



# Health Survey for England 2016

## Physical activity in adults

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This report examines physical activity in adults in England in 2016. It reports on adherence to current physical activity guidelines for aerobic activity, muscle-strengthening activity, and, for older people, activities to improve balance and co-ordination. Participation in individual types of leisure physical activity is also shown, as well as occupational activity, and sedentary behaviours.

### Key findings

- 66% of men and 58% of women aged 16 and over met the aerobic guidelines of at least 150 minutes of moderate activity or 75 minutes of vigorous activity per week or an equivalent combination of both, in bouts of 10 minutes or more.
- Compared with 2012, the proportion of adults meeting these aerobic activity guidelines was similar for men (67% in 2012) but had increased for women (from 55% in 2012).
- The proportion of adults meeting the aerobic activity guidelines varied by region, being lowest in the West Midlands (53%) and highest in London (65%). The proportion also varied by quintile of the Index of Multiple Deprivation (IMD), ranging from 50% in the most deprived quintile to 68% in the least deprived quintile.
- Adults are also recommended to undertake muscle-strengthening activities on at least two days per week to increase bone strength and muscular fitness. 31% of men and 23% of women aged 16 and over met both the aerobic and muscle-strengthening guidelines.
- Men were more likely than women to spend six or more hours of total sedentary time (time spent watching TV and other sedentary time such as reading and computer use, excluding sedentary time during paid work) per weekend day (40% and 35% respectively); however, the equivalent proportion per weekday was the same for men and women (29%).

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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 adults meeting current physical activity guidelines in England and to monitor adherence to these guidelines over time.

## Introduction

### Contents

This report presents leisure and occupational physical activity data from adults who participated in the Health Survey for England in 2016. It describes the frequency and duration of participation in different types of activity, and compares reported activity levels with the current UK guidelines for aerobic activity, muscle-strengthening activity, and in older people, exercise to improve balance and co-ordination. This report also presents sedentary behaviour data. It compares levels of both physical activity and sedentary behaviour in 2016 with those reported in 2012. Detailed tables accompanying this report can be accessed via <http://digital.nhs.uk/pubs/hse2016>.

### Background

Physical activity is important for cardiovascular health. The UK analysis of the Global Burden of Diseases, Injuries and Risk Factors Study found physical inactivity and low physical activity to be the fourth leading risk factor contributing to deaths and the burden of disease globally, ranking ahead of overweight or obesity.<sup>1</sup> Physical inactivity was estimated in that study to contribute to almost one in ten premature deaths from coronary heart disease (CHD) and one in six deaths from any cause.

In addition to the health burden, physical inactivity imposes a significant financial burden, with the direct costs to the National Health Service estimated to be more than £900 million in 2009/10.<sup>2</sup> Participation in sport is beneficial for the economy, contributing £39 billion every year.<sup>3</sup> Regular physical activity is also beneficial for mental wellbeing and for reducing the risk of developing depression.<sup>4</sup> Among older people, physical activity is associated with better health and cognitive function<sup>5</sup> and can reduce the risk of falls in those with mobility problems.<sup>6,7</sup>

In 2011, the Chief Medical Officers of the four UK countries introduced revised guidelines for physical activity that reflected current evidence on what is needed to benefit health and what are the incremental benefits from undertaking physical activity.<sup>8</sup> Separate guidelines were issued for aerobic activity (recommending a

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<sup>1</sup> 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.

<sup>2</sup> Townsend N, Wickramasinghe K, Williams J, et al. *Physical activity statistics 2015*. British Heart Foundation, 2015.

<sup>3</sup> HM Government. *Sporting Future: A New Strategy for an Active Nation*. Cabinet Office, London, 2015.

<sup>4</sup> Mammen G and Faulkner G. *Physical Activity and the Prevention of Depression: A Systematic Review of Prospective Studies*. Am J Prev Med 2013;**45**(5):649-657.

<sup>5</sup> Paillard T, Rolland Y, de Souto Barreto P. *Protective effects of physical exercise in Alzheimer's disease and Parkinson's disease: A narrative review*. J Clin Neurol 2015;**11**:212-219.

<sup>6</sup> Lusa Cadore E, Rodríguez-Mañas L, Sinclair A, et al. *Effects of Different Exercise Interventions on Risk of Falls, Gait Ability, and Balance in Physically Frail Older Adults: A Systematic Review*. Rejuvenation Research 2013;**16**:105-114.

<sup>7</sup> Bauman A, Merom D, Bull FC. *Updating the Evidence for Physical Activity: Summative Reviews of the Epidemiological Evidence, Prevalence, and Interventions to Promote "Active Aging"*. The Gerontologist 2016;**56** Suppl 2:S268-S280.

<sup>8</sup> Department of Health. *Start Active, Stay Active. A report on physical activity for health from the four home countries' Chief Medical Officers*. DH, London, 2011.  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/216370/dh\\_128210.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/216370/dh_128210.pdf)

combination of moderate and vigorous intensity activities); muscle-strengthening activities; and, among older people, activities to improve balance and co-ordination. The recommendations provide more flexibility towards achieving physical activity goals, recognising that the overall volume of physical activity is more important for health than the specific type of activity or frequency of sessions. Data from the Health Survey for England are used to monitor adherence to the guidelines; the HSE 2016 provides the first opportunity to measure the extent to which the proportion of adults meeting them has changed since 2012.<sup>9</sup> As the Health Survey for England includes occupational activity in the overall measure of physical activity, it complements the local measurement of aerobic physical activity and sport through Sport England's Active Lives Survey.<sup>10</sup>

The 2011 guidelines also highlighted the importance of minimising the amount of time spent being sedentary (sitting) for extended periods. Sedentary behaviour is defined as activity with very low energy expenditure, undertaken primarily sitting or lying down. Sedentary behaviours are undertaken in a range of settings, including home, travel, work, and in leisure time. Evidence suggests that sedentary behaviour is strongly associated with poor health, independent of overall levels of physical activity.<sup>11</sup>

Helping more people to be more active, more often is an over-arching policy objective of the government. The previous government's strategy for sport and physical activity published in 2015 included broadening Sport England's remit to take responsibility for sport outside school from the age of five, rather than 14, and an emphasis on making future funding decisions on the basis of the social good that sport and physical activity could deliver, not simply on the number of participants.<sup>12</sup> The strategy committed to distributing funding to focus on those groups with participation rates well below the national average, including women, disabled people, those in lower socioeconomic groups and older people. The commitment to and the rationale for reducing levels of physical inactivity had been set out in the 2014 *Moving More, Living More* report.<sup>13</sup> Public Health England's *Everybody Active, Every Day* report, also published in 2014, set out clear guidance for public sector bodies and others to promote physical activity, under the four themes of: active society (creating a social movement); moving professionals (activating networks of expertise); active environments (creating the right spaces); and moving at scale (interventions that make us active).<sup>14</sup>

Given the public health importance of physical activity and of minimising the amount of time spent being sedentary, it is essential that there are robust surveillance data to

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<sup>9</sup> Scholes S, Mindell J. *Physical activity in adults*. Chapter 2 in Craig R, Mindell J (eds). *Health Survey for England 2012*. Health and Social Care Information Centre, Leeds, 2013.

<sup>10</sup> Sport England. *Active Lives Survey 2016-17: May 16/17 Report*. Sport England 2017. [www.sportengland.org/media/12458/active-lives-adult-may-16-17-report.pdf](http://www.sportengland.org/media/12458/active-lives-adult-may-16-17-report.pdf)

<sup>11</sup> Owen N, Healy GN, Matthews CE, et al. *Too Much Sitting: The Population-Health Science of Sedentary Behavior*. *Exerc Sport Sci Rev*. 2010;**38(3)**:105-113.

<sup>12</sup> HM Government. *Sporting Future: A New Strategy for an Active Nation*. Cabinet Office, London, 2015.

<sup>13</sup> HM Government. *Moving More, Living More: The physical activity Olympic and Paralympic Legacy for the Nation*. HMG, London, 2014. [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/279657/moving\\_living\\_more\\_inspired\\_2012.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/279657/moving_living_more_inspired_2012.pdf)

<sup>14</sup> Public Health England. *Everybody active, every day*. Public Health England, London, 2014. [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/374914/Framework\\_13.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/374914/Framework_13.pdf)

assess the impact of policy initiatives and to highlight the case, and to generate hypotheses, for further research. The HSE series provide a robust method of achieving this. The data reported here enable assessment of patterns in physical activity and sedentary behaviour over time, to monitor the impact of trends in both underlying causal factors and policy initiatives. These findings will contribute to UK, European, and global surveillance of physical activity, as part of the international efforts to prevent and treat non-communicable diseases.<sup>15</sup>

## Methods and definitions

### Methods

Full details of the questions used to assess physical activity are contained in the survey documentation.<sup>16</sup> They are summarised briefly here.

### Questions about physical activity

The physical activity questionnaire in HSE 2016 was identical to the questionnaire used in HSE 2012. The evolution of the various different questionnaires that have been used in the HSE series to assess adult physical activity was described in detail in the HSE 2012 report.<sup>17</sup>

Questions concerned participation during the last four weeks in housework, manual, gardening and DIY activities, walking, and sports and exercise. Activities were counted if they had been done for a minimum of 10 minutes, reflecting the policy recommendations for physical activity.

The questionnaire also asked about occupational activity, capturing information about physical activity while at work. The questions focused on what people actually did at work, and asked how many hours they typically worked to capture these data more accurately.

A short set of questions asked about television watching and about other time spent sitting down in leisure time activities, such as reading, studying, using a computer, or playing video games. The questions gathered information separately about sedentary time on weekdays and at weekends, excluding sedentary time during paid work.

As in HSE 2012, adults' physical activity in the four weeks prior to interview was measured in HSE 2016 by examining: overall participation; frequency of participation in activities that lasted at least 10 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 questions on occupational activity were taken into account in the estimation of summary activity levels.

### Activity types, frequency, duration, and intensity

Details about four main types of physical activity were included in the questionnaire. For most activities undertaken, participants were asked on how many days in the last

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<sup>15</sup> World Health Organization. *Global Action Plan for the prevention and control of NCDs 2013-2020*. WHO, Geneva. [www.who.int/nmh/events/ncd\\_action\\_plan/en/](http://www.who.int/nmh/events/ncd_action_plan/en/)

<sup>16</sup> The survey documentation can be found on the HSE 2016 report website <https://digital.nhs.uk/pubs/hse2016>.

<sup>17</sup> Scholes S, Mindell J. in Craig R, Mindell J (eds). *Health Survey for England 2012*. See Note 9.

four weeks they had done the activity in 'bouts' of 10 minutes or more, and the average length of time spent doing that activity on those days.

### **Home activity**

This consisted of housework and manual work, gardening and DIY. The initial question was 'Have you done any housework in the last four weeks?' Participants were shown a card with a list of examples of light housework and were asked if they had done any of the listed activities. (The show cards are included in the survey documentation.)<sup>16</sup>

They were then shown another card with examples of heavy housework, and frequency was assessed for these higher intensity activities.<sup>18</sup> Frequency of light home activity (i.e. those activities listed in the first set of show cards) was not assessed.

