

Health Survey for England 2017

Multiple risk factors

Published 4 December 2018

This report examines multiple risk factors among adults in England using data from 2016 and 2017. Information on smoking, alcohol, body mass index, physical activity, and fruit and vegetable consumption was combined to assign a multiple risk score. Information on raised biomarkers (elevated levels of blood pressure, total cholesterol, and glycated haemoglobin) was separately combined. The report provides information on the most common combinations of risk factors and raised biomarkers, as well as the prevalence of multiple risks by population subgroups.

Key findings

- In total, 13% of adults had no risk factors, and a further 36% had only one. Around half of adults had two or more risk factors, including 32% who had two and 19% who had three or more. A very small proportion (less than 1%) had all five risks.
- The prevalence of multiple risk factors was higher in men than in women. 54% of men and 47% of women had two or more risk factors; 21% of men and 17% of women had three or more.
- The prevalence of multiple risk factors was higher for men than for women from the age of 25 up to the age of 74.
- Among men with two risk factors, drinking over the recommended weekly limit with low fruit and vegetable consumption was the most prevalent combination (10%). Among women, the most common combination was low fruit and vegetable consumption with obesity (10%).
- 12% of adults had two raised biomarkers and 1% had all three. The prevalence of multiple raised biomarkers was higher for men than for women between the ages 25 and 44. It was higher for women than for men among those aged 65 and over.



Contents	
Key findings	1
This is a National Statistics publication	3
Introduction	4
Contents	4
Background	5
Methods and definitions	7
Risk factors based on interview data	7
Raised biomarkers based on nurse visit data	8
Age-standardisation	9
About the survey estimates	9
Prevalence and combinations of multiple risks	10
Prevalence of multiple risks, by age and sex	10
Combinations of risk types, by age and sex	11
Prevalence of multiple risks, by region	13
Prevalence of multiple risks, by equivalised household income	13
Prevalence of multiple risks, by Index of Multiple Deprivation	14
Prevalence of multiple risks, by ethnicity	16
Prevalence of multiple risks, by doctor-diagnosed cardiovascular disease	17
Prevalence of multiple risks, by longstanding mental or other condition	18
Prevalence and combinations of multiple raised biomarkers	19
Prevalence of multiple raised biomarkers, by age and sex	19
Combinations of multiple raised biomarkers, by age and sex	20
Prevalence of multiple raised biomarkers, by population subgroups	22
Prevalence of multiple raised biomarkers, by number of risks based on interviewer data	23

This is a National Statistics publication

National Statistics status means that official statistics meet the highest standards of trustworthiness, quality and public value.

All official statistics should comply with all aspects of the Code of Practice for Official Statistics. They are awarded National Statistics status following an assessment by the Authority's regulatory arm. The Authority considers whether the statistics meet the highest standards of Code compliance, including the value they add to public decisions and debate.

It is NHS Digital's responsibility to maintain compliance with the standards expected of National Statistics. If we become concerned about whether these statistics are still meeting the appropriate standards, we will discuss any concerns with the Authority promptly. National Statistics status can be removed at any point when the highest standards are not maintained, and reinstated when standards are restored.

Find out more about the Code of Practice for Official Statistics at www.statisticsauthority.gov.uk/assessment/code-of-practice

ISBN 978-1-78734-255-2

This report may be of interest to members of the public, policy officials, people working in public health and to commissioners of health and care services to see the prevalence of multiple risk factors among adults in England and could be used to inform future health improvement and disease prevention strategies.

Introduction

Contents

This report presents data on multiple risk factors among adults who participated in the Health Survey for England (HSE) in 2016 and 2017. It describes the prevalence of multiple risk factors (reported current cigarette smoking, above recommended alcohol consumption, below recommended fruit and vegetable consumption, physical inactivity, and obesity based on measured height and weight). The co-existence of these is described in different population groups defined by age and sex, region, income, area deprivation, ethnicity, longstanding mental condition, and doctor-diagnosed cardiovascular disease. It also examines the most common combinations of risk factors.

There is growing evidence on the co-occurrence of ‘unhealthy lifestyle behaviours’ such as smoking and alcohol consumption, but information is scarce about the extent to which individuals have multiple uncontrolled biological risk factors. This report presents data on three uncontrolled risk factors based on biophysical measurements (hereafter referred to as ‘raised biomarkers’, comprising raised blood pressure, total cholesterol, and glycated haemoglobin). In addition, it examines the association between the number of risk factors¹ and the number of raised biomarkers.² Detailed tables accompanying this report are available via <https://digital.nhs.uk/pubs/hse2017>.

Taken together, this report includes data on the majority of the risk factors thought to be driving most of the death and disability in the UK.³ Examples of strategies implemented in eight local areas in England to tackle multiple unhealthy risk factors were set out in a recent report commissioned by the Department of Health and Social Care.⁴

¹ In this report, ‘risk factors’ refers to any of: reported current cigarette smoking, above recommended alcohol consumption, below recommended fruit and vegetable consumption, physical inactivity, and obesity based on measured height and weight.

² In this report, ‘raised biomarkers’ refers to any of: raised blood pressure, raised total cholesterol, and raised glycated haemoglobin.

³ According to the 2016 ranking, the top eleven risk factors thought to be driving the most death and disability combined in the UK are as follows: tobacco; dietary risks; high blood pressure; high body mass index; alcohol and drug use; high total cholesterol; high fasting plasma glucose; occupational risks; air pollution; impaired kidney function; and low physical activity. Institute for Health Metrics and Evaluation (<http://www.healthdata.org/united-kingdom>).

⁴ Evans H and Buck D. *Tackling multiple unhealthy risk factors. Emerging lessons from practice*. The King’s Fund, London, 2018. Available at: <https://www.kingsfund.org.uk/sites/default/files/2018-03/Tackling%20multiple%20unhealthy%20risk%20factors%20-%20full%20report.pdf>

Background

Risk factors such as cigarette smoking,⁵ heavy alcohol consumption,⁶ physical inactivity,⁷ having a diet low in fruit and vegetables,⁸ and obesity⁹ are leading modifiable causes of non-communicable diseases (NCDs) worldwide. Elevated levels of certain biological factors are also major causes of cardiovascular disease (CVD). For example, raised blood pressure,¹⁰ cholesterol (hyperlipidaemia),¹¹ and blood sugar (hyperglycaemia)¹² are leading risk factors for heart attack and stroke.

While empirical data exist about the health impacts of these separate risk factors, increasing evidence suggests that a substantial proportion of adults in the UK have multiple risks to their health. For example, an analysis based on data from HSE 2003 found that 68% of adults (aged 16 to 64) in England had two or more of the four risk factors considered and that 25% had three or more.¹³ Recent analyses of the Scottish Health Survey (SHeS) data from the years 2013 to 2016 combined found that 31% of adults had multiple risk factors (two or more).¹⁴ Using HSE 2010 data, information on a broader set of seven variables showed that more than a third of adults in England had two risk factors and a further third had three or more.¹⁵ The same study showed that the increase in the prevalence of multiple risks from young to middle age was mainly due to the rise with age in the prevalence of raised total cholesterol,

⁵ Carter BD, Abnet CC, Feskanich D, et al. *Smoking and Mortality – Beyond Established Causes*. New England Journal of Medicine 2015;**372**:631-640.

⁶ Xi B, Veeranki SP, Zhao M, et al. *Relationship of alcohol consumption to all-cause, cardiovascular, and cancer-related mortality in US adults*. Journal of the American College of Cardiology 2017;**70**(8):913-922.

⁷ Lee IM, Shiroma EJ, Lobelo F, et al. *Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy*. Lancet 2012;**380**:219-229.

⁸ Aune D, Giovannucci E, Boffetta P, et al. *Fruit and vegetable intake and the risk of cardiovascular disease, total cancer and all-cause mortality—a systematic review and dose-response meta-analysis of prospective studies*. International Journal of Epidemiology 2017;**46**:1029-1056.

⁹ Prospective Studies Collaboration. *Body-mass index and cause-specific mortality in 900,000 adults: collaborative analyses of 57 prospective studies*. Lancet 2009;**373**:1083-1096.

¹⁰ World Health Organization. *A global brief on hypertension: silent killer, global public health crisis*. World Health Organization. Geneva. 2013.

http://apps.who.int/iris/bitstream/handle/10665/79059/WHO_DCO_WHD_2013.2_eng.pdf?sequence=1

¹¹ Verschuren WMM, Jacobs DR, Bloemberg BPM, et al. *Serum Total Cholesterol and Long-term Coronary Heart Disease Mortality in Different Cultures: Twenty-five-Year Follow-up of the Seven Countries Study*. JAMA 1995;**274**(2):131-136.

¹² Stratton IM, Adler AI, Neil AW, et al. *Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): prospective observational study*. BMJ 2000;**321**:405-12.

¹³ Poortinga W. *The prevalence and clustering of four major lifestyle risk factors in an English adult population*. Preventive Medicine 2007;**44**:124-128. The risk factors considered in that study were: smoking, heavy drinking, lack of fruit and vegetable consumption, and physical activity.

