2	7.1	e	7.1
% ≥4.0 mmol/l	96	99	98	e	97
% ≥5.0 mmol/l	71	84	78	e	74

Continued…

Table 10.7 continued

Aged 35 and over with a valid total cholesterol measurement [a] *2006*

Blood cholesterol (mmol/l)	Age group				Total
	35-54	55-64	65-74	75+	
Men					
Bases (unweighted)					
Men (including taking LLD)					
CVD[b]	*94*	*110*	*70*	*51*	*325*
HT[c] *and/or DM*[d] *but not CVD*	*249*	*240*	*94*	*56*	*639*
None of these	*754*	*258*	*63*	*21*	*1096*
Men (not taking LLD)					
CVD[b]	*73*	*40*	*23*	*22*	*158*
HT[c] *and/or DM*[d] *but not CVD*	*213*	*182*	*57*	*38*	*490*
None of these	*742*	*248*	*55*	*21*	*1066*
Bases (weighted)					
Men (including taking LLD)					
CVD[b]	*102*	*87*	*111*	*102*	*402*
HT[c] *and/or DM*[d] *but not CVD*	*239*	*188*	*146*	*105*	*678*
None of these	*773*	*202*	*92*	*38*	*1106*
Men (not taking LLD)					
CVD[b]	*78*	*31*	*37*	*43*	*188*
HT[c] *and/or DM*[d] *but not CVD*	*199*	*142*	*87*	*68*	*496*
None of these	*759*	*194*	*80*	*38*	*1072*

[a] Excludes participants aged 65 and over not asked questions on CVD.

[b] CVD: Cardiovascular disease.

[c] HT: Hypertension, defined as SBP≥140mmHg or DBP≥90mmHg or on medication to reduce blood pressure.

[d] DM: Self-reported doctor diagnosed diabetes. Includes 27 participants with no blood pressure readings.

[e] Result not shown because of small base.

Continued…

Table 10.7

Table 10.7 continued

Aged 35 and over with a valid total cholesterol measurement [a] *2006*

Blood cholesterol (mmol/l)	Age group				Total
	35-54	55-64	65-74	75+	
Women					
CVD[b] including those taking LLD					
Mean (mmol/l)	5.5	5.9	5.3	5.0	5.4
Standard error of the mean	0.10	0.12	0.17	0.12	0.06
10th percentile (mmol/l)	4.2	4.1	3.9	3.7	4.0
90th percentile (mmol/l)	6.8	7.6	7.1	6.3	6.9
% ≥4.0 mmol/l	94	96	90	86	91
% ≥5.0 mmol/l	69	75	52	53	61
CVD[b] and not taking LLD					
Mean (mmol/l)	5.7	6.2	e	e	5.7
Standard error of the mean	0.09	0.12	e	e	0.07
10th percentile (mmol/l)	4.2	4.6	e	e	4.3
90th percentile (mmol/l)	6.8	7.6	e	e	7.0
% ≥4.0 mmol/l	97	98	e	e	96
% ≥5.0 mmol/l	73	84	e	e	76
HT[c] and/or DM[d] but not CVD, including those taking LLD					
Mean (mmol/l)	5.6	6.0	5.8	5.7	5.8
Standard error of the mean	0.08	0.09	0.13	0.16	0.06
10th percentile (mmol/l)	4.5	4.3	4.3	3.9	4.3
90th percentile (mmol/l)	7.0	7.5	7.2	7.5	7.4
% ≥4.0 mmol/l	96	97	92	89	93
% ≥5.0 mmol/l	74	81	76	68	75
HT[c] and/or DM[d] but not CVD and not taking LLD					
Mean (mmol/l)	5.7	6.4	6.3	6.1	6.1
Standard error of the mean	0.08	0.09	0.13	0.17	0.06
10th percentile (mmol/l)	4.5	5.1	4.8	4.6	4.7
90th percentile (mmol/l)	7.0	7.8	7.6	7.5	7.5
% ≥4.0 mmol/l	98	99	97	94	97
% ≥5.0 mmol/l	77	93	88	84	85
None of these, including those taking LLD					
Mean (mmol/l)	5.3	6.2	6.4	[5.9]	5.6
Standard error of the mean	0.03	0.05	0.13	[0.17]	0.03
10th percentile (mmol/l)	4.2	4.8	5.0	[4.8]	4.4
90th percentile (mmol/l)	6.6	7.5	7.9	[7.4]	7.0
% ≥4.0 mmol/l	95	98	100	[100]	96
% ≥5.0 mmol/l	64	88	93	[84]	72
None of these and not taking LLD					
Mean (mmol/l)	5.4	6.2	6.5	e	5.7
Standard error of the mean	0.03	0.05	0.13	e	0.03
10th percentile (mmol/l)	4.2	4.9	5.1	e	4.4
90th percentile (mmol/l)	6.6	7.5	7.9	e	7.0
% ≥4.0 mmol/l	95	98	100	e	96
% ≥5.0 mmol/l	64	89	94	e	73