A similar sequence of questions was asked for manual work, gardening and DIY.<sup>19</sup>

### **Walking**

Participants were asked 'During the past four weeks, on how many days did you do a walk of at least 10 minutes?' Walking intensity was assessed by asking participants to rate their usual walking pace (slow, average, fairly brisk or fast). Walking at a fairly brisk or fast pace was considered to be moderate intensity physical activity. Because walking at a slow or average pace can also represent moderate intensity physical activity in some older people, an additional question asked participants aged 65 years and over whether the effort of walking for 10 minutes or more was usually enough to make them 'breathe faster, feel warmer or sweat'.

### **Sports and exercise**

Participants were asked: 'Can you tell me on how many separate days you did [name of specific sport and exercise activity] for at least 10 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 participants whether the activity had made them 'out of breath or sweaty'.

### **Occupational activities**

After establishing whether participants did any paid or unpaid work in the last four weeks, those who did were asked 'Which of these did you do whilst working?' Answer categories were: sitting down or standing up; walking at work; climbing stairs or ladders; and lifting, carrying or moving heavy loads. This was followed by a question about the average time spent on that type of activity on a typical work day. Those participants who reported that they did some climbing of stairs or ladders, or lifting, carrying or moving heavy loads were then asked whether they engaged in that activity every working day, or only on some days. Those replying that they engaged in that activity on only some days were then asked on how many work days in the last four weeks they did that activity. Participants were also asked 'Thinking about your job in

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<sup>18</sup> 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.

<sup>19</sup> Examples of heavy manual work, 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.



general would you say that you are...very physically active; fairly physically active; not very physically active; not at all physically active?’

It should be noted that questions ask about activities over the last four weeks, to ensure that occasional activities (such as a monthly activity) are adequately covered. The questions do not establish in which of the last four weeks each activity was undertaken, and the weekly averages presented are calculated over the four week period. So for instance someone who has done an activity twice a week on average may have done this twice a week, or eight times in one week and not in any other week, or some other pattern.

## Definitions

### Summary activity levels

The following abbreviations are used throughout this report:

MPA: Moderate physical activity

VPA: Vigorous physical activity

MVPA: Moderate to vigorous physical activity

The current UK guidelines for physical activity recommend that adults aged 19 years and over should undertake a minimum of 150 minutes (2 ½ hours) of moderate intensity activity per week in bouts of 10 minutes or more. Alternatively, comparable benefits can be achieved through 75 minutes of vigorous intensity activity spread across the week, or combinations of moderate and vigorous intensity activity. This recommendation is referred to throughout this report as the aerobic, or MVPA, guideline. One way to approach this is to achieve 30 minutes of moderate intensity activity on at least five days a week.

Responses to the questions on occupational activity (which asked on how many work days had climbing of stairs or ladders, lifting, and carrying or moving heavy loads been undertaken) and walking (for adults aged 65 years and older) that were introduced in the HSE 2012 were taken into account in the estimation of summary activity levels. As in previous years, participants’ activity at work was classified by whether it was at least moderate according to their occupation, which was categorised using the Standard Occupational Classification 2000.

To assess activity against the UK guidelines, participants were classified according to the weekly time spent in activities of at least moderate intensity. Only bouts of 10 minutes or more were included towards the 150 minutes per week target. Minutes of vigorous intensity activity were given twice the credit of minutes of moderate intensity activity when combining moderate and vigorous intensity to calculate the equivalent combination. The summary activity level classification is shown in Table A.

**Table A: Classification of summary activity levels**

Activity level	Definition
Meets aerobic / MVPA guidelines	Reported 150 minutes/week of MPA, 75 minutes/week of VPA, or an equivalent combination of the two.
Some activity	Reported 60-149 minutes/week of MPA, 30-74 minutes/week of VPA, or an equivalent combination of these.
Low activity	Reported 30-59 minutes/week of MPA, 15-29 minutes/week of VPA, or an equivalent combination of these.
Inactive	Reported less than 30 minutes/week of MPA, less than 15 minutes/week of VPA, or an equivalent combination of these.

### Assumptions underlying the intensity classification of physical activities

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

- For home activity (housework, manual work, gardening and DIY) participants were given examples of types of activities that counted as 'heavy' and 'light'. Only examples of heavy housework and heavy manual work, gardening and DIY were classified as 'moderate'.
- Walking was included as a moderately intense activity if participants of any age reported walking at a 'fairly brisk' or 'fast' usual pace, and for those aged 65 years and over for whom the effort of walking for 10 minutes or more was usually enough to make them 'breathe faster, feel warmer, or sweat'.
- For sports and exercise, activities were classified according to the nature of the activity using metabolic equivalent intensity (MET) level and the participants' own assessment of the amount of effort involved in doing that activity.<sup>20</sup> For example, cycling was counted as 'vigorous' if the effort was usually enough to make the participant 'out of breath or sweaty', otherwise as 'moderate'.<sup>21</sup>
- Work-based occupational activities (i.e. climbing stairs or ladders, and lifting, carrying or moving heavy loads) were assumed to be of moderate intensity, i.e. there was no sustained vigorous activity.

### Physical activity at work

Walking around, climbing stairs or ladders, and lifting, carrying, or moving heavy loads were counted as moderate activity for certain occupations.<sup>22</sup> Because those

<sup>20</sup> Sports and exercises were grouped into light, moderate or vigorous intensity categories based on the MET (metabolic equivalent) intensity. MET is a unit used to estimate the intensity of physical activity. It is based on the amount of oxygen consumed during physical activity. The baseline energy used by the body at rest in one minute is defined as 1 MET. Thus an activity with a MET value of 1.5 uses 50% more energy than baseline energy expenditure. MET levels can be linked to specific activities in various settings. Moderate physical activity (MPA) includes activities with estimated intensity levels of 3-6 METs; vigorous physical activities (VPA) are those with estimated intensity levels of 6 METs or higher.

<sup>21</sup> Examples of sports and exercise activities classified as vigorous, moderate and light are given in the Appendix to this report.

<sup>22</sup> See the Appendix to this report for a list of occupations requiring moderate level activity.

who were involved in climbing stairs or ladders, or lifting, carrying or moving heavy loads often did not do these on every working day, the average time spent per work day doing these activities was calculated by multiplying the time spent doing that activity on an average work day by the number of work days they did that activity, then dividing by the total number of days worked.

### **Muscle-strengthening activities**

In addition to aerobic (MVPA) activity, the current UK guidelines recommend that adults aged 19 and over should also undertake physical activity to improve muscle strength on at least two days a week to increase bone strength and muscular fitness.<sup>23</sup> Physical activities that strengthen muscles involve using body weight or working against a resistance, and should involve using all the major muscle groups. Participants were shown a card listing examples of activities and asked which they engaged in, and whether there were any other similar activities they engaged in.<sup>24</sup> A further question was asked in some cases to establish whether the effort of each specific sport or exercise activity was usually enough to make their muscles 'feel some tension, shake or feel warm'. Muscle-strengthening activities were identified in this report as follows:

- Sports/exercise pursuits such as canoeing or climbing not listed on the card but reported as additional activities were always included as muscle-strengthening activities (i.e. regardless of responses to the follow-up question).
- Working out at a gym, aerobics, or exercises such as press-ups<sup>25</sup> or sit-ups reported from the show card, or additional non-listed activities such as golf and volleyball were included as muscle-strengthening activities if participants reported that the effort of that activity was usually enough to make their muscles feel some tension, shake or feel warm.
- Some pursuits such as cycling, swimming, squash and football were listed among the examples on the card, but were not routed to the follow-up question; if these pursuits were reported they were always included as muscle-strengthening, possibly leading to some overestimate of the number of participants meeting the muscle-strengthening guideline.

Examples of muscle-strengthening activities are given in the Appendix to this report.

### **Activities to improve balance and co-ordination**

The current UK physical activity guidelines recommend that older adults at risk of falls should incorporate physical activity to improve balance and co-ordination on at least two days a week.<sup>23,26</sup> Engaging in activities to improve balance and co-ordination were taken into account in the estimation of summary activity levels, if they were activities of at least moderate intensity.

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<sup>23</sup> Department of Health, 2011, cited in Note 8.

<sup>24</sup> The survey documentation can be found on the HSE 2016 report website <https://digital.nhs.uk/pubs/hse2016>.

<sup>25</sup> Although the recommendations refer to 'push ups' the show card that was presented to respondents referred to 'press-ups'.

<sup>26</sup> See the Appendix to this report for examples of activities that improve balance and co-ordination.

## Sedentary behaviour

The current UK physical activity guidelines recommend that all adults should minimise the amount of time spent being sedentary (sitting) for extended periods.<sup>23</sup> The section on sedentary time estimates how much time people spent watching television on average; how much other time people spent being sedentary on average, doing such things as reading, studying, drawing, using a computer or playing video games; as well as the total for both types. This is recorded both by weekday and weekend day.

## Methodological considerations

Self-report is the most widely used measurement method in UK surveys. It should be noted however that self-report can lead to some inaccuracies if individuals are unable to recall how much physical activity they have done, or they feel that they should say they have done more or less than they actually have. Correlations between self-report and direct (e.g. accelerometry) measures of physical activity were found in a systematic review to be generally low-to-moderate.<sup>27</sup> However, the health-based recommendation for aerobic activity is based on studies using self-reported physical activity data.

## Age-standardisation

Age-standardised data are presented in this report for analyses shown in the text, tables and charts. 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 levels of overweight and obesity, etc. 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.

## 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.<sup>28</sup> The Index of Multiple Deprivation (IMD) is a measure of the overall deprivation experienced by people living in a neighbourhood.<sup>29</sup>

In this publication IMD rankings have been split into quintiles. The lowest quintile indicates the lowest levels of deprivation; the highest quintile indicates that the neighbourhood experiences the highest levels of deprivation. Not everyone who lives in a deprived neighbourhood will be deprived themselves.

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<sup>27</sup> Prince SA, Adamo KB, Hamel ME et al. *A comparison of direct versus self-report measures for assessing physical activity in adults: a systematic review*. *Int J Behav Nutr Phys Act*. 2008;**5**:56.

<sup>28</sup> 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.

<sup>29</sup> 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](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/465791/English_Indices_of_Deprivation_2015_-_Statistical_Release.pdf)

## Body mass index (BMI)

BMI is a calculation which considers an individual's weight in relation to their height. For each participant with a valid height and weight measurement, their BMI status was calculated by dividing their weight in kilograms by the square of their height in metres (kg/m<sup>2</sup>).

Adult survey participants were classified into the following BMI groups according to the World Health Organization (WHO) BMI classification, shown in the table below.<sup>30</sup>

**Table B: Classification of Body Mass Index (BMI) groups**

BMI (kg/m <sup>2</sup> )	Description
Less than 18.5	Underweight
18.5 to less than 25	Normal
25 to less than 30	Overweight, not obese
30 or more	Obese, including morbidly obese
40 or more	Morbidly obese

For a more detailed discussion of BMI, see the HSE 2016 Adult Overweight and Obesity report.