¹⁴ Terje A (2017). Chapter 6: Multiple risks. In McLean J, Christie S and Gray L (eds). *The Scottish Health Survey 2016 edition – Volume 1: Main Report*. Edinburgh, Scottish Government. Available from: <http://www.gov.scot/Resource/0052/00525472.pdf>. The multiple risk factors considered in that study were: smoking, harmful drinking, low physical activity and obesity.

¹⁵ Chapter 3 'Risk Factors' in Davies SC. *Annual Report of the Chief Medical Officer, Volume One, 2011. On the State of the Public's Health*. London, Department of Health 2012. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/141774/CMO_Annual_Report_2011_Chapter_3.pdf. The risk factors considered in that study were: smoking, binge drinking, low fruit and vegetable consumption, obesity, diabetes, high blood pressure, and raised cholesterol.

hypertension, obesity and diabetes.¹⁵ Differences between areas in the prevalence of multiple risks were mainly due to the higher prevalence of smoking, obesity and diabetes in the most deprived neighbourhoods.¹⁵

In addition to describing the prevalence of multiple risk factors, previous studies have presented the most prevalent combinations of risk factors. For example, the SHeS 2013 to 2016 analyses showed the most common combination of two risk factors to be failing to meet the UK physical activity guidelines with obesity (9% of all adults).¹⁴

Recent studies have examined risk factor 'clustering'. A number of studies describe clustering in terms of co-occurring risk factors within individuals whose prevalence is higher or lower than could have been expected given the prevalence of the individual risk factors in the study population.¹³ Alternatively, a number of studies describe clustering in terms of underlying patterns in risk behaviours identified through advanced statistical methods including latent class analysis. For example, tobacco use, excessive alcohol consumption, poor diet and, to a lesser extent, inactivity have been shown to co-occur within an 'elevated risk' cluster.¹⁶ The likelihood of individuals belonging to such 'elevated risk' clusters has been shown to be significantly higher among younger and more socio-economically disadvantaged adults.¹⁶

Addressing multiple risks is important from a public health perspective as evidence suggests that the combination of risks is more detrimental to people's health than can be expected from the added individual risks alone. In an analysis of the UK Health and Lifestyle Survey, persons with four risk behaviours (cigarette smoking, high alcohol intake, physical inactivity, and a low fruit and vegetable intake) had a 3.5 fold increase in risk of mortality compared with those with none of these behaviours.¹⁷

Interventions which attempt to modify multiple risk factors may be a more efficient and cost-effective way of improving overall health than interventions that tackle specific risks such as smoking cessation or physical activity promotion. Interventions focusing on multiple risks have demonstrated improved health outcomes compared with single behaviour interventions.^{18,19} NICE (the National Institute for Health and Care Excellence) guidance for health practitioners and the public on preventing excess weight gain highlights the importance of addressing both physical activity and diet.^{20,21}

¹⁶ Hobbs M, Duncan MJ, Collins P, et al. *Clusters of health behaviours in Queensland adults are associated with different socio-demographic characteristics*. Journal of Public Health 2018; <https://doi.org/10.1093/pubmed/fdy043>

¹⁷ Kvaavik E, Batty D, Ursin G, et al. *Influence of individual and combined health behaviors on total and cause-specific mortality in men and women*. Archives of Internal Medicine. 2010;**170**:711–718.

¹⁸ Goldstein M, Whitlock E, Depue J. *Multiple behavioural risk factor interventions in primary care. Summary of research evidence*. American Journal of Preventive Medicine. 2004;**27**:61-79.

¹⁹ Hyman D, Pavlik V, Taylor W et al. *Simultaneous vs sequential counselling for multiple behaviour change*. Archives of Internal Medicine. 2007;**167**:1152-1158.

²⁰ National Institute of Health and Care Excellence. *Preventing excess weight gain. NG7*. Available at: www.nice.org.uk/guidance/ng7/resources/preventing-excess-weight-gain-pdf-51045164485

²¹ National Institute for Health and Care Excellence. *NICE impact. Cardiovascular disease prevention*. London: NICE, 2018. Available at: <https://www.nice.org.uk/Media/Default/About/what-we-do/Into-practice/measuring-uptake/nice-impact-cardiovascular-disease-prevention.pdf>

Methods and definitions

Risk factors based on interview data

A recent systematic review on multiple risk behaviours found that smoking, alcohol use, unhealthy diet and physical inactivity were the most common behaviours studied.²² These four risk behaviours were specifically mentioned in the World Health Organization's (WHO) Action Plan for the global strategy for the prevention and control of NCDs.²³ For the purpose of this report, obesity was included along with these four 'unhealthy lifestyles' to be consistent with similar analyses conducted using the HSE²⁴ and SHeS.²⁵

This report therefore focuses on five risk factors for poor health based on data collected by HSE interviewers: reported cigarette smoking, levels of alcohol consumption indicating increased or higher risk of harm, low fruit and vegetable consumption, physical inactivity, and obesity based on measured height and weight. These are defined as follows:

- Being a current cigarette smoker;
- Drinking more than the UK recommended weekly guidelines (more than 14 units a week)²⁶;
- Consuming fewer than the recommended five portions of fruit and vegetables per day²⁷;
- Being physically inactive: spending less than 30 minutes per week in moderate-to-vigorous intensity physical activity (MVPA); and
- Being obese according to the WHO Body Mass Index (BMI) classification (BMI $\geq 30\text{kg/m}^2$).²⁸

²² Meader N, King K, Moe-Byrne T et al. *A systematic review on the clustering and co-occurrence of multiple risk behaviours*. BMC Public Health 2016;**16(1)**:1-9.

²³ World Health Organization. *2008–2013 Action plan for the global strategy for the prevention and control of noncommunicable diseases: Prevent and control cardiovascular diseases, cancers, chronic respiratory diseases and diabetes*. Geneva, Switzerland: WHO 2008.

²⁴ Davies SC (2012), cited in note 155.

²⁵ Terje A (2017), cited in note 144. Note that in that analysis, physical inactivity was defined in terms of failing to meet the UK guidelines for sufficient aerobic activity. For the purpose of this report, the term physical inactivity only encompasses those who spent less than 30 minutes/week in MVPA. See note 30 below for the rationale.

²⁶ In 2016, the UK Chief Medical Officers (CMOs) published new guidelines on low risk drinking. In a move away from daily limits, it is now recommended that men and women should not regularly (defined as most weeks) drink more than 14 units a week. Drinking at this level is considered to be 'low risk', and adults who regularly drink up to this amount are advised to spread their drinking over three or more days. Above this level is considered to be 'increased risk', for men this is now above 14 units and up to 50 units, and for women over 14 units and up to 35 units per week. Men who regularly drink more than 50 units a week and women more than 35 units, are described as 'higher risk drinkers'. See https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/545937/UK_CMOs_report.pdf

²⁷ Department of Health 2001. *Five-a-day update*. The Stationery Office, London.

²⁸ See the HSE 2017 Adult and Child Overweight and Obesity report for further information about using BMI as an indicator of obesity <https://digital.nhs.uk/pubs/hse2017>.

Definitions of the risk factors were according to the latest public health recommendations, and matched those used in the HSE 2016 Adult Health Trends report and other HSE topic reports.²⁹ This approach also enables the findings to be comparable with other similar studies. Due to the different data collected in HSE 2016 and HSE 2017 the definition of risk for physical activity was defined in terms of participants being inactive (spending less than 30 minutes/week in MVPA) rather than failing to meet the UK guidelines for sufficient levels of aerobic activity (less than a minimum of 150 minutes/week in MVPA).³⁰

On each of the five risk factors based on interview data participants were classified as either having no or low risk (score 0) or as being at increased or higher risk (score 1). The scores for each risk variable were summed to assign an overall risk score to participants ranging from 0 (no risk factors) to 5 (having all risk factors). The detailed tables accompanying this report show the proportions of adults with none, one, two, three, four, and five risk factors. In addition, the tables show the proportions of adults with two or more risk factors, and the proportions of adults with three or more risk factors.

Raised biomarkers based on nurse visit data

For the purpose of this report, risk factors based on biophysical measurements collected during the nurse-visit were defined as 'uncontrolled' or 'raised' biomarkers (i.e. being above commonly used thresholds for diagnosing disease or identifying individuals at risk of other diseases). The raised biomarkers were defined as follows:

- *Raised blood pressure*: systolic blood pressure (SBP) 140mmHg or above and/or diastolic blood pressure (DBP) 90mmHg or above³¹;
- *Raised total cholesterol*: total cholesterol equal to or greater than 5mmol/L³²; and
- *Raised glycated haemoglobin*: HbA_{1c} 48mmol/mol or above.³³

²⁹ Health Survey for England 2016 Adult health trends

<https://files.digital.nhs.uk/publication/m/0/hse2016-adult-trends.pdf>

³⁰ MVPA data was collected from the full physical activity module in HSE 2016 and from the Short-Form International Physical Activity Questionnaire (IPAQ) in HSE 2017. Risk for this report is defined in terms of inactivity (reported less than 30 minutes/week of MVPA) rather than not meeting UK guidelines for sufficient levels of aerobic activity (less than a minimum of 150 minutes/week of MVPA). Analyses using HSE 2012 data comparing the full module and the Short-Form IPAQ showed that the relative agreement across the two questionnaires was stronger for estimates of inactivity than for sufficient aerobic activity:

Scholes S, Bridges S, Ng Fat L et al. *Comparison of the Physical Activity and Sedentary Behaviour Assessment Questionnaire and the Short-Form International Physical Activity Questionnaire: An Analysis of Health Survey for England Data* PLoS ONE 2016;**11(3)**:e0151647.