Continued…

Table 10.7 continued

Aged 35 and over with a valid total cholesterol measurement [a] *2006*

Blood cholesterol (mmol/l)	Age group				Total
	35-54	55-64	65-74	75+	
Women					
Bases (unweighted)					
Women (including taking LLD)					
CVD[b]	*138*	*102*	*51*	*66*	*357*
HT[c] *and/or DM*[d] *and not CVD*	*191*	*211*	*118*	*84*	*604*
None of these	*1038*	*374*	*82*	*31*	*1525*
Women (not taking LLD)					
CVD[b]	*126*	*74*	*25*	*29*	*254*
HT[c] *and/or DM*[d] *and not CVD*	*175*	*158*	*84*	*62*	*479*
None of these	*1032*	*358*	*76*	*26*	*1492*
Bases (weighted)					
Women (including taking LLD)					
CVD[b]	*120*	*76*	*79*	*144*	*420*
HT[c] *and/or DM*[d] *and not CVD*	*161*	*152*	*183*	*189*	*684*
None of these	*862*	*268*	*127*	*66*	*1323*
Women (not taking LLD)					
CVD[b]	*109*	*53*	*38*	*65*	*265*
HT[c] *and/or DM*[d] *and not CVD*	*147*	*112*	*130*	*139*	*528*
None of these	*858*	*255*	*117*	*55*	*1285*

[a] Excludes participants aged 65 and over not asked questions on CVD.

[b] CVD: Cardiovascular disease.

[c] HT: Hypertension, defined as SBP≥140mmHg or DBP≥90mmHg or on medication to reduce blood pressure.

[d] DM: Self-reported doctor diagnosed diabetes. Includes 27 participants with no blood pressure readings.

[e] Result not shown because of small base.

Table 10.8

HDL-cholesterol, by age and sex

Aged 16 and over with a valid HDL-cholesterol measurement *2006*

HDL-cholesterol (mmol/l)	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Mean[a] (mmol/l)	1.3	1.3	1.3	1.4	1.4	1.3	1.3	1.3
Standard error of the mean	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.01
10th percentile (mmol/l)	0.9	0.9	1.0	1.0	1.0	0.9	1.0	1.0
90th percentile (mmol/l)	1.7	1.7	1.7	1.8	1.8	1.8	1.7	1.7
% <1.0 mmol/l	11.4	11.2	8.6	7.8	7.8	11.0	8.3	9.4
Women								
Mean[a] (mmol/l)	1.5	1.5	1.6	1.7	1.7	1.6	1.7	1.6
Standard error of the mean	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.01
10th percentile (mmol/l)	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.1
90th percentile (mmol/l)	1.9	2.0	2.0	2.2	2.2	2.1	2.2	2.1
% <1.0 mmol/l	2.2	2.2	2.1	1.7	1.4	2.2	0.2	1.8
Bases (unweighted)								
Men	*265*	*417*	*681*	*604*	*682*	*480*	*281*	*3410*
Women	*291*	*512*	*817*	*753*	*764*	*545*	*379*	*4061*
Bases (weighted)								
Men	*549*	*589*	*727*	*593*	*537*	*366*	*257*	*3618*
Women	*525*	*620*	*721*	*606*	*554*	*408*	*417*	*3850*

[a] Including those taking lipid-lowering drugs.