## 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.<sup>31</sup>

Confidence intervals are quoted for key statistics within this report and are also shown in more detail in the Excel tables accompanying the Methods 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.

<sup>30</sup> World Health Organization. *World Health Organization body mass index (BMI) classification*. [www.euro.who.int/en/health-topics/disease-prevention/nutrition/a-healthy-lifestyle/body-mass-index-bmi](http://www.euro.who.int/en/health-topics/disease-prevention/nutrition/a-healthy-lifestyle/body-mass-index-bmi)

<sup>31</sup> Statistical significance does not imply substantive importance; differences that are statistically significant are not necessarily meaningful or relevant.

## Summary activity levels

### Introduction

The Health Survey for England defines adults as those aged 16 and over, which is the age group used for the main tables and text in this report. However, the adult guidelines for aerobic and muscle-strengthening activities are aimed at those aged 19 and over.<sup>32</sup> The guidelines are tailored to specific age groups over the life course, including additional recommendations for adults aged 65 and over. Thus estimates of the proportion of adults meeting the aerobic and muscle-strengthening recommendations are also presented separately for adults aged 19 to 64 years and for adults aged 65 and over in the main tables in this report.

### Summary activity levels by age and sex

In 2016, 66% of men and 58% of women aged 16 and over met the guidelines for aerobic activity (as described in Table A on page 9 of this report). Survey estimates are subject to a margin of error. It is likely that the proportion of men meeting the guidelines is between 64% and 68%, and the proportion of women meeting the guidelines is between 56% and 60%.

As Figure 1 shows, the proportion meeting the aerobic activity guidelines among both sexes generally fell with age. Conversely, the proportion of participants classed as inactive (less than 30 minutes/week of MVPA) generally increased with age from age 35 to 44 years, with a steeper increase for women than men. In 2016, 19% of women and 13% of men aged 16 to 24 were classed as inactive compared with 58% of women and 47% of men aged 75 and over.

The adult guidelines for aerobic activities are aimed at those aged 19 and over.<sup>32</sup> In 2016, 62% of adults aged 19 and over met these guidelines (66% of men; 58% of women). 67% of adults aged 19 to 64 years met the aerobic activity guidelines (71% of men; 63% of women) compared with 44% of adults aged 65 and over (48% of men; 41% of women).

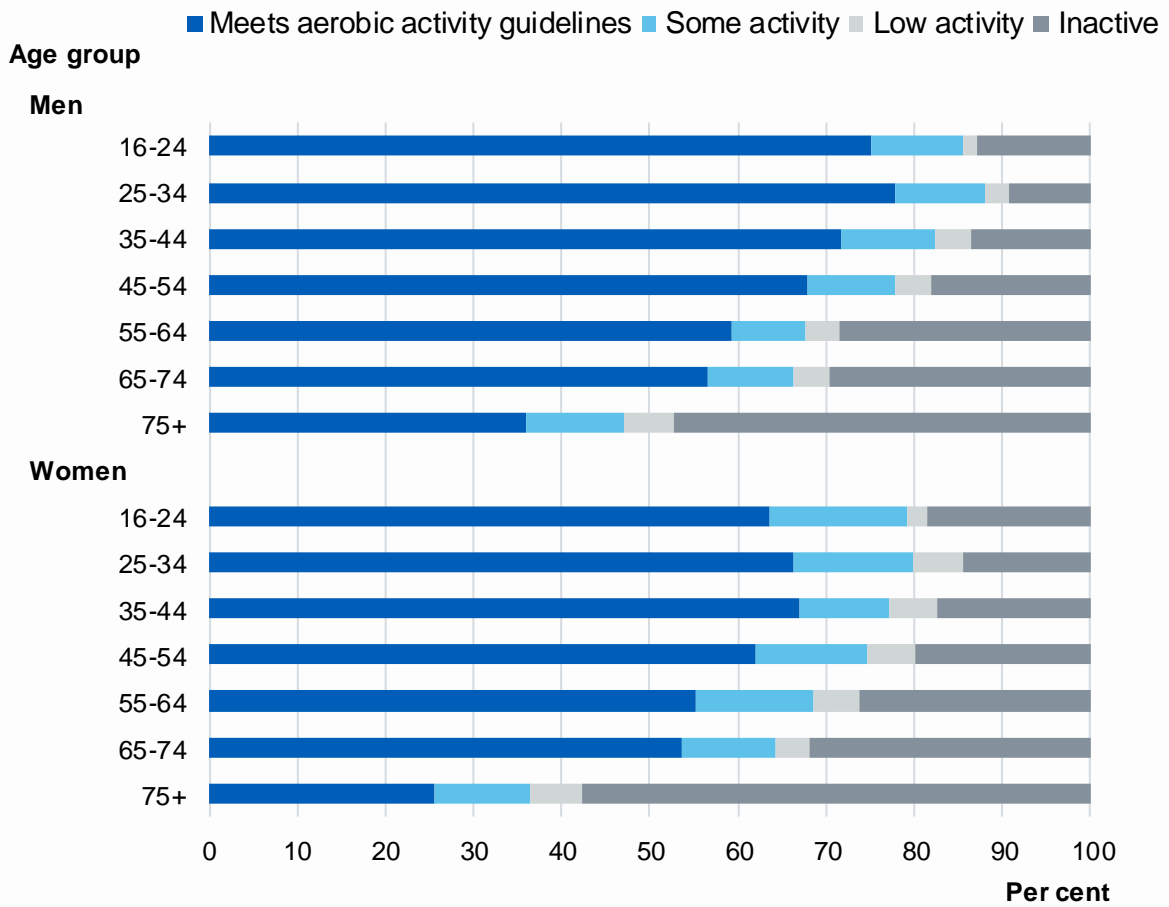
Figure 1, Table 1

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<sup>32</sup> Department of Health, 2011, cited in Note 8.

**Figure 1: Summary activity levels, by age and sex**

Base: Aged 16 and over



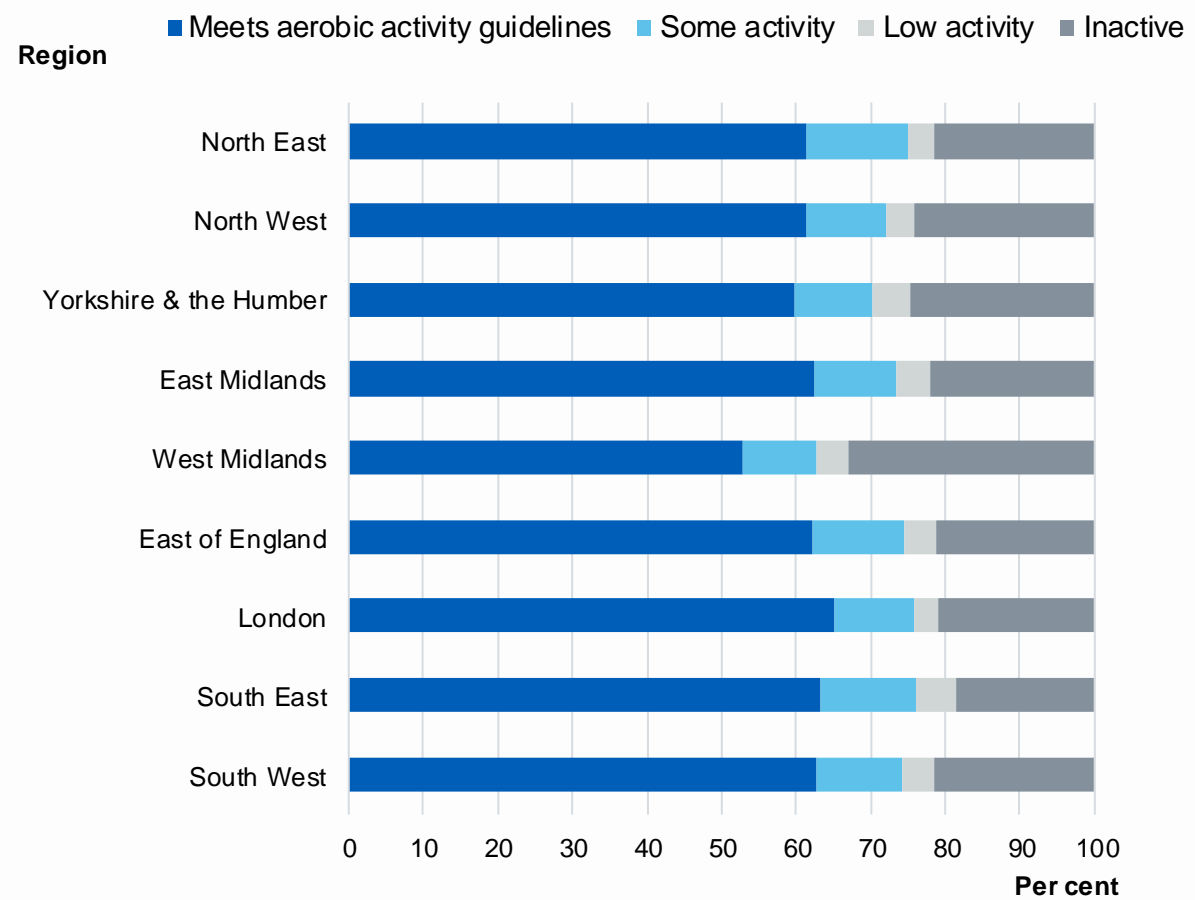
## Summary activity levels by region

The (age-standardised) proportion of adults aged 16 and over who met the guidelines for aerobic activity varied between regions. As Figure 2 shows, the proportion of adults meeting the aerobic activity guidelines was lowest in the West Midlands (53%) and highest in London (65%).