³¹ Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure and the National Blood Pressure Education Program Coordinating committee. *The sixth report of the Joint National Committee on prevention, detection, evaluation, and treatment of high blood pressure*. Archives of Internal Medicine 1997;**157**:2413-2446.

³² World Health Organization. *Raised Cholesterol: Situation and Trends*. 2015. www.who.int/gho/ncd/risk_factors/cholesterol_text/en/

³³ The nurse took blood samples from those who agreed. The second sample, into a tube containing EDTA, was taken to measure glycated haemoglobin (HbA_{1c}). This is a measure of the average glucose level in the blood over the preceding two to three months. Levels of 48mmol/mol or above are diagnostic of diabetes. Details of the protocol for taking blood samples and the laboratory analytical methods can be found in the HSE 2017 Methods report <https://digital.nhs.uk/pubs/hse2017>.

On each of the three biomarkers participants were classified as either being non-elevated (score 0) or as being elevated (score 1). The scores for each biomarker were summed to assign an overall risk score to participants ranging from 0 (none of the three biomarkers raised) to 3 (raised levels on each measure). Survey participants were classified for these biological risk factors based on the actual measurements, regardless of whether or not they were taking any medicine to reduce the levels (i.e. these were uncontrolled but not necessarily untreated levels). Persons whose levels of blood pressure, total cholesterol and/or HbA_{1c} were below threshold levels through medication, lifestyle changes or both were not defined as having that risk. The detailed tables accompanying this report show the proportions of adults with none, one, two, or three raised biomarkers. In addition, the tables show the proportions of adults with two or more raised biomarkers.

Analyses presented in this report were based on complete cases (i.e. participants are included in the multiple risk and raised biomarkers derived variables only if they had a valid value for each variable). For most analyses, HSE 2016 and 2017 data were combined to increase the sample size.

Age-standardisation

Age-standardised data are presented in this report for some analyses shown in the text, tables and charts where appropriate. Age-standardisation allows comparisons between groups after adjusting for the effects of any differences in their age distributions. For regions, both observed and age-standardised data are provided. Those wishing to ascertain the actual prevalence of multiple risks in each region should use the observed data, while those making comparisons between regions should use the age-standardised data. The comments on region in this report are based on age-standardised results.

About the survey estimates

The Health Survey for England, in common with other surveys, collects information from a sample of the population. The sample is designed to represent the whole population as accurately as possible within practical constraints, such as time and cost. Consequently, statistics based on the survey are estimates, rather than precise figures, and are subject to a margin of error, also known as a 95% confidence interval. For example, the survey estimate might be 24% with a 95% confidence interval of 22% to 26%. A different sample might have given a different estimate, but we expect that the true value of the statistic in the population would be within the range given by the 95% confidence interval in 95 cases out of 100.

Where differences are commented on in this report, these reflect the same degree of certainty that these differences are real, and not just within the margins of sampling error. These differences can be described as statistically significant.³⁴

Confidence intervals are quoted for key statistics within this report and are also shown in more detail in the Excel tables accompanying this report. Confidence intervals are affected by the size of the sample on which the estimate is based. Generally, the larger the sample, the smaller the confidence interval, and hence the more precise the estimate.

³⁴ Statistical significance does not imply substantive importance; differences that are statistically significant are not necessarily meaningful or relevant.

Prevalence and combinations of multiple risks

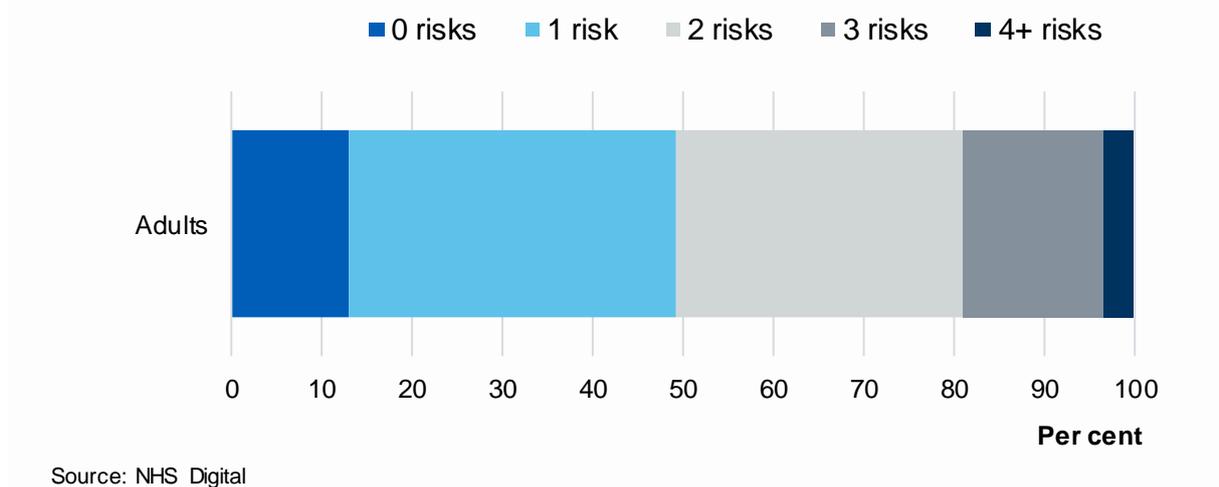
Prevalence of multiple risks, by age and sex

In 2016-17, 13% of adults had no risk factors, and 36% had only one risk. Overall, 32% of adults had a combination of two risks and 19% had three or more. A very small proportion of adults had all five risks (below 1%).

Figure 1, Table 1

Figure 1: Prevalence of multiple risks based on interview data

Base: Aged 16 and over



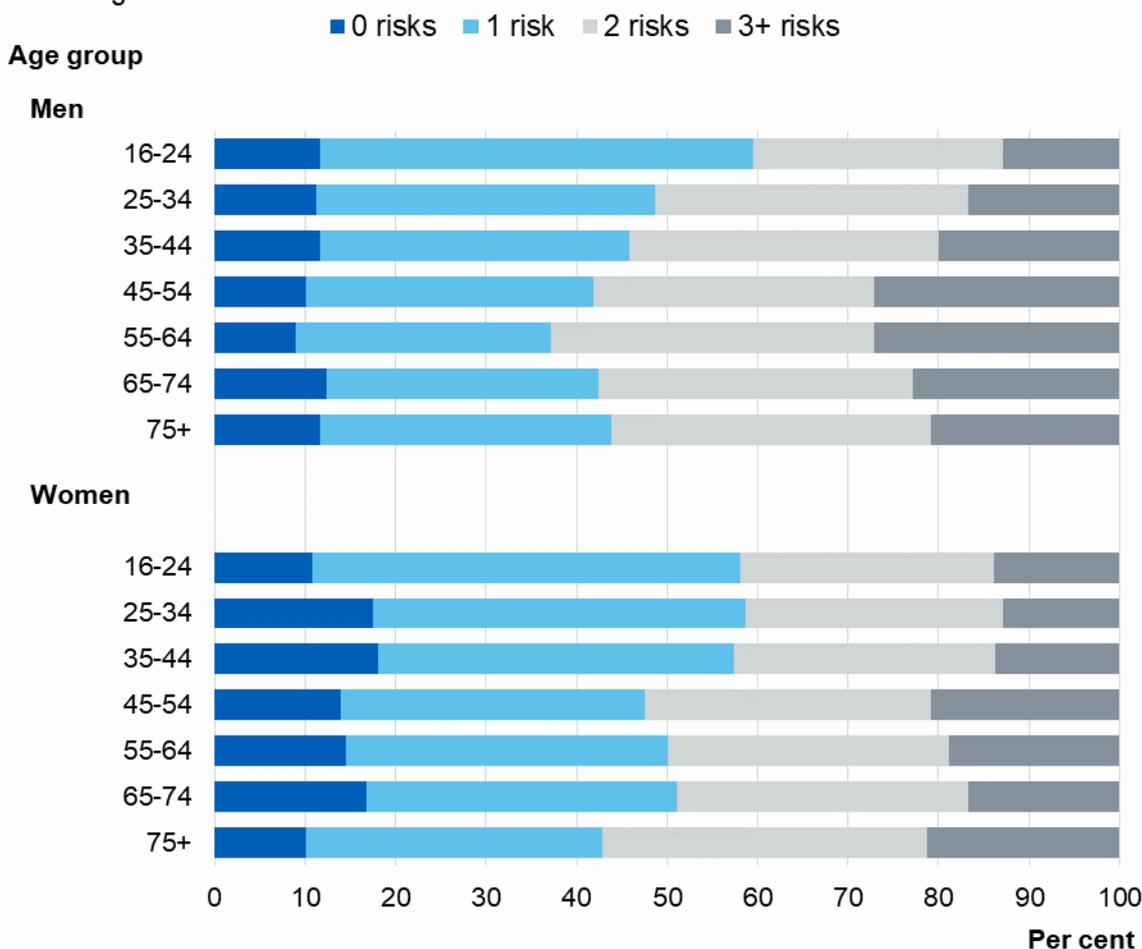
Prevalence of multiple risks was higher in men than in women. 54% of men and 47% of women had two or more risks; 21% of men and 17% of women had three or more risks. Survey estimates are subject to a margin of error. It is likely that the proportion of men with two or more risks is between 53% and 56%, and the proportion of women with two or more risks is between 46% and 49%.