Table 10.9

HDL-cholesterol (observed and age-standardised), by Government Office Region/Strategic Health Authority[a] and sex

Aged 16 and over with a valid HDL-cholesterol measurement *2006*

HDL-cholesterol (mmol/l)	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
	%	%	%	%	%	%	%	%	%	%	%
Men											
Observed											
Mean[b] (mmol/l)	1.3	1.3	1.3	1.3	1.3	1.4	1.4	1.3	1.3	1.3	1.3
Standard error of the mean	0.03	0.02	0.02	0.02	0.01	0.02	0.03	0.02	0.02	0.02	0.02
10th percentile (mmol/l)	0.9	1.0	0.9	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0
90th percentile (mmol/l)	1.8	1.8	1.7	1.7	1.7	1.8	1.8	1.7	1.7	1.7	1.8
% <1.0 mmol/l	9.9	8.6	10.5	9.8	14.2	9.9	7.7	6.7	8.6	8.8	8.4
Standardised											
Mean[b] (mmol/l)	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.3	1.3	1.3	1.3
Standard error of the mean	0.03	0.02	0.02	0.02	0.01	0.02	0.03	0.02	0.02	0.03	0.02
10th percentile (mmol/l)	1.0	1.0	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0
90th percentile (mmol/l)	1.8	1.8	1.7	1.7	1.7	1.8	1.8	1.7	1.7	1.7	1.7
% <1.0 mmol/l	9.4	8.9	10.4	9.9	14.1	10.0	7.5	6.5	8.7	8.8	8.6
Women											
Observed											
Mean[b] (mmol/l)	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.7	1.6
Standard error of the mean	0.03	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.03	0.02
10th percentile (mmol/l)	1.1	1.2	1.2	1.2	1.1	1.2	1.1	1.2	1.1	1.2	1.1
90th percentile (mmol/l)	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.2	2.2	2.1
% <1.0 mmol/l	1.8	1.7	1.3	0.6	1.8	2.0	2.7	1.8	1.7	1.1	2.6
Standardised											
Mean[b] (mmol/l)	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.7	1.6
Standard error of the mean	0.03	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.03	0.02
10th percentile (mmol/l)	1.1	1.2	1.1	1.2	1.1	1.2	1.2	1.2	1.1	1.2	1.1
90th percentile (mmol/l)	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.1
% <1.0 mmol/l	2.0	1.9	1.3	0.6	1.8	2.0	2.6	1.9	1.7	1.0	2.6
Bases (unweighted)											
Men	*190*	*521*	*383*	*328*	*378*	*410*	*296*	*303*	*601*	*312*	*289*
Women	*224*	*639*	*448*	*387*	*477*	*411*	*334*	*404*	*737*	*419*	*318*
Bases (weighted)											
Men	*178*	*475*	*363*	*339*	*375*	*435*	*536*	*343*	*575*	*312*	*263*
Women	*197*	*549*	*389*	*323*	*425*	*393*	*530*	*401*	*644*	*374*	*269*

[a] This table provides data for regional analysis both by Government Office Region (GOR) and the new configuration of Strategic Health Authorities (SHAs) in place from July 2006. The first eight columns represent GORs and SHAs of the same name, while the South East GOR (column nine) is divided into South East Coast SHA and South Central SHA, shown in the final two columns.

[b] Including those taking lipid-lowering drugs.

Table 10.10

HDL-cholesterol (age-standardised), by equivalised household income and sex

Aged 16 and over with a valid HDL-cholesterol measurement *2006*

HDL-cholesterol (mmol/l)	Equivalised household income quintile				
	Highest	2nd	3rd	4th	Lowest
	%	%	%	%	%
Men					
Mean[a] (mmol/l)	1.4	1.4	1.3	1.3	1.3
Standard error of the mean	0.01	0.01	0.01	0.02	0.02
10th percentile (mmol/l)	1.0	1.0	0.9	0.9	0.9
90th percentile (mmol/l)	1.8	1.8	1.7	1.8	1.7
% <1.0 mmol/l	7.6	5.6	10.6	11.0	14.4
Women					
Mean[a] (mmol/l)	1.7	1.6	1.6	1.5	1.5
Standard error of the mean	0.02	0.02	0.02	0.02	0.02
10th percentile (mmol/l)	1.2	1.2	1.2	1.1	1.1
90th percentile (mmol/l)	2.1	2.2	2.1	2.0	2.0
% <1.0 mmol/l	0.5	1.1	1.6	2.3	4.2
Bases (unweighted)					
Men	*720*	*697*	*605*	*488*	*376*
Women	*708*	*724*	*732*	*731*	*515*
Bases (weighted)					
Men	*721*	*737*	*601*	*494*	*430*
Women	*636*	*659*	*662*	*692*	*533*

[a] Including those taking lipid-lowering drugs.