Figure 2, Table 2

**Figure 2: Age-standardised summary activity levels, by region**

Base: Aged 16 and over



Source: NHS Digital



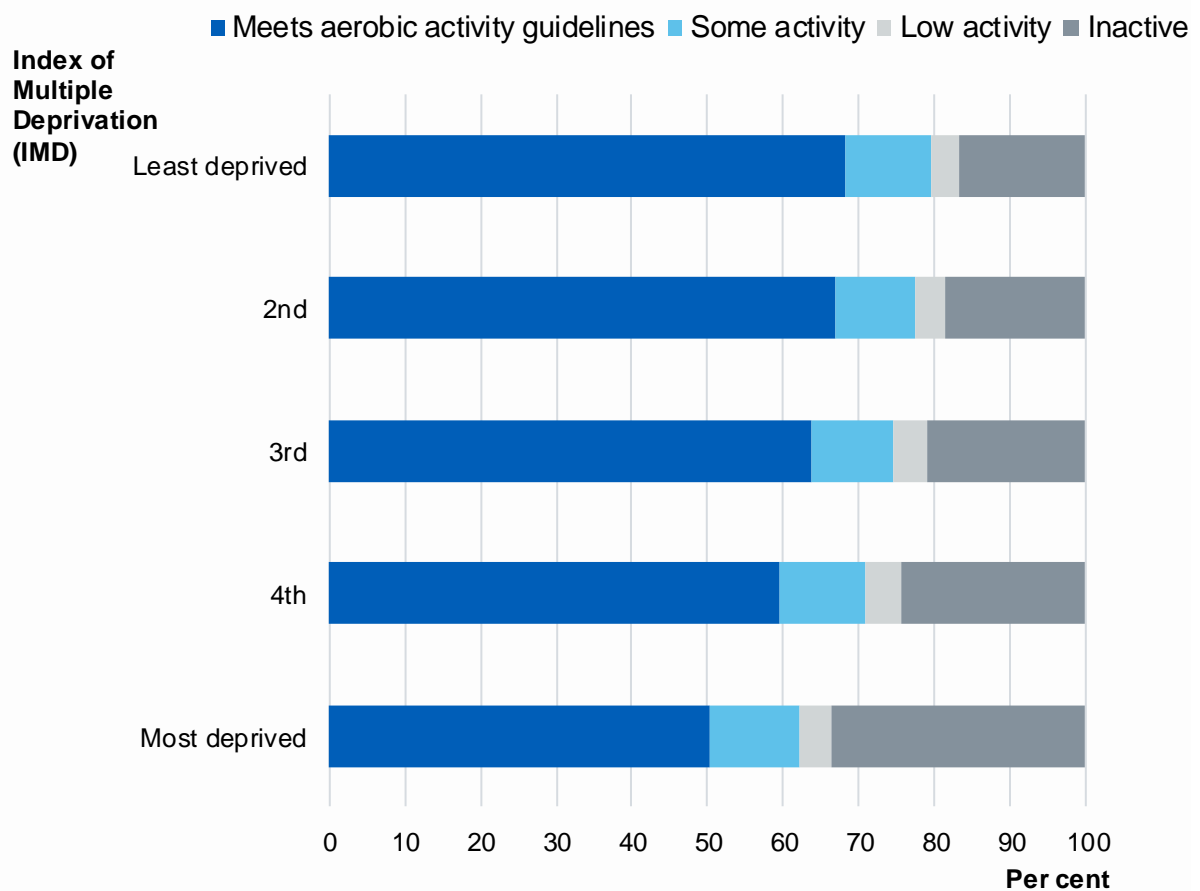
## Summary activity levels by Index of Multiple Deprivation

The (age-standardised) proportion of adults aged 16 and over who met the guidelines for aerobic activity varied by quintiles of the Index of Multiple Deprivation (IMD). As Figure 3 shows, the proportion was lowest in the most deprived quintile (50%) and highest in the least deprived quintile (68%).

Figure 3, Table 3

**Figure 3: Age-standardised summary activity levels, by Index of Multiple Deprivation (IMD)**

Base: Aged 16 and over



Source: NHS Digital

## Summary activity levels by Body Mass Index (BMI) category

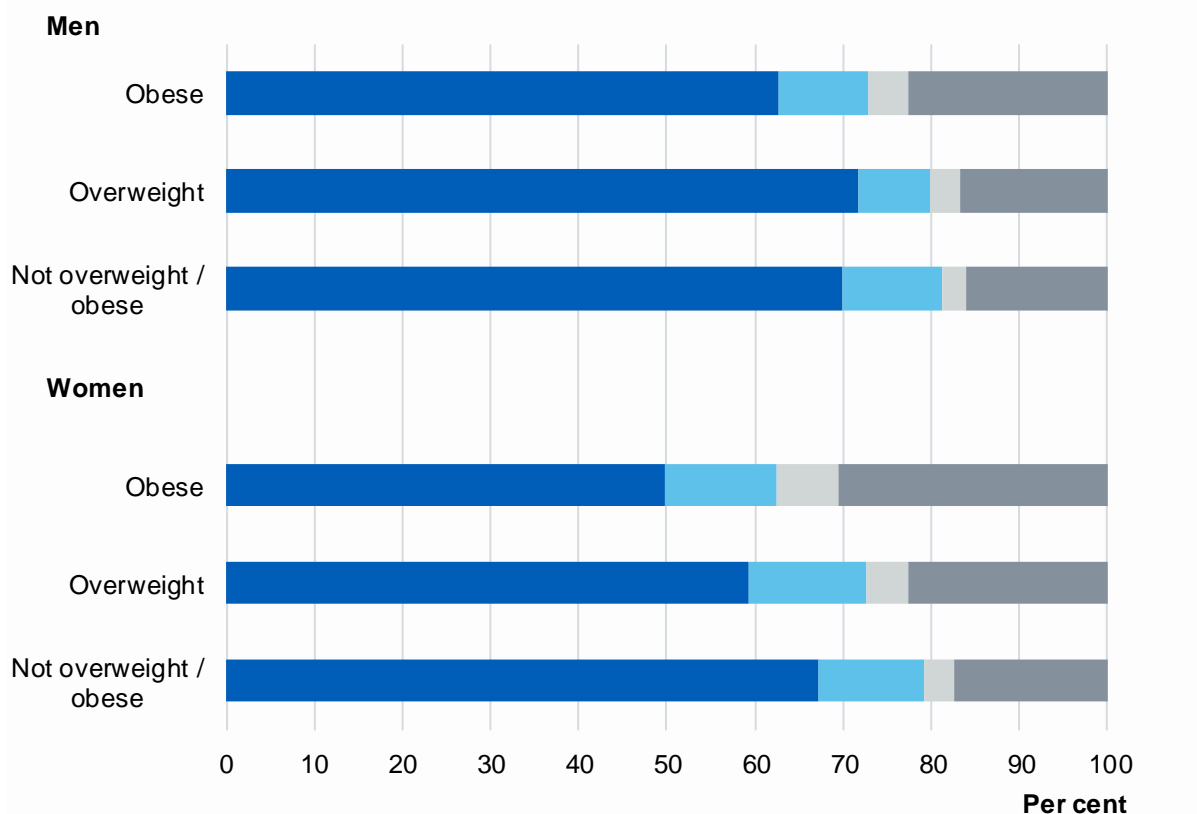
Adults who were obese (BMI 30kg/m<sup>2</sup> or more) were less likely to have met the guidelines for aerobic activity than adults who were overweight (BMI 25kg/m<sup>2</sup> to less than 30kg/m<sup>2</sup>) or were not overweight or obese (BMI less than 25kg/m<sup>2</sup>). However, as Figure 4 shows, the difference between BMI categories in the (age-standardised) proportions of adults aged 16 and over meeting the aerobic guidelines was more pronounced for women than for men. 70% of men who were not overweight or obese met the guidelines, compared with 72% of overweight men and 63% of obese men. Among women, 67% of those who were not overweight or obese met the guidelines, compared with 59% of overweight women and 50% of obese women.

Figure 4, Table 4

**Figure 4: Age-standardised summary activity levels, by body mass index (BMI) category and sex**

Base: Aged 16 and over

**BMI status** ■ Meets aerobic activity guidelines ■ Some activity ■ Low activity ■ Inactive



Source: NHS Digital

## Trends in physical activity

Trend data on adults' physical activity are given in the 2016 Adult trend tables.<sup>33</sup> Table 5 compares physical activity levels in HSE 2012 and in HSE 2016 using the questions on occupational activity and walking (for persons aged 65 and over) introduced in HSE 2012. Both years are compared using the current UK guidelines for aerobic physical activity (as described in Table A on page 10 of this report).

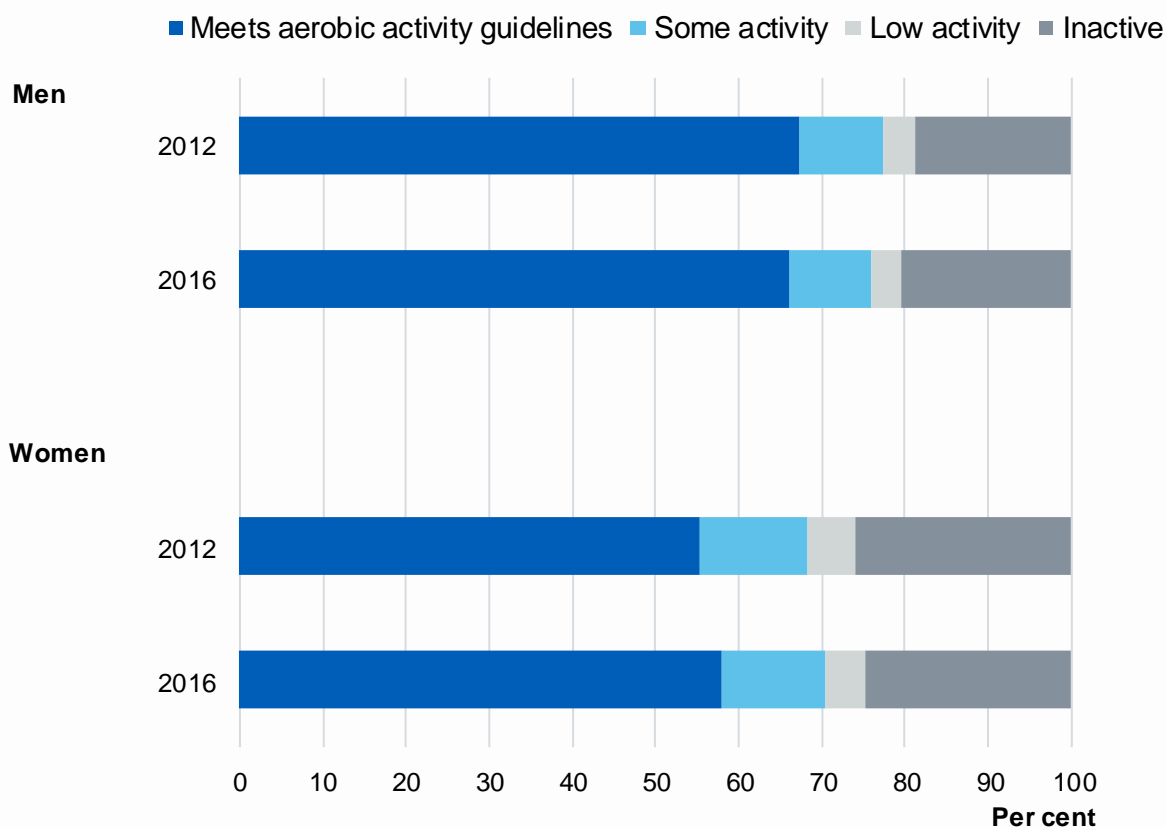
Compared with 2012, the proportion of adults aged 16 and over meeting the aerobic activity guidelines was at a similar level for men (67% in 2012; 66% in 2016) but increased by three percentage points for women (55% in 2012; 58% in 2016).

The adult guidelines for aerobic activities are aimed at those aged 19 and over.<sup>34</sup> The proportion of adults aged 19 and over meeting the aerobic activity guidelines in 2016 were similar to those in 2012 for men (66% in 2012 and 2016) and for women (56% in 2012; 58% in 2016).

Figure 5, Table 5

**Figure 5: Trends in summary activity levels, by year and sex**

Base: Aged 16 and over



Source: NHS Digital

<sup>33</sup> HSE 2016 Trend tables are available at <https://digital.nhs.uk/pubs/hse2016>.