The proportions of adults with two or more risks increased with age from 41% in those aged 16 to 24 to 55% in those aged 45 to 54, and were at a broadly similar level thereafter. The prevalence of multiple risks was similar for men and women in the youngest and oldest age groups. In contrast, the prevalence of multiple risks was higher in men than in women between the ages of 25 and 74. For example, 54% of men aged 35 to 44 had two or more risks, compared with 43% of women.

Figure 2, Table 1

Figure 2: Prevalence of multiple risks based on interview data, by age and sex

Base: Aged 16 and over



Source: NHS Digital

Combinations of risk types, by age and sex

Overall, 17% of adults were current smokers, 21% were physically inactive, 23% drank more than 14 units of alcohol a week, and 27% were obese. While each of these risk types comprised a minority of adults, a majority, 72%, of adults consumed fewer than the recommended five portions of fruit and vegetables per day.^{35,36}

Figure 3 shows the combinations of risk types by sex.³⁷ Overall, 35% of men and 38% of women had only one risk. The most prevalent single risk was consuming fewer than the recommended five portions of fruit and vegetables per day (24% of men and 26% of women). Other common single risks were drinking more than 14 units of alcohol a week (4% of men and 3% of women) and obesity (3% of men and 5% of women).

³⁵ These proportions were based on the survey participants with full information ('complete cases') analysed for this topic report, so may differ from figures published in the other reports and are not definitive.

³⁶ The differences in the proportions of adults in each risk category are reflected in the proportions in each combined risk category.

³⁷ Figure 3 shows only the combinations of risk types with a sex-specific prevalence of at least 1%.

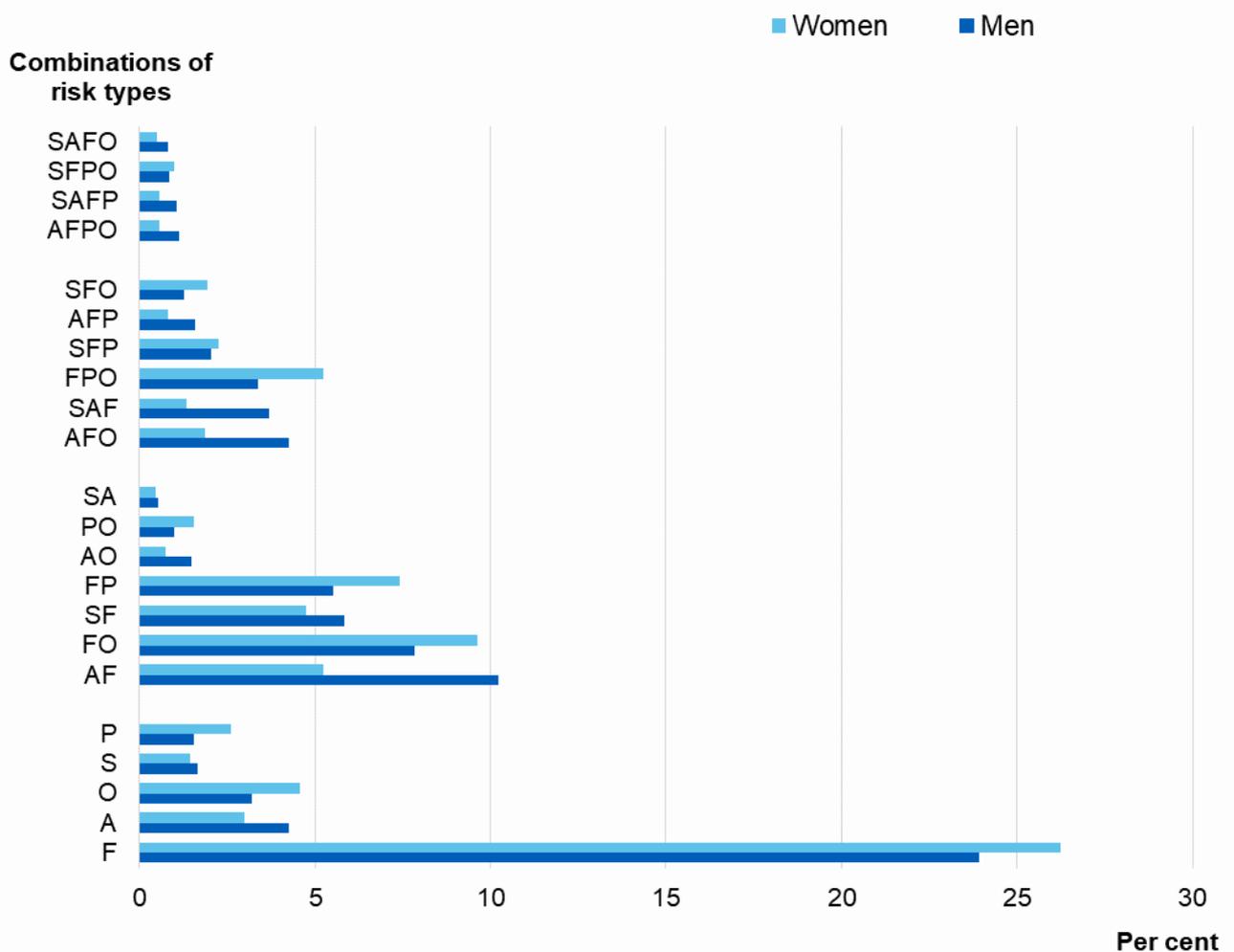
33% of men and 31% of women had two risks. The most common combination of two risks among men was drinking over the recommended weekly limit and consuming fewer than five portions of fruit and vegetables per day (10%). Among women, the most common combination of two risks was consuming fewer than five portions of fruit and vegetables per day and being obese (10%).

Overall, 17% of men and 14% of women had three risks. Combinations of drinking over the recommended weekly limit and low fruit and vegetable consumption with another factor were the most prevalent among men (4% for both obesity and smoking as the third risk). A similar proportion of women exhibited the three risks of low fruit and vegetable consumption, inactivity, and obesity (5%).

Figure 3, Table 2

Figure 3: Combinations of risk types based on interview data, by sex

Base: Aged 16 and over



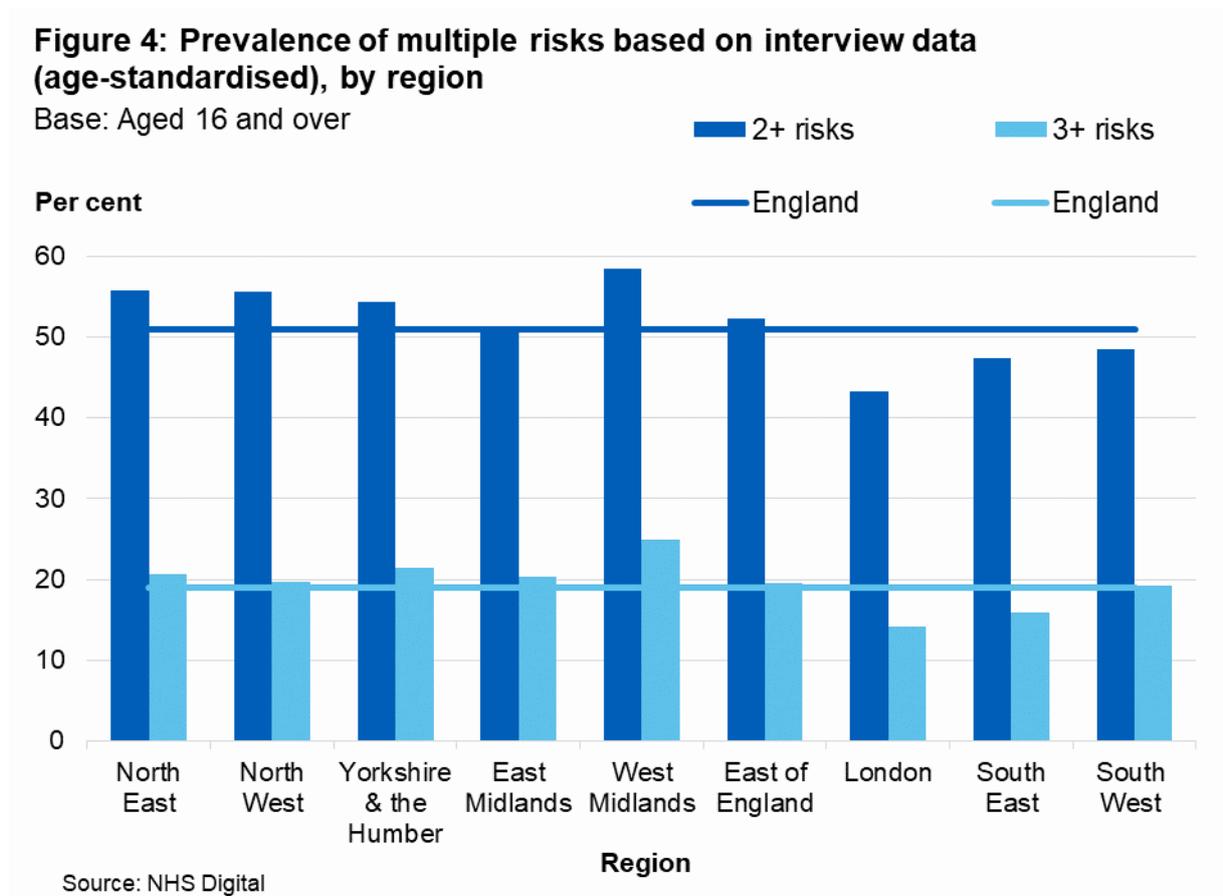
Source: NHS Digital

F: Low Fruit and vegetable consumption; A: above weekly Alcohol consumption limit; O: Obesity; S: Smoking; P: Physical inactivity

Prevalence of multiple risks, by region

The age-standardised proportions of adults with multiple risks varied between regions. The proportion of adults with two or more risks was highest in the West Midlands (58%) and lowest in London (43%). This pattern by region was broadly similar for the proportions with three or more risks.