Table 10.11

Trends in HDL-cholesterol, 1998-2006, by sex

Aged 16 and over with a valid HDL-cholesterol measurement *1998, 2003, 2006*

HDL-cholesterol (mmol/l)	Survey year			
	1998	2003	2003[a]	2006
Men				
Mean[b] (mmol/l)	1.3	1.4	1.4	1.3
Standard error of the mean	0.01	0.01	0.01	0.01
10th percentile (mmol/l)	0.9	1.0	1.0	1.0
90th percentile (mmol/l)	1.8	1.8	1.8	1.7
Women				
Mean[b] (mmol/l)	1.6	1.6	1.6	1.6
Standard error of the mean	0.01	0.01	0.01	0.01
10th percentile (mmol/l)	1.1	1.2	1.2	1.1
90th percentile (mmol/l)	2.1	2.2	2.1	2.1
Bases (unweighted)				
Men	*4989*	*3814*	*3814*	*3410*
Women	*5552*	*4460*	*4460*	*4061*
Bases (weighted)[a]				
Men	-	-	*4020*	*3618*
Women	-	-	*4249*	*3850*

[a] Data since 2003 have been weighted for non-response; for 2003 both unweighted and weighted data (shaded columns) are shown

[b] Including those taking lipid-lowering drugs.

Table 10.12

C-reactive protein, by age and sex

Aged 16 and over with a valid C-reactive protein measurement *2006*

C-reactive protein (mg/l)	Age group							Total
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
	%	%	%	%	%	%	%	%
Men								
Mean[a] (mg/l)	1.8	2.2	2.7	3.0	3.4	4.8	6.8	3.1
Standard error of the mean	0.33	0.22	0.24	0.28	0.27	0.36	0.83	0.12
≤0.5[b] (%)	46	29	24	19	15	10	9	23
0.6-1.0 (%)	20	20	22	17	21	16	12	19
1.1-1.9 (%)	12	19	23	23	21	20	19	20
2.0-3.7 (%)	15	18	16	21	21	23	22	19
>3.7 (%)	7	14	14	20	22	31	38	19
Women								
Mean[a] (mg/l)	3.0	3.3	3.1	3.7	4.1	3.8	4.8	3.6
Standard error of the mean	0.30	0.34	0.22	0.42	0.35	0.19	0.50	0.14
≤0.5[b] (%)	31	26	28	20	18	9	8	21
0.6-1.2 (%)	18	20	20	23	20	19	23	20
1.3-2.4 (%)	18	19	19	22	20	25	23	20
2.5-4.9 (%)	15	18	17	16	23	23	24	19
>4.9 (%)	18	17	16	20	19	24	23	19
Bases (unweighted)								
Men	265	417	681	604	682	480	281	3410
Women	*291*	*512*	*816*	*753*	*763*	*545*	*378*	*4058*
Bases (weighted)								
Men	*549*	*589*	*727*	*593*	*537*	*366*	*257*	*3618*
Women	*525*	*620*	*720*	*606*	*553*	*408*	*416*	*3847*

[a] Including those taking lipid-lowering drugs.

[b] These values correspond to the 1998 quintiles specific to men and women.

Table 10.13

C-reactive protein (observed and age-standardised), by Government Office Region/Strategic Health Authority[a] and sex