<sup>34</sup> Department of Health, 2011, cited in Note 8.

## Participation in aerobic and/or in muscle-strengthening activities

The 2011 UK guidelines for physical activity recommended that adults aged 19 and over should undertake muscle-strengthening activities on at least two days a week; examples include weight training, working with resistance bands, carrying heavy loads, heavy gardening, push ups and sit ups.<sup>35</sup> Table 6 shows the proportion of adults who met the aerobic activity guideline, the muscle-strengthening guideline, or both. This is shown separately for HSE 2012 and HSE 2016. It should be noted that participation in muscle-strengthening activities was included in the estimation of aerobic activity levels where the muscle-strengthening activities were of moderate or vigorous aerobic intensity.

In 2016, more men than women met both the aerobic and muscle-strengthening guidelines (31% and 23% respectively). As shown in Figure 6, this proportion decreased with age more sharply for men than for women. 49% of men and 35% of women aged 16 to 24 years met both the aerobic and muscle-strengthening guidelines, compared with 7% of men and 6% of women aged 75 and over. Very few participants (1%) met only the muscle-strengthening guideline; just over a third of men and women (35% and 34% respectively) met only the aerobic activity guideline through activities such as walking and heavy housework.

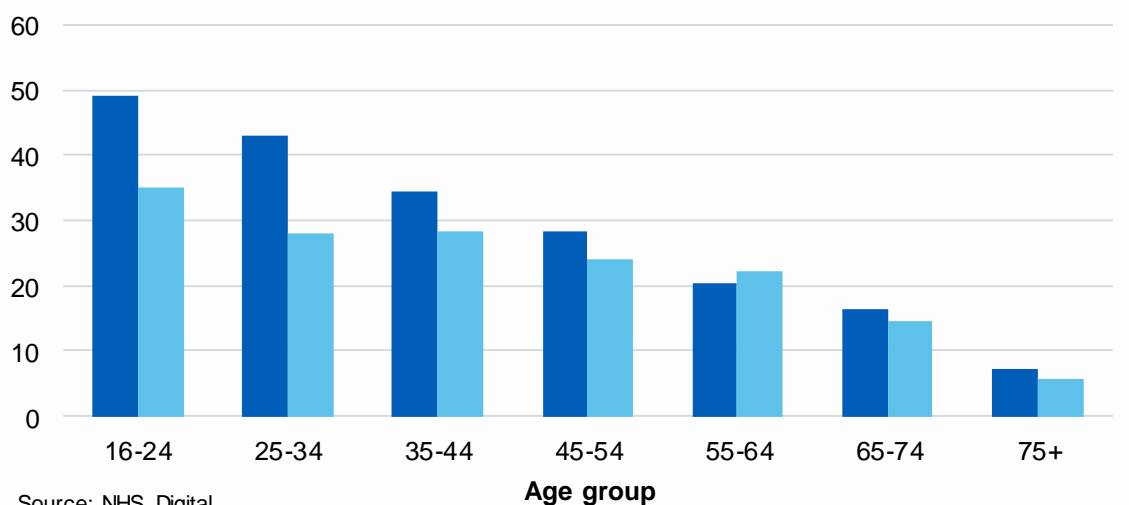
Among adults aged 19 and over (the target group<sup>35</sup>), 26% met both the aerobic and muscle-strengthening guidelines. This proportion was higher for men than for women (30% and 23% respectively). 31% of adults aged 19 to 64 years met both guidelines (34% men; 27% women); 12% of adults aged 65 and over met both guidelines (13% men; 10% women).

Figure 6, Table 6

**Figure 6: Proportion meeting both the aerobic and muscle-strengthening guidelines, by age and sex**

Base: Aged 16 and over

Per cent



<sup>35</sup> Department of Health, 2011, cited in Note 8.

## Participation in activities to promote balance and co-ordination

The guidelines for physical activity recommend that those adults aged 65 and over at risk of falls should incorporate activities to improve balance and co-ordination on at least two days a week.<sup>36</sup> However, it is not possible to identify which older adults in the HSE are at risk of falls, so analysis is therefore based on all adults aged 65 and over.

Table 7 presents levels of participation in exercises that improve balance and co-ordination by summary aerobic activity levels (described in Table A on page 10 of this report). Among both men and women, the proportion of adults aged 65 and over who had undertaken exercise that improved balance and co-ordination on at least two days per week increased with levels of MVPA.<sup>37</sup> 27% of adults aged 65 and over who met the aerobic activity guideline also met the balance and co-ordination guideline, compared with 11% of adults aged 65 and over with lower levels of aerobic activity and 2% of adults aged 65 and over classed as inactive.

Table 7

## Participation in different activities

### Number of days of participation in different activities

Table 8 shows on how many days in the past four weeks adults aged 16 and over participated in four groups of non-occupational physical activities of at least moderate intensity: heavy housework; heavy manual work, gardening and DIY; walking; and sports and exercise (all for bouts of 10 minutes or more). As in previous years, variation in participation across non-occupational physical activities by age showed a different pattern in men and women.<sup>38,39</sup>

#### Heavy housework

The proportion of adults who had done some heavy housework in the past four weeks was higher for women than for men (58% and 46% respectively). Among both sexes, the proportion who had done this peaked between the ages of 25 to 44 and then declined with age thereafter. The mean number of days on which heavy housework was undertaken in the past four weeks was also higher for women than for men (3.6 and 2.2 days respectively); with the most pronounced differences between the ages of 16 to 74.

Table 8

#### Heavy manual work, gardening and DIY

Participation in heavy manual work, gardening and DIY was the least common non-occupational activity for both sexes: 25% of men and 12% of women did one of these

<sup>36</sup> Department of Health, 2011, cited in Note 8.

<sup>37</sup> Moderate to vigorous physical activity.

<sup>38</sup> Scholes S, Mindell J. in Craig R, Mindell J (eds). *Health Survey for England 2012*. See Note 9.

<sup>39</sup> Roth M. *Self-reported physical activity in adults*. Chapter 2 in Craig R, Mindell J, Hirani V (eds). *Health Survey for England 2008*. Health and Social Care Information Centre, London, 2009.

activities in the past four weeks. For both sexes, the proportions who did some heavy manual work, gardening or DIY increased up to middle age (peaking between the ages of 45 to 54) then decreased in older age. The mean number of days undertaking this type of exercise was higher for men than for women (1.3 and 0.5 days respectively), and the difference between men and women was most pronounced from the age of 35.

Table 8

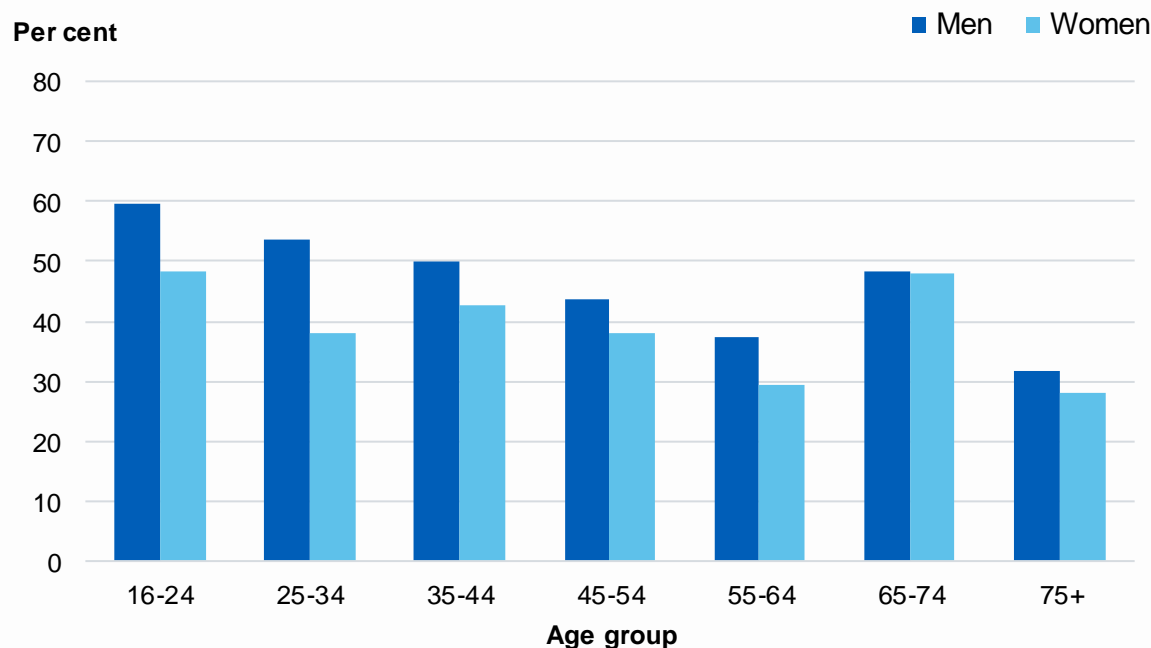
### Walking

47% of men and 39% of women reported walking of at least moderate intensity for 10 minutes or more on at least one day in the past four weeks.<sup>40</sup> As Figure 7 shows, the difference between men and women was most pronounced in those aged 16 to 34 than in older groups. The mean number of days in the last four weeks on which they walked was higher for men than for women (8.6 and 7.4 days respectively). Among both sexes, the average number of days on which they walked for at least 10 minutes varied with age.

Figure 7, Table 8

**Figure 7: Participation in moderate intensity walking on at least one day in the last four weeks, by age and sex**

Base: Aged 16 and over



Source: NHS Digital

<sup>40</sup> Walking was considered to be of at least moderate intensity for participants of any age who reported walking at a fairly brisk or fast pace, and for those aged 65 and over for whom the pace of walking was slow or average but for whom the effort of walking for 10 minutes or more was usually enough to make them breathe faster, feel warmer or sweat.