Figure 4, Table 3



Prevalence of multiple risks, by equivalised household income

The age-standardised proportions of adults with multiple risks varied by equivalised household income.³⁸ The proportion of adults with three or more risks was 13% in the highest income households, compared with 26% in the lowest income households.

The variation in the proportions between income groups was larger in women than in men. For example, 46% of men in the highest income households had two or more risks, compared with 62% of men in the lowest income households. Among women, 34% in the highest income households had two or more risks, compared with 60% of women in the lowest income households. This pattern by income was broadly similar for the proportions with three or more risks.

³⁸ Equivalised household income, takes into account the number of adults and dependent children in the household as well as overall household income. Households are divided into quintiles (fifths) based on this measure.

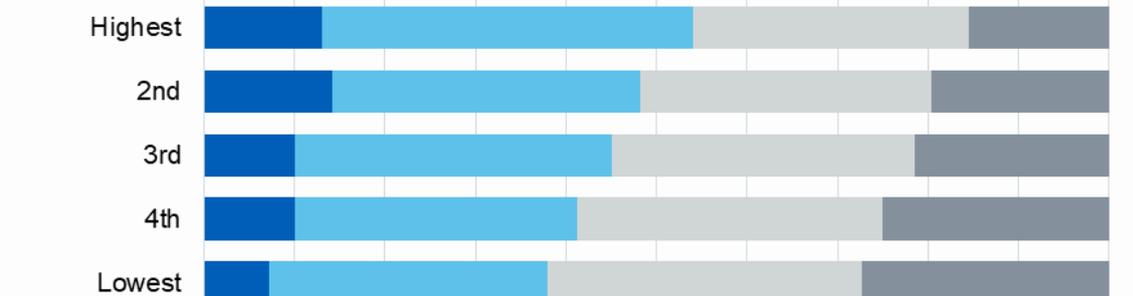
Figure 5, Table 4

Figure 5: Prevalence of multiple risks based on interview data (age-standardised), by equivalised household income and sex

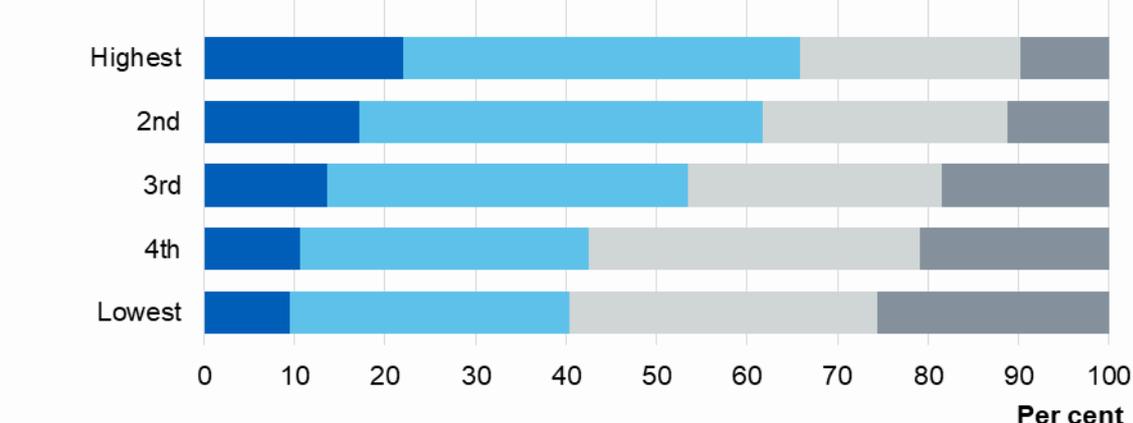
Base: Aged 16 and over

Equivalised household income quintile

Men



Women



Source: NHS Digital

Prevalence of multiple risks, by Index of Multiple Deprivation

The English Indices of Deprivation 2015, which measure and rank local levels of deprivation, are calculated by the Department for Communities and Local Government. The indices are based on 37 indicators, across seven domains of deprivation.³⁹ The Index of Multiple Deprivation (IMD) is a measure of the overall deprivation experienced by people living in a neighbourhood.⁴⁰

In this publication, IMD rankings have been split into quintiles (fifths). The lowest quintile indicates the lowest levels of deprivation; the highest quintile indicates that the

³⁹ The seven domains used to calculate IMD are: income deprivation; employment deprivation; health deprivation and disability; education; skills and training deprivation; crime; barriers to housing and services; and living environment deprivation.

⁴⁰ Department for Communities and Local Government. *The English Indices of Deprivation 2015*, London, 2015. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/465791/English_Indices_of_Deprivation_2015_-_Statistical_Release.pdf

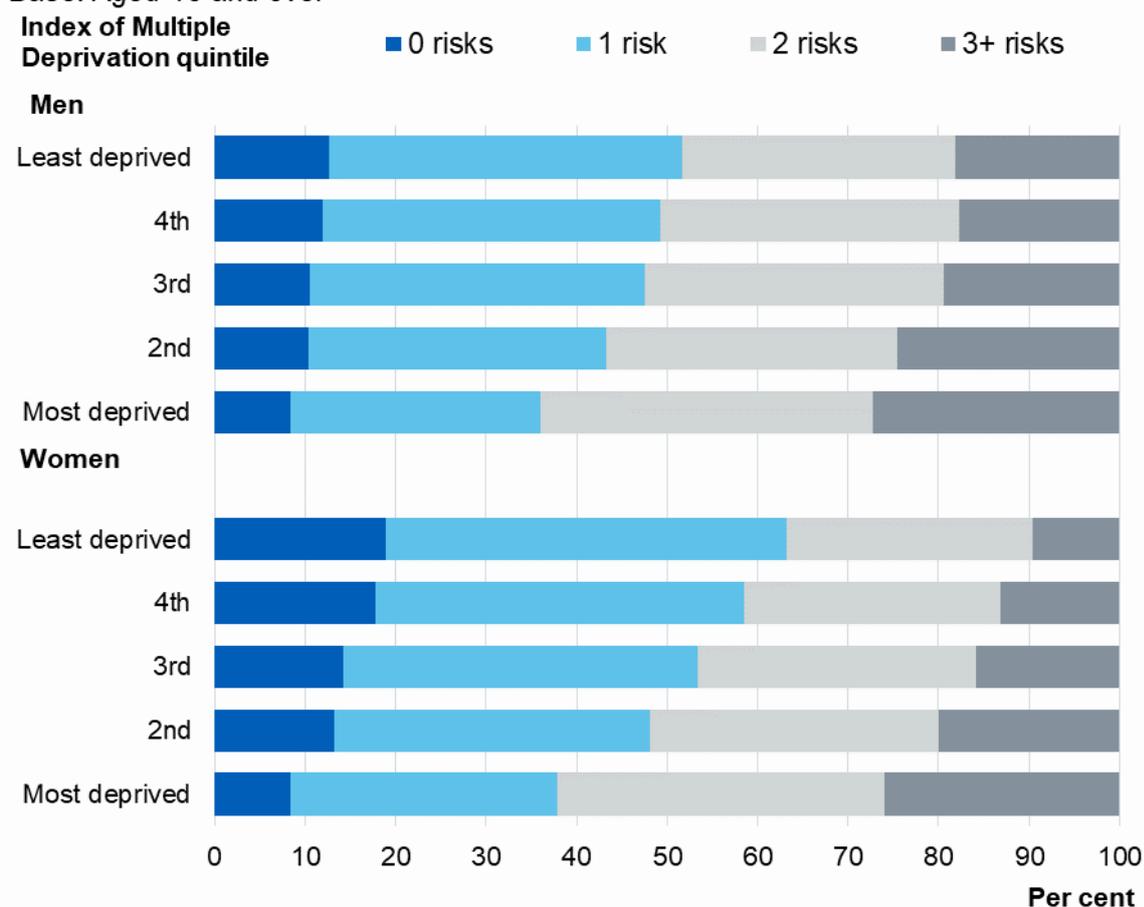
neighbourhood experiences the highest levels of deprivation. Not everyone who lives in a deprived neighbourhood will be deprived themselves.