Aged 16 and over with a valid C-reactive protein measurement — *2006*

C-reactive protein (mg/l)	Government Office Region									Strategic Health Authority	
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South West	South East	South East Coast	South Central
	%	%	%	%	%	%	%	%	%	%	%
Men											
Observed											
Mean[b] (mg/l)	3.6	3.1	2.5	2.5	3.3	3.7	2.8	3.7	3.2	3.6	2.8
Standard error of the mean	0.40	0.28	0.22	0.24	0.34	0.48	0.29	0.55	0.28	0.43	0.32
≤0.5[c] (%)	32	23	19	27	22	23	24	22	24	25	23
0.6-1.0 (%)	13	21	18	18	17	19	22	20	19	18	19
1.1-1.9 (%)	16	16	27	21	21	20	16	19	22	22	23
2.0-3.7 (%)	17	19	21	18	21	17	20	21	16	16	17
>3.7 (%)	22	22	15	16	18	21	18	18	19	19	18
Standardised											
Mean[b] (mg/l)	3.6	3.0	2.6	2.7	3.1	3.6	2.9	3.6	3.1	3.5	2.6
Standard error of the mean	0.43	0.28	0.23	0.26	0.33	0.47	0.36	0.55	0.26	0.41	0.34
≤0.5[c] (%)	32	24	19	25	23	23	23	24	25	26	27
0.6-1.0 (%)	13	21	18	17	18	19	23	20	19	18	19
1.1-1.9 (%)	16	16	27	22	21	21	16	18	22	21	22
2.0-3.7 (%)	17	19	21	18	20	17	20	21	16	16	15
>3.7 (%)	22	21	16	18	18	20	19	17	18	18	17
Women											
Observed											
Mean[b] (mg/l)	4.5	4.1	3.3	4.0	4.2	3.2	3.1	3.4	3.2	3.3	3.1
Standard error of the mean	0.65	0.53	0.31	0.44	0.45	0.35	0.34	0.29	0.23	0.36	0.25
≤0.5[c] (%)	21	19	23	18	19	20	26	22	22	21	23
0.6-1.2 (%)	16	21	21	23	19	18	19	17	24	25	22
1.3-2.4 (%)	20	21	19	19	19	24	21	21	19	21	17
2.5-4.9 (%)	21	19	18	20	21	22	15	20	18	17	19
>4.9 (%)	22	20	18	20	21	16	18	20	17	16	19
Standardised											
Mean[b] (mg/l)	4.4	4.0	3.4	4.2	4.1	3.1	3.2	3.5	3.2	3.3	3.1
Standard error of the mean	0.59	0.49	0.33	0.54	0.45	0.32	0.34	0.30	0.23	0.36	0.24
≤0.5[c] (%)	21	19	22	18	20	21	25	22	22	21	24
0.6-1.2 (%)	16	21	21	24	19	18	20	17	24	25	22
1.3-2.4 (%)	20	21	20	19	19	23	21	21	19	21	17
2.5-4.9 (%)	21	19	18	19	20	22	17	20	18	17	19
>4.9 (%)	22	20	19	20	21	15	18	19	17	16	18
Bases (unweighted)											
Men	*190*	*521*	*383*	*328*	*378*	*410*	*296*	*303*	*601*	*312*	*289*
Women	*224*	*638*	*447*	*387*	*477*	*411*	*334*	*404*	*736*	*418*	*318*
Bases (weighted)											
Men	*178*	*475*	*363*	*339*	*375*	*435*	*536*	*343*	*575*	*312*	*263*
Women	*197*	*548*	*388*	*323*	*425*	*393*	*530*	*401*	*643*	*373*	*269*

[a] This table provides data for regional analysis both by Government Office Region (GOR) and the new configuration of Strategic Health Authorities (SHAs) in place from July 2006. The first eight columns represent GORs and SHAs of the same name, while the South East GOR (column nine) is divided into South East Coast SHA and South Central SHA, shown in the final two columns.

[b] Including those taking lipid-lowering drugs.

[c] These values correspond to the 1998 quintiles specific to men and women.