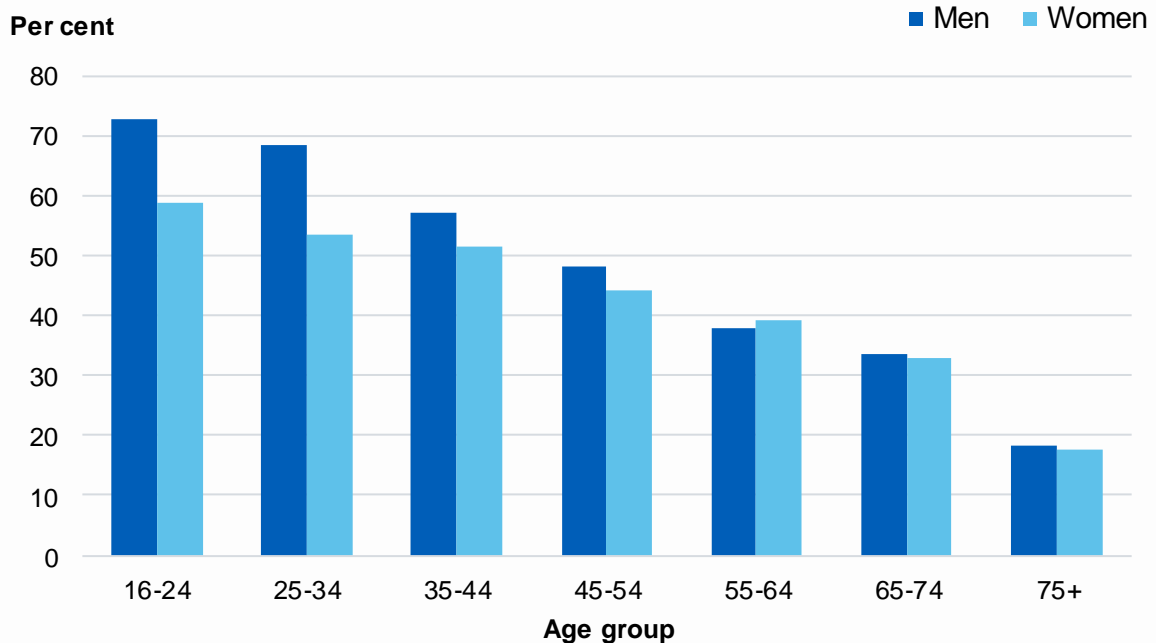
### Sports and exercise

51% of men and 44% of women had taken part in sports and exercise of at least moderate intensity at least once during the past four weeks. The difference between the sexes was most pronounced in those aged 16 to 34. The mean number of days on which they participated in sports and exercise in the last four weeks was higher for men than for women (6.9 and 5.3 days respectively). The mean number of days' spent in sports and exercise participation decreased with age for both sexes, and the difference between men and women diminished after the age of 55.

Figure 8, Table 8

**Figure 8: Participation in moderate intensity sports/exercise on at least one day in the last four weeks, by age and sex**

Base: Aged 16 and over



Source: NHS Digital

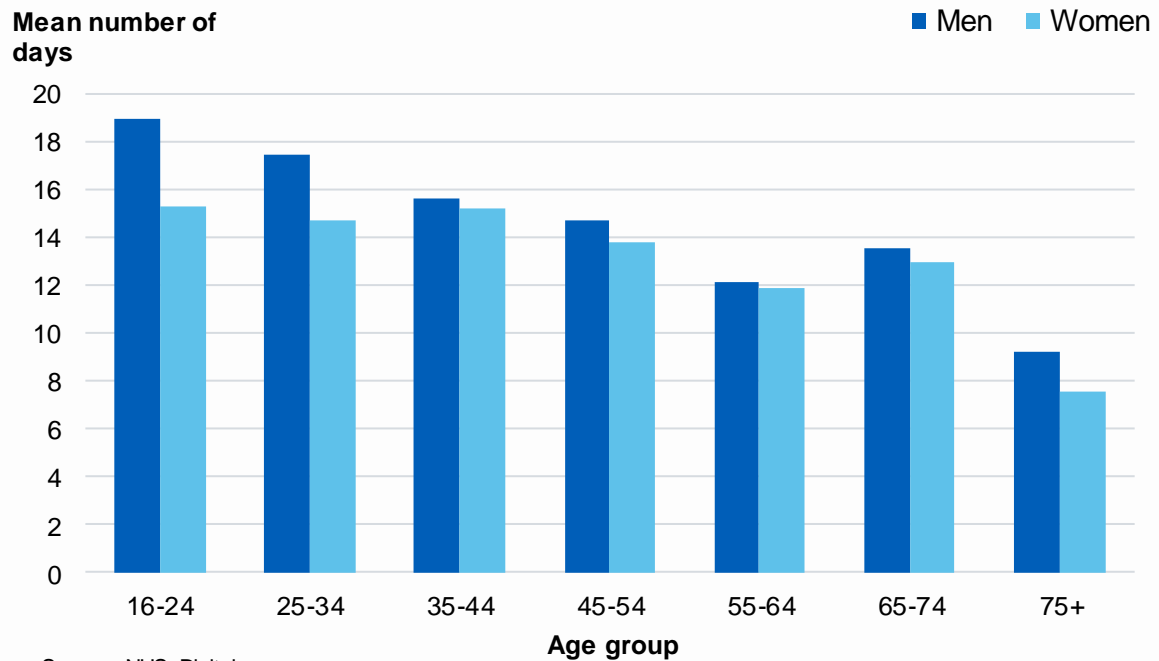
### Any non-occupational activity

81% of men and 80% of women had taken part in one or more types of non-occupational physical activity of at least moderate intensity during the past four weeks. In both men and women, levels of participation were highest among those aged 16 to 54, declined to similar levels among those aged 55 to 74, and fell sharply among those aged 75 and over. On average, men participated in at least one type of non-occupational activity on 15.0 days in the past four weeks, compared with 13.3 days for women. As Figure 9 shows, the difference between men and women in the mean number of days spent in non-occupational physical activity was most pronounced in the youngest and the oldest age groups.

Figure 9, Table 8

**Figure 9: Mean number of days spent in non-occupational physical activities in the last four weeks, by age and sex**

Base: Aged 16 and over





## Average time spent participating in different activities

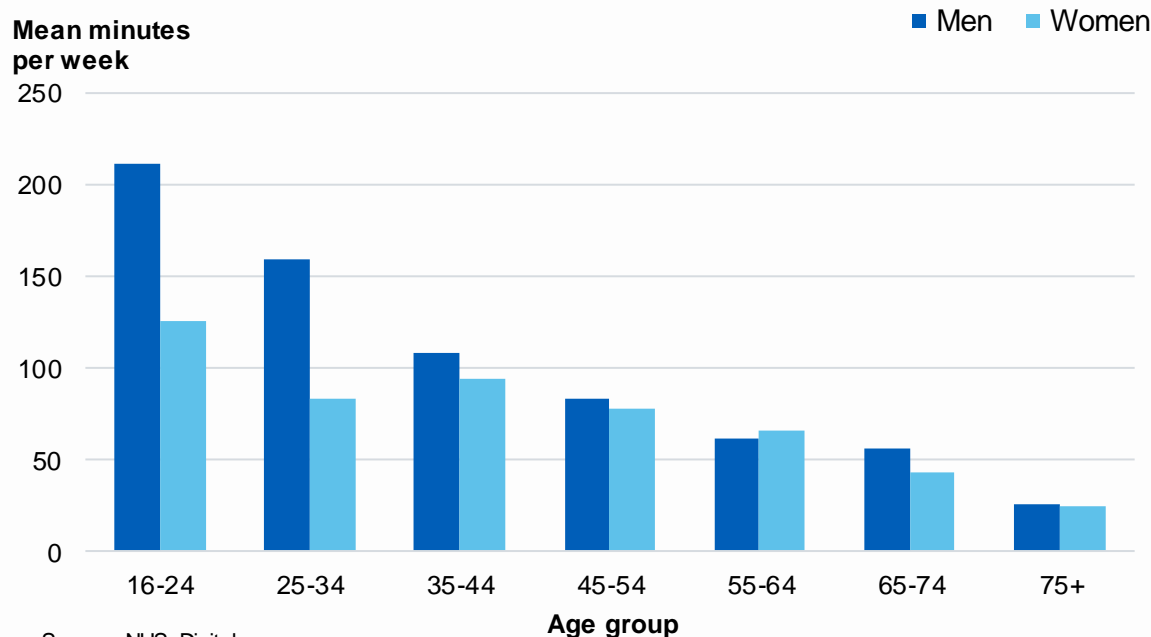
Table 9 shows the average time in minutes per week that participants had spent in four types of non-occupational moderately intensive physical activity: heavy housework; heavy manual work, gardening and DIY; walking; and sports and exercise. It includes those with no participation in the last four weeks. The patterns were generally similar to those for the number of days of participation in the different activities.

Women averaged more time than men in heavy housework (92.0 and 50.5 minutes per week respectively), but the difference between men and women was more pronounced in those aged between 25 and 44. Men averaged more time than women in heavy manual work, gardening and DIY activities (63.9 and 18.8 minutes per week respectively) and in walking (170.9 and 148.2 minutes per week respectively).<sup>41</sup> Men also averaged more time than women in sports and exercise<sup>42</sup> (107.3 and 75.8 minutes per week respectively), with the difference most pronounced in those aged 16 to 34.

Figure 10, Table 9

**Figure 10: Mean minutes per week spent in sports/exercise, by age and sex**

Base: Aged 16 and over



<sup>41</sup> Walking was considered to be of at least moderate intensity for participants of any age who reported walking at a fairly brisk or fast pace, and for those aged 65 and over for whom the pace of walking was slow or average but for whom the effort of walking for 10 minutes or more was usually enough to make them breathe faster, feel warmer or sweat.

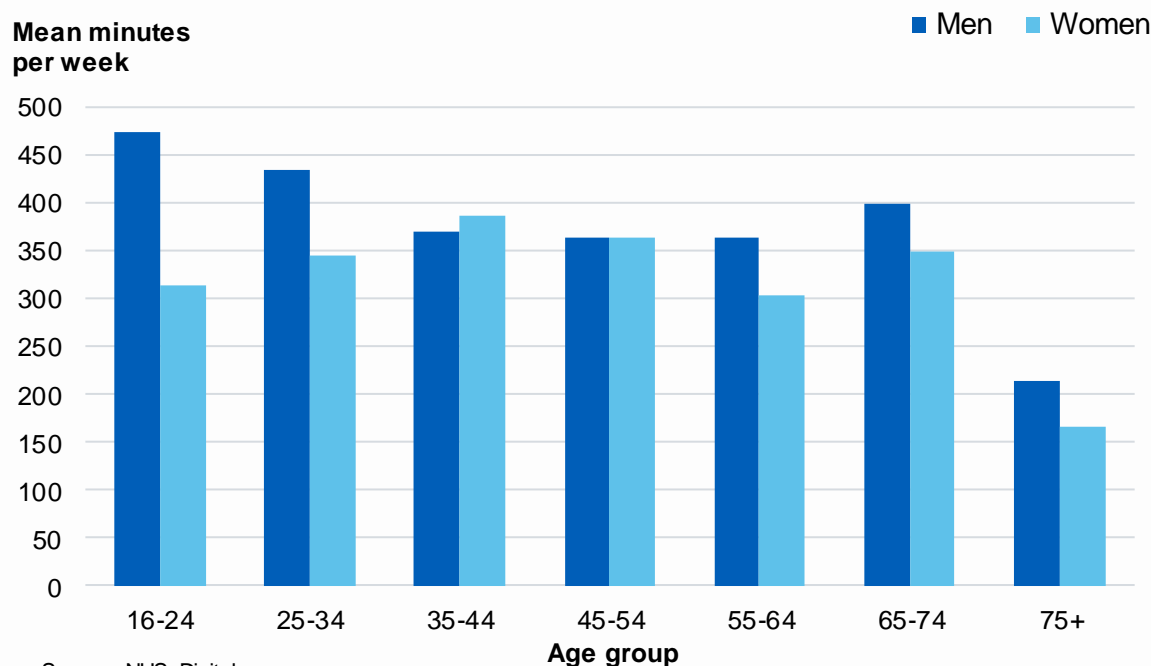
<sup>42</sup> Minutes of both moderate and vigorous intensity sports/exercise participation were assumed equivalent.