The prevalence of multiple risks varied by area deprivation. The proportion of adults with three or more risks was 14% in the least deprived quintile, compared with 27% in the most deprived quintile. The variation in the proportions between IMD quintiles was larger in women than in men. For example, 48% of men in the least deprived quintile had two or more risks, compared with 64% of men in the most deprived quintile. Among women, 37% in the least deprived quintile had two or more risks, compared with 62% of women in the most deprived quintile. This pattern by IMD was broadly similar for the proportions with three or more risks.

Figure 6, Table 5

Figure 6: Prevalence of multiple risks based on interview data (age-standardised), by Index of Multiple Deprivation and sex

Base: Aged 16 and over



Source: NHS Digital

Previous HSE reports on cigarette smoking⁴¹ and fruit and vegetable consumption⁴² have shown that the prevalence of each of these individual risk factors is generally higher among adults in the lowest income households. Conversely, risky alcohol consumption (i.e. exceeding 14 units a week) is higher in higher income households than in lower income households.⁴³ Physical activity⁴⁴ and fruit and vegetable consumption are generally higher among adults in less deprived neighbourhoods.⁴² Obesity varies by area deprivation in women but not in men.⁴⁵

Prevalence of multiple risks, by ethnicity

Table 7 shows the prevalence of multiple risk factors by ethnicity. Ethnicity is presented in three categories: White, Black, and Asian (including Chinese). Analyses of multiple risk factors by ethnicity were limited to persons aged 25 to 64, due to small numbers at lower and older ages within the Black and Asian groups. The 'Mixed' category was not included in this table as most are young, as well as coming from a range of backgrounds. The 'other' category is small and likely to be composed of individuals from a variety of different backgrounds, and so has been omitted from the analysis.

After controlling for age, the proportions of adults aged 25 to 64 with multiple risks were highest among adults in the White group. 53% of adults in the White group had two or more risks, compared with 48% of adults in the Black group and 38% of adults in the Asian group.

Figure 7, Table 6

⁴¹ Ng Fat L. *Health Survey for England 2015. Adult cigarette smoking*. Health and Social Care Information Centre, Leeds, 2016, available via <https://files.digital.nhs.uk/publicationimport/pub22xxx/pub22610/hse2015-adult-smo.pdf>

⁴² Roberts C. *Fruit and vegetable consumption*. Chapter 7 in Craig R, Mindell J (eds). *Health Survey for England 2013*. Health and Social Care Information Centre, Leeds, 2014, available via <https://files.digital.nhs.uk/publicationimport/pub16xxx/pub16076/hse2013-ch7-fru-veg-com.pdf>

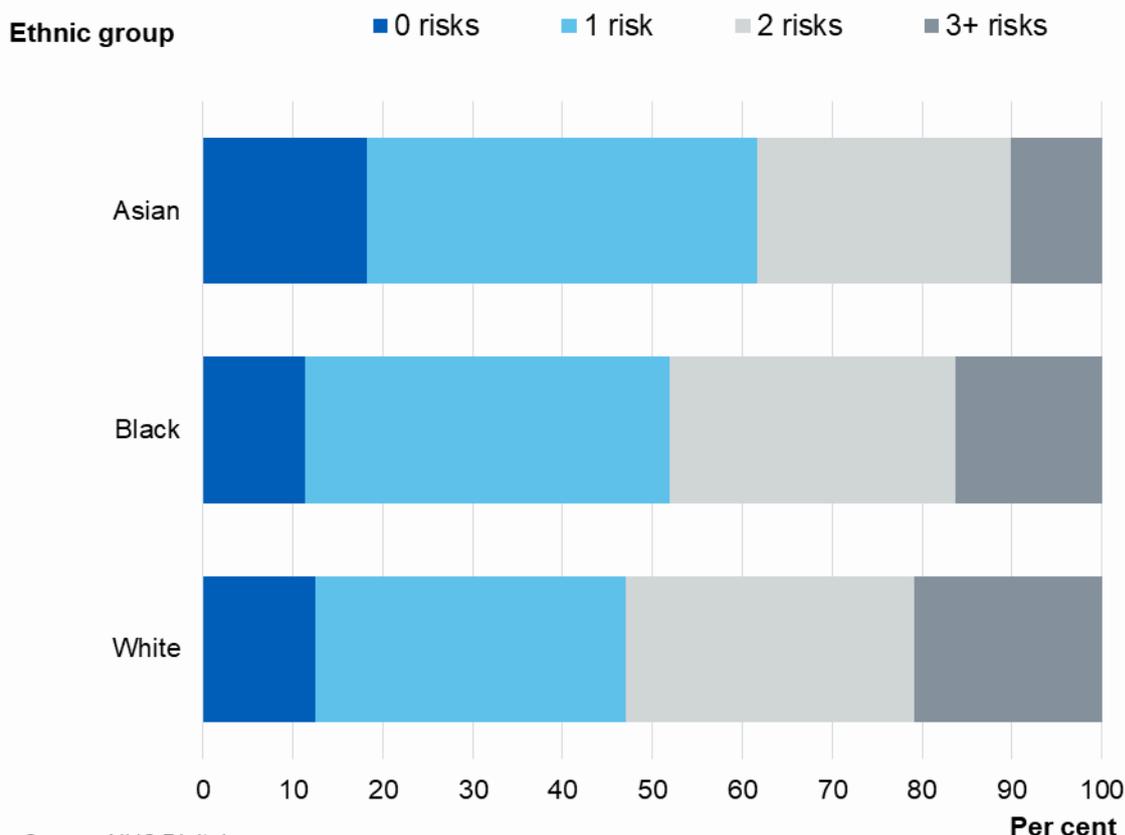
⁴³ Brown L. *Adult alcohol consumption. Health Survey for England 2015*. Health and Social Care Information Centre, Leeds, 2016, available via <https://files.digital.nhs.uk/publicationimport/pub22xxx/pub22610/hse2015-adult-alc.pdf>

⁴⁴ Scholes S. *Physical activity in adults. Health Survey for England 2016*. NHS Digital, Leeds, 2017, available via <https://files.digital.nhs.uk/publication/m/3/hse16-adult-phy-act.pdf>.

⁴⁵ Conolly A and Saunders C. *Adult overweight and obesity. Health Survey for England 2016*. Health and Social Care Information Centre, Leeds, 2017, available via <https://files.digital.nhs.uk/publication/m/6/hse2016-adult-obe.pdf>.

Figure 7: Prevalence of multiple risks based on interview data (age-standardised), by ethnicity

Base: Aged 25-64



Prevalence of multiple risks, by doctor-diagnosed cardiovascular disease

Participants were classified as ever having any CVD if they responded ‘Yes’ to any of the questions indicating doctor-diagnosed angina, myocardial infarction (MI), stroke, abnormal heart rhythm, a heart murmur, or ‘other doctor-diagnosed cardiovascular condition’.⁴⁶ Information on the number of multiple risks by CVD status is shown using data from the 2017 HSE only as the questions on CVD were not asked in the 2016 HSE. This analysis was based on participants aged 35 and over due to the low prevalence of CVD among younger adults.

In 2017, the age-standardised proportion of adults aged 35 and over with multiple risks was higher among adults with CVD. For instance, 61% of adults with CVD had two or more risks, compared with 51% of adults without CVD. A similar pattern was observed for three or more risks. 30% of adults with CVD had three or more risks, compared with 19% of adults without CVD.

Table 7

⁴⁶ See the HSE 2017 report on Cardiovascular disease for further information about CVD. <https://digital.nhs.uk/pubs/hse2017>

Prevalence of multiple risks, by longstanding mental or other condition

Participants in the HSE were asked whether they had any physical or mental health conditions lasting or expected to last 12 months or more. Those who reported such a condition were asked whether it limited their daily activities in any way. Those participants who described their longstanding illness through terms such as 'mental illness', 'anxiety' or 'depression' were classified as having a longstanding mental condition. Table 8 shows the prevalence of multiple risk factors by longstanding mental or other conditions.⁴⁷ Three categories of longstanding condition were defined:

- Longstanding mental condition (limiting or non-limiting);
- Longstanding illness or condition but no mental condition (limiting or non-limiting); and
- No longstanding illness or condition.

Participants with a longstanding mental condition may also have reported a physical disorder.