Table 10.14

C-reactive protein (age-standardised), by equivalised household income and sex

Aged 16 and over with a valid C-reactive protein measurement *2006*

C-reactive protein (mg/l)	Equivalised household income quintile				
	Highest	2nd	3rd	4th	Lowest
	%	%	%	%	%
Men					
Mean[a] (mg/l)	2.3	2.9	2.8	3.6	4.5
Standard error of the mean	0.20	0.27	0.20	0.43	0.53
≤0.5[b] (%)	30	25	21	23	18
0.6-1.0 (%)	19	18	22	16	15
1.1-1.9 (%)	20	22	19	14	19
2.0-3.7 (%)	16	18	20	20	22
>3.7 (%)	15	16	18	26	25
Women					
Mean[a] (mg/l)	2.8	3.2	3.7	3.4	4.4
Standard error of the mean	0.22	0.30	0.27	0.26	0.41
≤0.5[b] (%)	25	23	20	21	16
0.6-1.2 (%)	20	22	20	18	16
1.3-2.4 (%)	23	21	21	23	22
2.5-4.9 (%)	17	19	19	19	24
>4.9 (%)	14	16	20	19	22
Bases (unweighted)					
Men	*720*	*697*	*605*	*488*	*376*
Women	*708*	*722*	*732*	*731*	*515*
Bases (weighted)					
Men	*721*	*737*	*601*	*494*	*430*
Women	*636*	*657*	*662*	*692*	*533*

[a] Including those taking lipid-lowering drugs.

[b] These values correspond to the 1998 quintiles specific to men and women.

Table 10.15

Trends in C-reactive protein, 1998-2006, by sex

Aged 16 and over with a valid C-reactive protein measurement — *1998, 2003, 2006*

C-reactive protein (mg/l)	Survey year			
	1998 unweighted	2003 unweighted	2003[a] unweighted	2006 unweighted
Men				
Mean[b] (mg/l)	3.0	3.1	3.1	3.1
Standard error of the mean	0.09	0.11	0.12	0.12
≤0.5[c] (%)	23	20	23	23
0.6-1.0 (%)	19	20	20	19
1.1-1.9 (%)	20	21	21	20
2.0-3.7 (%)	18	18	17	19
>3.7 (%)	20	20	19	19
Women				
Mean[b] (mg/l)	3.6	3.8	3.8	3.6
Standard error of the mean	0.11	0.10	0.24	0.14
≤0.5[c] (%)	20	20	20	21
0.6-1.2 (%)	21	20	20	20
1.3-2.4 (%)	20	19	18	20
2.5-4.9 (%)	19	20	20	19
>4.9 (%)	20	21	21	19
Bases (unweighted)				
Men	*4938*	*3789*	*3789*	*3410*
Women	*5502*	*4442*	*4442*	*4061*
Bases (weighted)				
Men	-	-	*3999*	*3618*
Women	-	-	*4230*	*3847*

[a] Data since 2003 have been weighted for non-response; for 2003 both unweighted and weighted data (shaded columns) are shown

[b] Including those taking lipid-lowering drugs.

[c] These values correspond to the 1998 quintiles specific to men and women.

Table 10.16

C-reactive protein by disease status, age and sex

Aged 35 and over with a valid C-reactive protein measurement[a] — 2006

C-reactive protein (mg/l)	Age group				Total
	35-54	55-64	65-74	75+	
Men					
CVD[b]					
Mean (mg/l)	5.3	3.4	5.3	7.6	5.5
Standard error of the mean	1.67	0.86	1.17	1.56	0.70
≤0.5[c] (%)	15	19	16	12	15
0.6-1.0 (%)	26	21	13	7	16
1.1-1.9 (%)	16	19	21	23	20
2.0-3.7 (%)	18	23	19	16	19
>3.7 (%)	25	18	30	43	29
HT[d] and/or DM[e] but not CVD					
Mean (mg/l)	3.0	3.4	3.9	4.3	3.5
Standard error of the mean	0.29	0.31	0.61	0.82	0.21
≤0.5[c] (%)	16	10	13	6	12
0.6-1.0 (%)	19	19	12	14	17
1.1-1.9 (%)	26	25	20	16	23
2.0-3.7 (%)	17	22	25	37	23
>3.7 (%)	23	25	30	27	25
None of these					
Mean (mg/l)	2.2	3.1	5.3	f	2.8
Standard error of the mean	0.14	0.48	1.03	f	0.17
≤0.5[c] (%)	25	19	6	f	22
0.6-1.0 (%)	20	24	20	f	21
1.1-1.9 (%)	24	18	23	f	23
2.0-3.7 (%)	18	21	24	f	19
>3.7 (%)	13	19	27	f	16
Men					
Bases (unweighted)					
CVD[b]	*94*	*110*	*70*	*51*	*325*
HT[d] and/or DM[e]	*249*	*240*	*94*	*56*	*639*
None of these	*754*	*258*	*63*	*21*	*1096*
Bases (weighted)					
CVD[b]	*102*	*87*	*111*	*102*	*402*
HT[d] and/or DM[e]	*239*	*188*	*146*	*105*	*678*
None of these	*773*	*202*	*92*	*38*	*1106*

[a] Excludes participants aged 65 and over not asked questions on cardiovascular health. Includes those taking lipid lowering drugs.