Overall men averaged 383.8 minutes (6.4 hours) and women averaged 326.1 minutes (5.4 hours) in moderate-intensity non-occupational physical activity per week. The difference between the sexes was clearest in those aged 16 to 34.

Figure 11, Table 9

**Figure 11: Mean minutes per week spent in non-occupational moderately intensive activity, by age and sex**

Base: Aged 16 and over



## Time spent in different occupational activities

Table 10 shows the average amount of time per day worked that participants spent in four types of occupational activity: sitting down or standing; walking around; climbing stairs or ladders; and lifting, moving or carrying heavy loads, as well as the combined time being physically active at work. The proportion of participants who reported being very or fairly physically active in their job is also shown. The results are based on adults aged 16 to 74 years who reported working in the last four weeks, including unpaid work. Averages are based on all participants, whether or not they carried out the activity in question.

Variation in participation across the occupational physical activities by age showed a similar pattern in men and women.

Men averaged more time than women sitting down or standing (4.9 and 4.4 hours per day worked respectively) but spent similar amounts of time walking around at work (2.1 hours per day worked in both sexes).

More men than women spent some time in climbing stairs or ladders (41% and 36% respectively) and in lifting, carrying or moving heavy loads (41% and 29% respectively). The average time per day spent in these activities was very low for both

men and women (climbing stairs and ladders: 0.3 hours for both men and women; lifting, carrying or moving heavy loads 0.8 hours for men and 0.4 hours for women).

Overall men spent more time than women in occupational physical activity (3.7 and 2.1 hours per day worked respectively). Similar proportions of men and women reported being very or fairly physically active at work (60% and 59% respectively).

Table 10

## Sedentary behaviour

Note that all the analysis in this section excludes sedentary time during paid work.

### Sedentary behaviour by age and sex

#### Total sedentary time

The same proportions of men and women, 29%, spent an average of six or more hours of sedentary time on a weekday (time spent watching TV and other sedentary time such as reading and computer use). Men were more likely than women to average six or more hours of total sedentary time per weekend day (40% and 35% respectively).

The average number of hours spent sedentary (TV and non-TV) were higher for men than for women on both weekdays and weekend days (4.8 and 4.6 hours per weekday for men and women respectively; 5.3 and 4.9 hours per weekend day).

Table 11

### Time spent watching TV

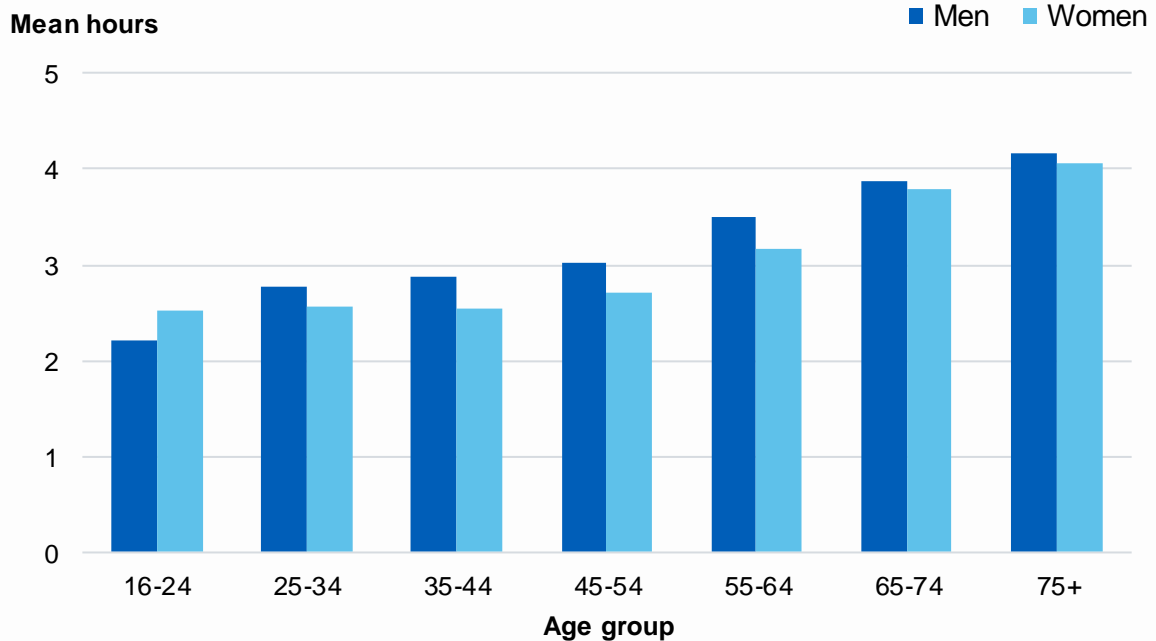
The proportion of participants who spent four or more hours watching TV per weekday increased from the age of 35, and there was no significant difference by sex (26% of men, 27% of women). The pattern was similar for the average number of hours spent watching TV per weekday (2.7 for men, 2.8 for women).

Men were more likely than women to spend four or more hours watching TV per weekend day (34% and 32% respectively); this proportion varied by age in similar ways for men and women. As Figure 12 shows, the average number of hours spent watching TV per weekend day by age showed a different pattern in men and women. Among men, the average number of hours increased with age. Among women, the average number of hours was similar between the ages of 16 and 44, and increased with age thereafter.

Figure 12, Table 11

**Figure 12: Mean hours watching TV per weekend day, by age and sex**

Base: Aged 16 and over



Source: NHS Digital

### Other (non-TV) sedentary time

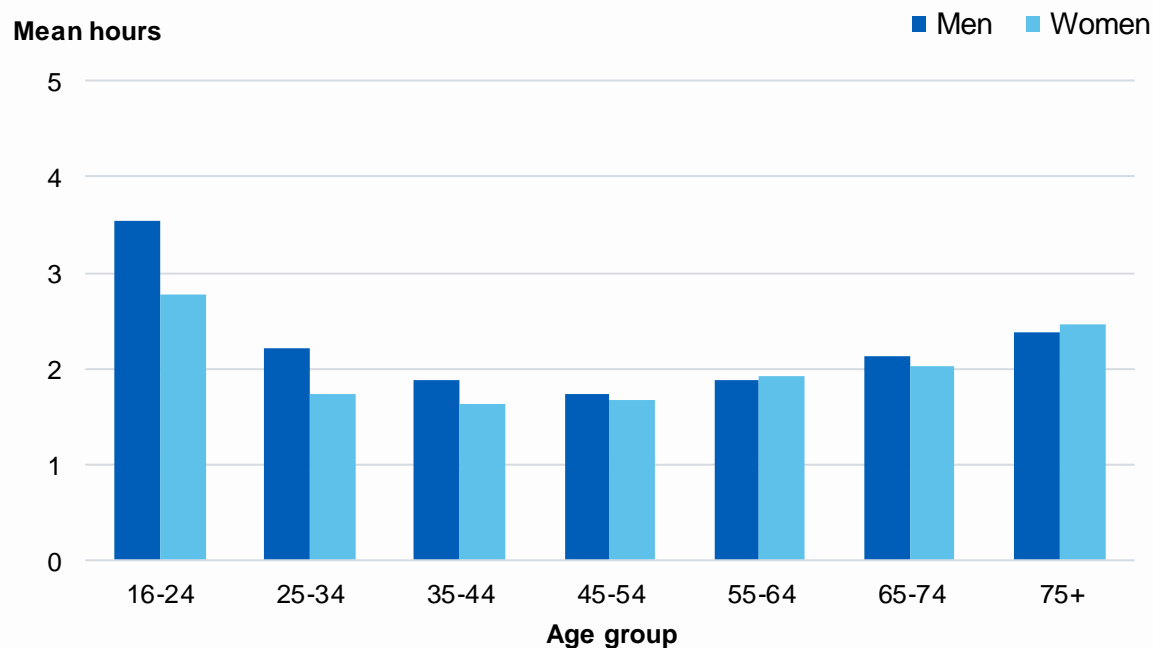
Men were more likely than women to average four or more hours in other (i.e. non-TV) sedentary time per weekday (16% and 14% respectively); the U-shaped pattern with age (higher levels in those aged 16 to 24 and those aged 65 and over) was similar for both sexes. Men were also more likely than women to spend an average of four or more hours a day in other sedentary time at weekends (18% and 15% respectively) and this was also most frequent among the youngest and oldest age groups.

As Figure 13 shows, the pattern in the average number of hours spent in other (i.e. non-TV) sedentary time per weekend day by age was slightly different for men and women. The average number of hours spent in other (non-TV) sedentary time per weekend day was higher for men than women among those aged 16 to 44, but was similar for men and women among those aged 45 and over.

Figure 13, Table 11

**Figure 13: Mean hours in other (non-TV) sedentary time per weekend day, by age and sex**

Base: Aged 16 and over



Source: NHS Digital

## Sedentary behaviour by BMI category

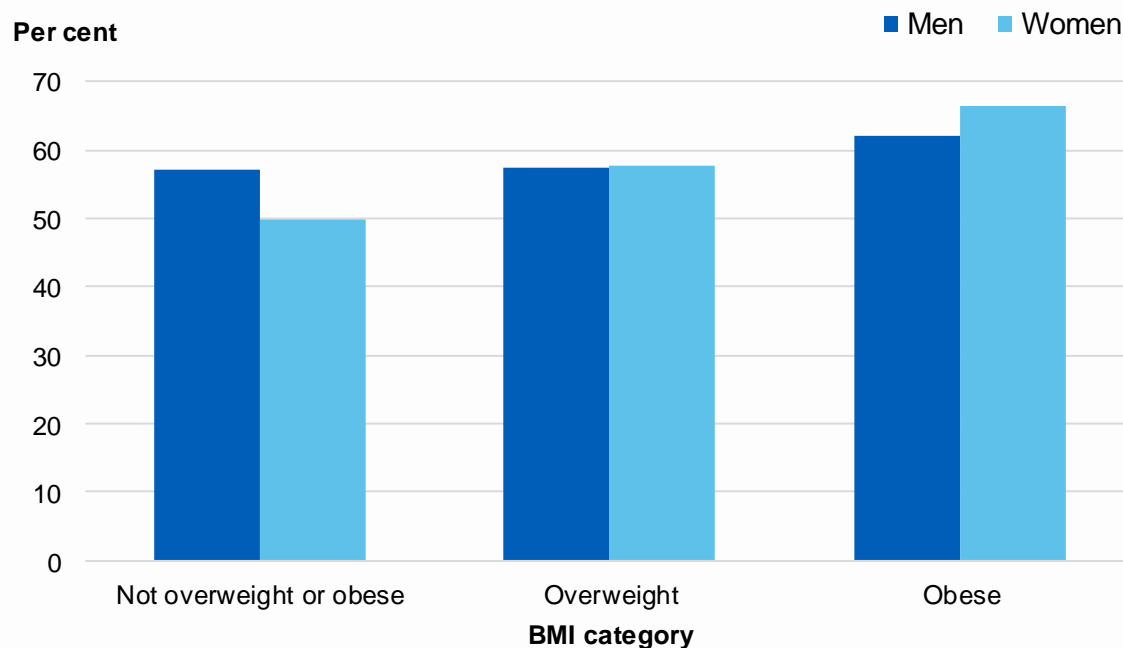
The proportion of participants who averaged at least four hours in sedentary time per weekday varied by BMI category more sharply for women than for men. 66% of women who were obese were sedentary for four or more hours per weekday, compared with 58% who were overweight, and 50% who were not overweight or obese. The equivalent figures for men per weekday were 62%, 57% and 57%.