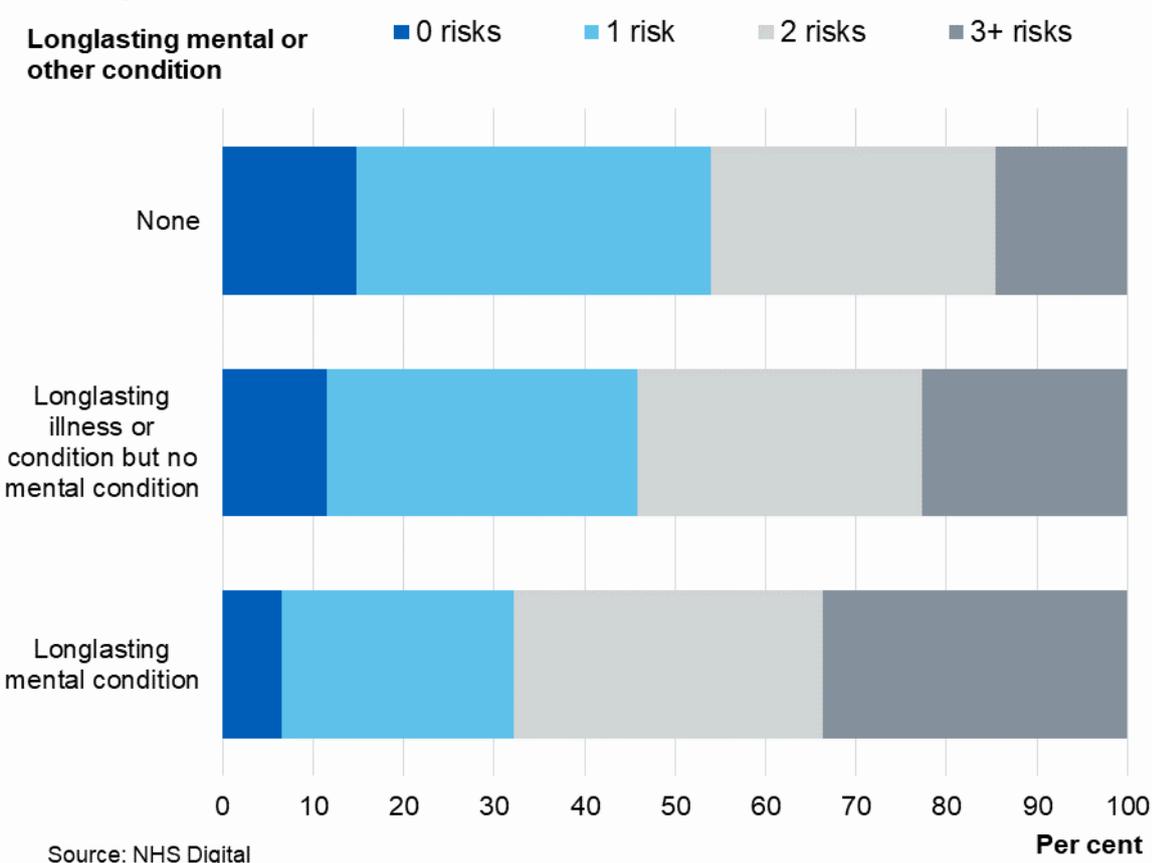
The age-standardised proportion of adults with multiple risks were higher for adults reporting any physical or mental health conditions lasting or expected to last 12 months or more. 68% of those with a longstanding mental condition had two or more risks, compared with 54% of those with a longstanding illness or physical condition but no mental condition and 46% of adults with no longstanding physical or mental health condition. A similar pattern was observed for three or more risks.

Figure 8, Table 8

⁴⁷ Questions on longstanding illness were asked in HSE 2016 and HSE 2017. The 12-item General Health Questionnaire (GHQ-12) and the EQ-5D health questionnaire were only available for single years (HSE 2016 and HSE 2017 respectively) and so were not used in this report.

Figure 8: Prevalence of multiple risks by longstanding mental or other condition (age-standardised)

Base: Aged 16 and over



Prevalence and combinations of multiple raised biomarkers

Prevalence of multiple raised biomarkers, by age and sex

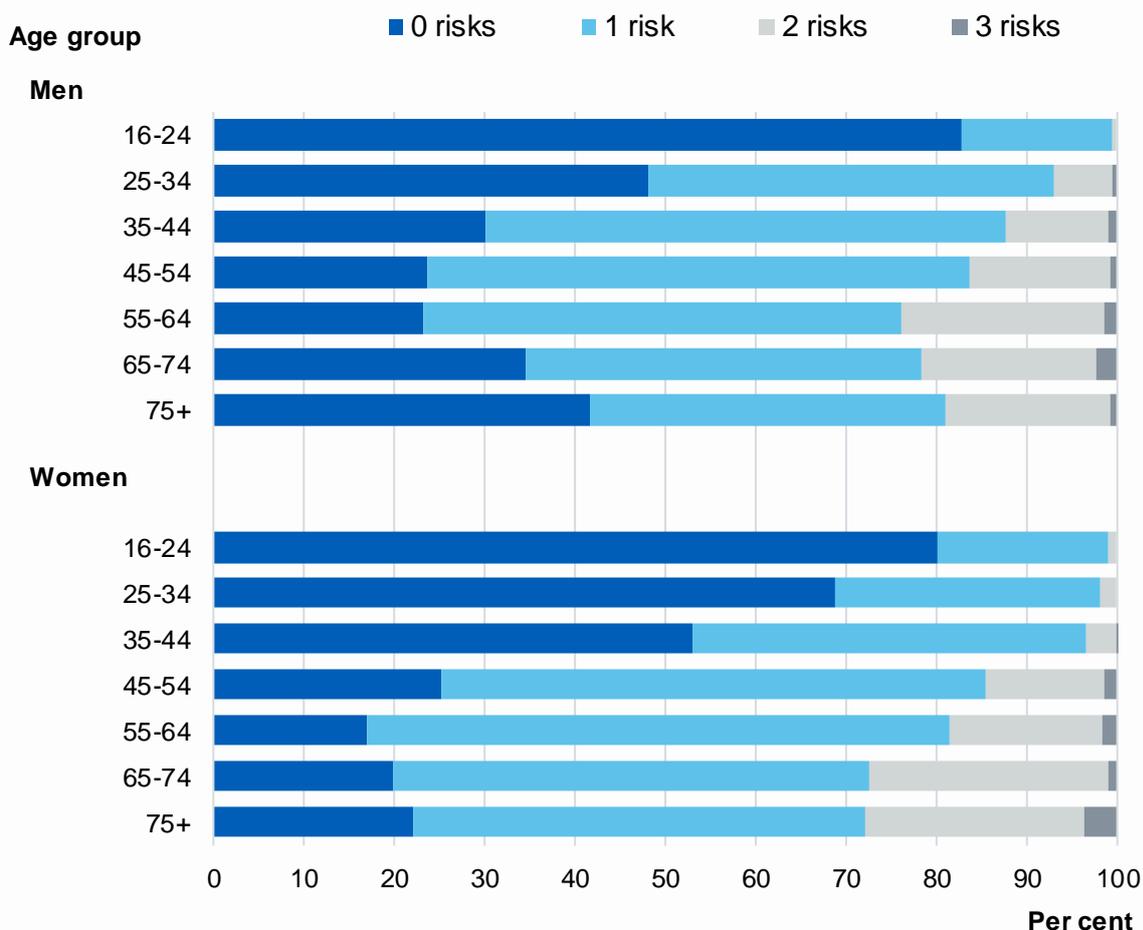
In 2016-17, 41% of adults had no raised biomarkers; 46% had only one of the three, and 12% had two. A very small proportion of adults had all three (1%).

For both men and women, there was marked variation by age in the prevalence of two or more raised biomarkers. It was higher for men than for women between the ages of 25 and 44, and higher for women than men among those aged 65 and over.

Figure 9, Table 9

Figure 9: Prevalence of multiple raised biomarkers, by age and sex

Base: Aged 16 and over with valid blood tests



Source: NHS Digital

Combinations of multiple raised biomarkers, by age and sex

Among survey participants with valid data for all three biomarkers, 7% had raised glycated haemoglobin, 17% had raised blood pressure, and 50% had raised total cholesterol.^{48,49}

Figure 10 shows the combinations of raised biomarkers by sex. Overall, 46% of both sexes had one raised biomarker only. The most prevalent single risk was raised total cholesterol (36% of men and 39% of women). Smaller proportions had raised blood pressure only (6% of men and 4% of women) and raised glycated haemoglobin only (4% of men and 2% of women). The most common combination of two uncontrolled biomarkers was raised blood pressure and raised total cholesterol (10% for men and women).

The prevalence of having both raised blood pressure and raised total cholesterol followed different age patterns for men and women, as is shown in Figure 11. The

⁴⁸ These proportions may differ from figures published in the other reports and are not definitive.

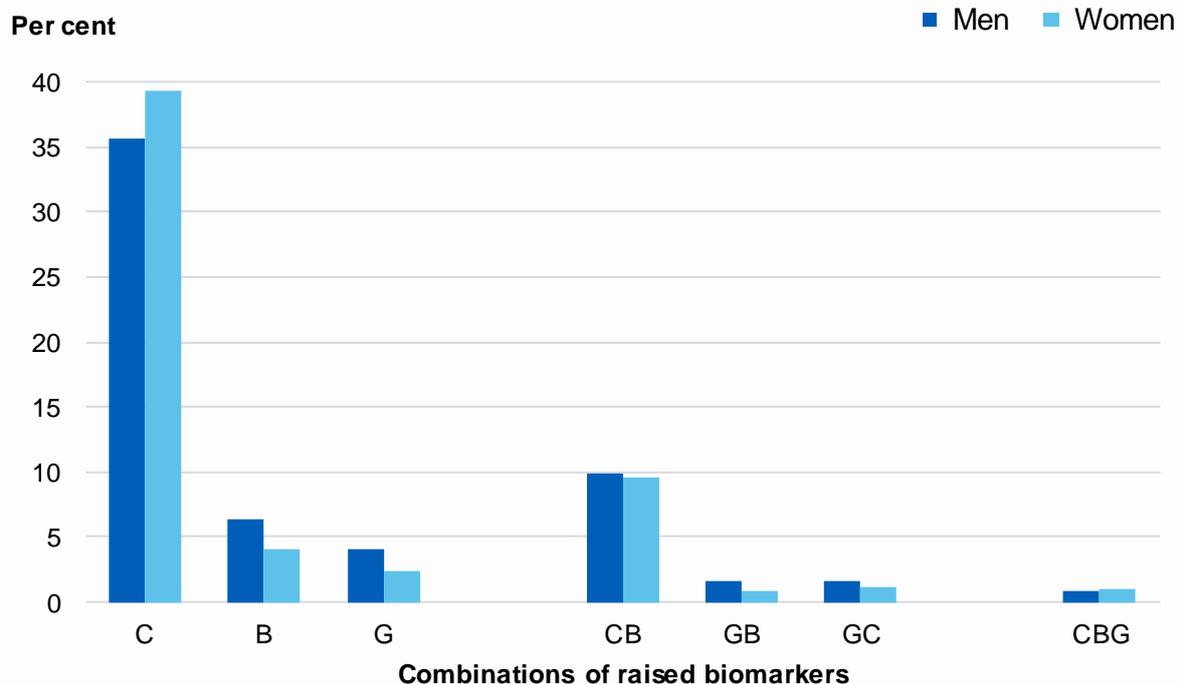
⁴⁹ The differences in these proportions are reflected in the proportions with two or three raised biomarkers.