[b] CVD: Cardiovascular disease.

[c] These values correspond to the 1998 quintiles specific to men and women.

[d] HT: Hypertension, defined as SBP≥140mmHg or DBP≥90mmHg or on medication to reduce blood pressure.

[e] DM: Self-reported doctor diagnosed diabetes. Includes 27 participants with no blood pressure readings.

[f] Result not shown because of small base.

Continued…

Table 10.16 continued

Aged 35 and over with a valid C-reactive protein measurement[a] — 2006

C-reactive protein (mg/l)	Age group				Total
	35-54	55-64	65-74	75+	
Women					
CVD[b]					
Mean (mg/l)	2.9	3.4	5.1	3.4	3.6
Standard error of the mean	0.32	0.35	0.96	0.44	0.27
≤0.5[c] (%)	25	11	7	9	14
0.6-1.2 (%)	19	19	17	27	21
1.3-2.4 (%)	20	21	27	22	22
2.5-4.9 (%)	16	33	15	19	20
>4.9 (%)	20	16	35	23	23
HT[d] and/or DM[e] but not CVD					
Mean (mg/l)	3.6	4.7	3.6	5.2	4.3
Standard error of the mean	0.39	0.73	0.34	0.97	0.35
≤0.5[c] (%)	10	14	9	7	10
0.6-1.2 (%)	19	15	21	17	18
1.3-2.4 (%)	26	21	21	24	23
2.5-4.9 (%)	23	23	24	28	25
>4.9 (%)	22	26	25	24	24
None of these					
Mean (mg/l)	3.2	3.1	2.9	[3.0]	3.1
Standard error of the mean	0.29	0.31	0.40	[0.61]	0.21
≤0.5[c] (%)	27	22	10	[7]	23
0.6-1.2 (%)	22	25	26	[27]	23
1.3-2.4 (%)	20	20	26	[32]	21
2.5-4.9 (%)	15	20	24	[19]	17
>4.9 (%)	16	14	14	[15]	15
Women					
Bases (unweighted)					
CVD[b]	*138*	*102*	*51*	*66*	*357*
HT[d] and/or DM[e]	*191*	*211*	*118*	*84*	*604*
None of these	*1037*	*373*	*82*	*31*	*1523*
Bases (weighted)					
CVD[b]	*120*	*76*	*79*	*144*	*420*
HT[d] and/or DM[e]	*161*	*152*	*183*	*189*	*684*
None of these	*862*	*267*	*127*	*66*	*1321*

[a] Excludes participants aged 65 and over not asked questions on cardiovascular health. Includes those taking lipid lowering drugs.

[b] CVD: Cardiovascular disease.

[c] These values correspond to the 1998 quintiles specific to men and women.

[d] HT: Hypertension, defined as SBP≥140mmHg or DBP≥90mmHg or on medication to reduce blood pressure.

[e] DM: Self-reported doctor diagnosed diabetes. Includes 27 participants with no blood pressure readings.

[f] Result not shown because of small base.

National Centre for Social Research

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 and postal methods; many use advanced applications of computer assisted interviewing. NatCen has approximately 300 staff, a national panel of over 1,000 interviewers and 200 nurses who work on health-related surveys.

Department of Epidemiology and Public Health, Division of Population Health, Royal Free and University College Medical School

The Department houses over 170 staff, in 11 main research groups, namely the: Joint Health Surveys Unit, part of the Health and Social Surveys Research Group; Cancer Research UK funded Health Behaviour Research Centre (including Weight Concern); Central and Eastern Europe Research Group; Dental Public Health; Health Care Evaluation Group; International Centre for Life Course Studies in Society and Health; MRC Unit for Lifelong Health and Ageing (including the MRC National Survey of Health and Development); Psychobiology Group; Clinical Epidemiology Group; Genetic Epidemiology Group; and the Whitehall II Study. 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, 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; the sociodental indicators of need; and the socio-economic and policy implications of an ageing population.