prevalence of having raised blood pressure and raised cholesterol was higher for men than for women between the ages of 25 and 64. From the age of 65, the prevalence of having raised blood pressure and raised total cholesterol was higher for women than for men.

Figures 10 and 11, Table 10

Figure 10: Combinations of raised biomarkers, by sex

Base: Aged 16 and over with valid blood tests

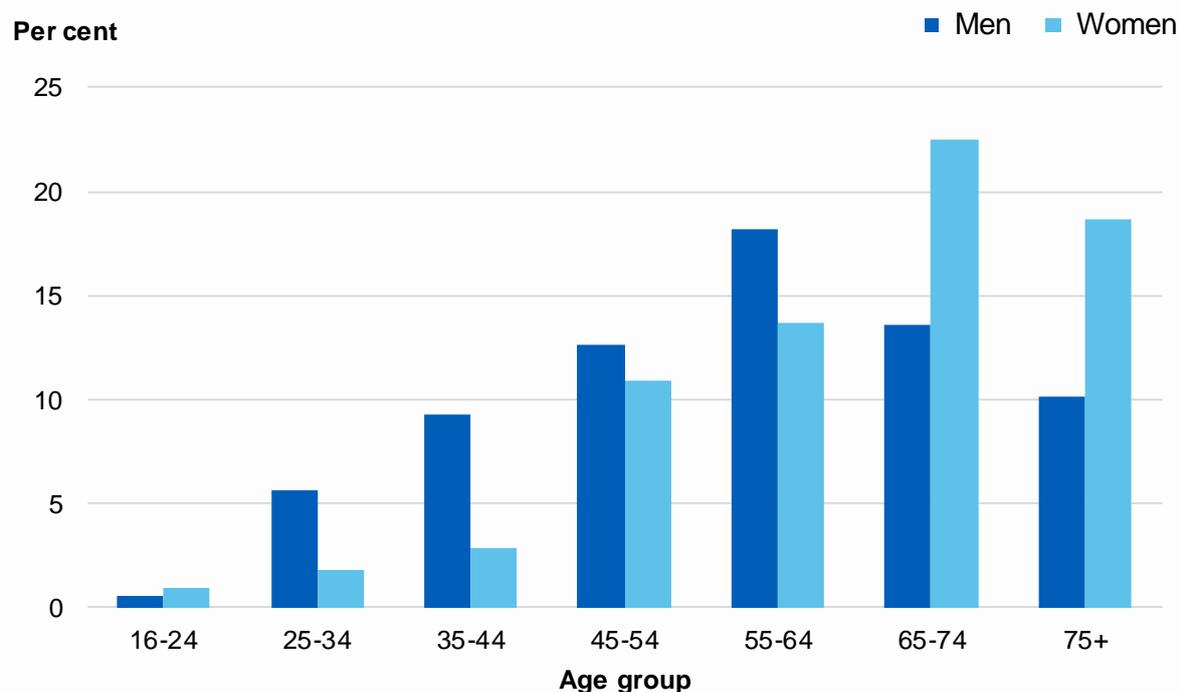


Source: NHS Digital

C: Raised total **C**holesterol; B: Raised **B**lood pressure; G: Raised **G**lycated haemoglobin

Figure 11: Prevalence of raised blood pressure and raised total cholesterol, by age and sex

Base: Aged 16 and over with valid blood tests



Source: NHS Digital

Prevalence of multiple raised biomarkers, by population subgroups

The age-standardised prevalence of multiple raised biomarkers was similar across regions: the apparent differences are within the margins of error which apply to this survey sample. The proportions also were similar across equivalised household income, neighbourhood deprivation (IMD), CVD status, and longstanding mental or physical conditions.

Tables 11 to 15

Prevalence of multiple raised biomarkers, by number of risks based on interviewer data

Adults with multiple risk factors based on interviewer data⁵⁰ were more likely to have multiple raised biomarkers. The proportion of adults with multiple raised biomarkers (two or more) was 22% among those with three or more risk factors and 14% among those with two risks, compared with 8% and 10% among those with no risks or a single risk factor respectively.

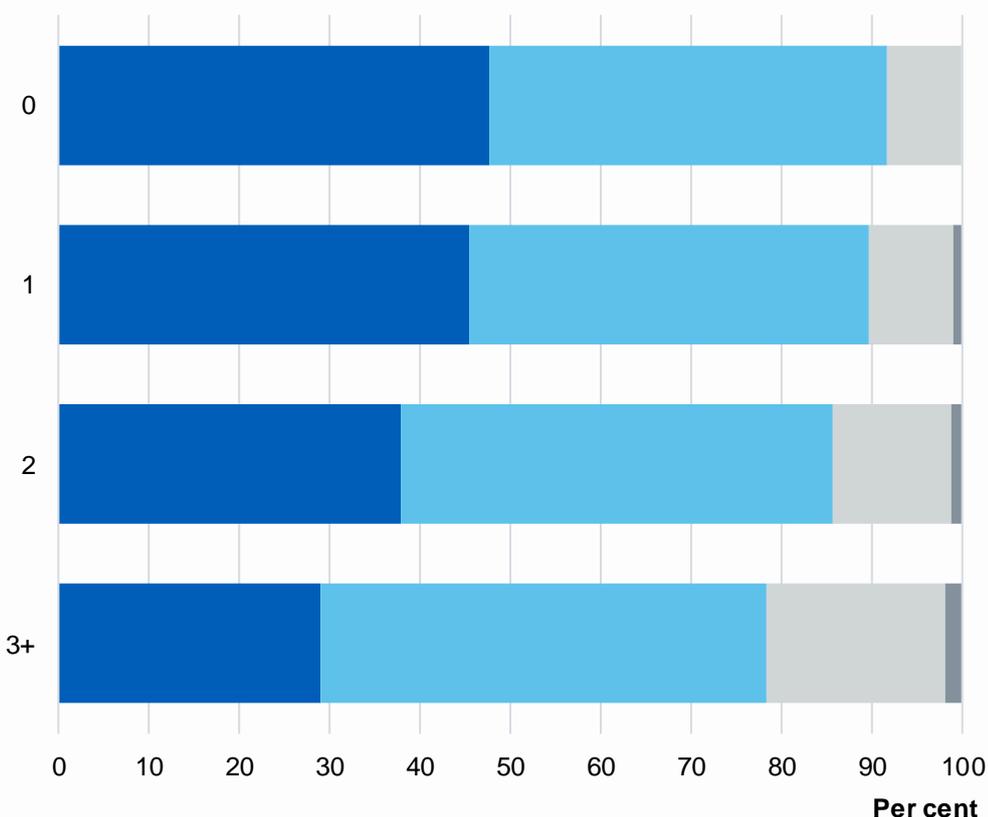
Figure 12, Table 16

Figure 12: Prevalence of multiple raised biomarkers, by number of risks based on interview data

Base: Aged 16 and over with valid blood tests

Number of risks based on interview data

0 risks 1 risk 2 risks 3 risks



Source: NHS Digital

⁵⁰ Cigarette smoking, levels of alcohol consumption indicating increased or higher risk of harm, obesity, low fruit and vegetable consumption, and physical inactivity.

Information and technology for better health and care

www.digital.nhs.uk

0300 303 5678

enquiries@nhsdigital.nhs.uk

 [@nhsdigital](https://twitter.com/nhsdigital)

ISBN 978-1-78734-255-2

This publication may be requested
in large print or other formats.

Published by NHS Digital,
part of the Government Statistical Service

Copyright © 2018 NHS Digital.
NHS Digital is the trading name of The Health and Social Care
Information Centre a non-departmental body created by statute.

OGL

You may re-use this document/publication (not including logos)
free of charge in any format or medium, under the terms of the Open
Government Licence v3.0.

To view this licence visit

www.nationalarchives.gov.uk/doc/open-government-licence

or write to the Information Policy Team, The National Archives,
Kew, Richmond, Surrey, TW9 4DU;

or email: psi@nationalarchives.gsi.gov.uk