The proportion of participants who averaged at least four hours in sedentary time per weekend day varied by BMI category in similar ways for men and women. 73% of women who were obese, 67% who were overweight, and 60% who were not overweight or obese were sedentary for four or more hours per weekend day. The equivalent figures for men per weekend day were 74%, 68% and 66%.

Figure 14, Table 12

**Figure 14: Proportion who were sedentary for four or more hours per day on weekdays, by BMI category and sex**

Base: Aged 16 and over



Source: NHS Digital

## Trends in sedentary behaviour

Table 13 shows the average number of hours spent in total sedentary time in 2008, 2012 and 2016, with estimates presented separately for weekdays and weekend days. The average number of hours spent sedentary per weekday and per weekend day was lower in 2016 than in 2008 (on weekdays 4.8 compared to 5.0 for men, 4.6 compared to 5.0 for women; on weekend days 5.3 compared to 5.6 for men, 4.9 compared to 5.3 for women).

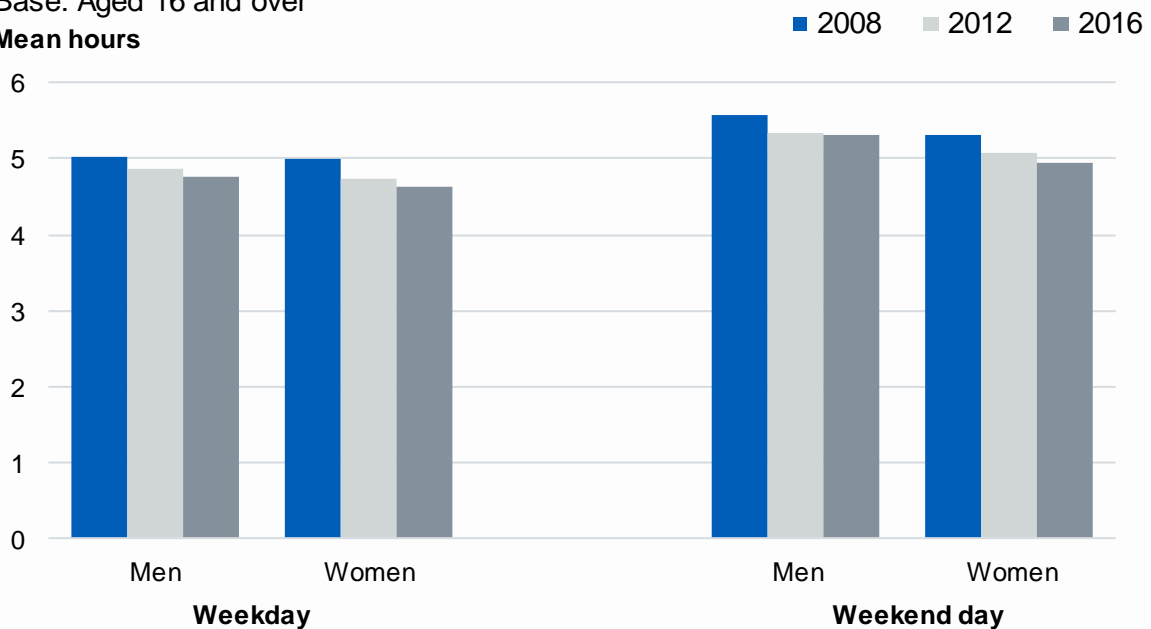
However, the average number of sedentary hours spent per weekday and weekend day in 2016 was similar to 2012 for both men and women (on weekdays 4.8 and 4.9 respectively for men, 4.6 and 4.7 respectively for women; on weekend days 5.3 and 5.4 respectively for men, 4.9 and 5.1 respectively for women).

Figure 15, Table 13

**Figure 15: Average total sedentary time in 2008, 2012, and 2016, by sex**

Base: Aged 16 and over

Mean hours



Source: NHS Digital

## Comparisons with other sources

The current UK physical activity guidelines recommend that adults should take part in at least 150 minutes of moderate activity or 75 minutes of vigorous activity per week or an equivalent combination of both, in bouts of 10 minutes or more.

The proportion of adults aged 16 years and over in HSE 2016 meeting the aerobic activity guidelines (66% men; 58% women) is similar to results from the Scottish Health Survey 2014 (68% men; 59% women);<sup>43</sup> and analysis of the Active Lives Survey 2016-17 (63% men; 58% women) in England.<sup>44</sup> Data from both surveys are reasonably comparable to the HSE. The physical activity questionnaire introduced in the Scottish Health Survey 2012 is similar to the HSE but has fewer questions on occupational activity.<sup>45</sup> The Active Lives Survey is conducted via a postal and online survey and covers walking, cycling, dance, and fitness or sports, but excludes gardening and occupational activity.<sup>46</sup>

Similar sex, age, and socioeconomic variations in the proportion of adults meeting the aerobic activity guidelines to those shown in this report have also been confirmed in analysis of the Scottish Health Survey 2014<sup>43,47</sup> and the Active Lives Survey 2016-17.<sup>48</sup>

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<sup>43</sup> Gill V. 'Physical Activity'. Chapter 5 in Campbell-Jack D, Hinchcliffe S, and Bromley C (eds). *The Scottish Health Survey. 2014 Edition*. [www.gov.scot/Resource/0048/00485587.pdf](http://www.gov.scot/Resource/0048/00485587.pdf)

<sup>44</sup> Sport England. *Active Lives Survey 2016-17*. See note 10.

<sup>45</sup> Bromley C. 'Physical Activity'. Chapter 6 in Rutherford L, Hinchcliffe S, and Sharp C (eds). *The Scottish Health Survey. 2012 Edition*. <http://www.gov.scot/Resource/0043/00434590.pdf>

<sup>46</sup> Active Lives Survey 2016/2017. Technical notes to accompany the May 2016/17 report. <https://www.sportengland.org/media/12455/technical-summary-may-16-17-report.pdf>

<sup>47</sup> Gray L and Leyland A. *Inequalities in health risks*. Chapter 9 in Campbell-Jack D, Hinchcliffe S, and Bromley C (eds). *The Scottish Health Survey. 2014 Edition*. [www.gov.scot/Resource/0048/00485587.pdf](http://www.gov.scot/Resource/0048/00485587.pdf)

<sup>48</sup> Sport England. *Active Lives Survey 2016-17*. See note 10.



## Appendix: Additional definitions of activity categories

### Sports and exercise activities – intensity classification

Sports and exercises were grouped into light, moderate or vigorous intensity categories based on the MET (metabolic equivalent) intensity. MET is a unit used to estimate the intensity of physical activity. It is based on the amount of oxygen consumed during physical activity. The baseline energy used by the body at rest in one minute is defined as 1 MET. Thus an activity with a MET value of 1.5 uses 50% more energy than baseline energy expenditure. MET levels can be linked to specific activities in various settings. Moderate physical activity (MPA) includes activities with estimated intensity levels of 3-6 METs; vigorous physical activities (VPA) are those with estimated intensity levels of 6 METs or higher.<sup>49</sup>

Vigorous:

- a) All occurrences of a number of activities (classified as being 7.5-12 METs) including: climbing, hockey, martial arts, running/jogging, squash.
- b) The following activities (5.5-7 METs) were coded as vigorous intensity if they had made the participant 'out of breath or sweaty', but were otherwise coded as moderate intensity: aerobics, badminton, boxing, cycling, football, hillwalking, rugby, skiing, swimming, tennis, workout at a gym (e.g. exercise bike, weight training).

Moderate:

- a) See 'vigorous' category (b).
- b) All occasions of a large number of activities (3.5-5 METs) including: canoeing, cricket, fell walking, golf, horse riding, tai chi, table tennis.
- c) The following sports were coded as moderate intensity if they had made the participant 'out of breath or sweaty', but were otherwise coded as light intensity: dancing, exercise (press-ups, sit-ups etc.).

Light:

- a) See 'moderate' category (c).
- b) All occasions of a large number of activities (1.5-3 METs) including: bowls, fishing, pilates, snooker yoga.

### Occupations requiring moderate level activity

*Walking:* farm managers; natural environment and conservation managers; managers in animal husbandry, forestry and fishing; nurses, including auxiliaries and assistants; sports players; sports coaches, instructors and officials; fitness instructors; sports and fitness occupations; conservation and environmental protection officers; countryside and park rangers; farmers; gardeners and grounds staff; agricultural and fishing trades; pest control officers; road construction operatives; rail construction operatives; construction operatives; farm workers; forestry workers; fishing and agriculture related occupations; labourers in building and woodworking trades; labourers in other

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<sup>49</sup> Based on Ainsworth BE, Haskell WL, Herrmann SD, et al. 2011 *Compendium of Physical Activities: a second update of codes and MET values*. *Med Sci Sports Exerc* 2011;**43**:1575-1581.

construction trades; stevedores, dockers and slingers; other goods handling and storage occupations; postal workers, mail sorters, messengers, couriers; road sweepers; cleaners, domestics; refuse and salvage occupations; elementary cleaning occupations.

*Climbing stairs or ladders:* production, works and maintenance managers; managers in construction; managers in mining and energy; chartered surveyors; building inspectors; fire service officers; inspectors of factories, utilities and trading standards; farmers; horticultural trades; gardeners and grounds staff; agricultural and fishing trades; electricians, electrical fitters; lines repairers and cable jointers; roofers, roof tilers and slaters; plasterers; floorers and wall tilers; painters and decorators; scaffolders, staggers, riggers; farm workers; forestry workers; fishing and agriculture related occupations; labourers in building and woodworking trades; labourers in other construction trades; window cleaners; cleaners, domestics.

*Lifting, carrying, or moving heavy loads:* paramedics; fitness instructors; sports and fitness occupations; farmers; horticultural trades; gardeners and grounds staff; agricultural and fishing trades; smiths and forge workers; moulders, core makers, die casters; sheet metal workers; metal plate workers, shipwrights, riveters; welding trades; pipe fitters; metal machining setters and setter-operators; tool makers, tool fitters and markers-out; metal working production and maintenance fitters; precision instrument makers and repairers; motor mechanics, auto engineers; vehicle body builders and repairers; steel erectors; bricklayers, masons; roofers, roof tilers and slaters; plumbers, heating and ventilating engineers; carpenters and joiners; glaziers, window fabricators and fitters; construction trades; plasterers; floorers and wall tilers; butchers, meat cutters; bakers, flour confectioners; fishmongers, poultry dressers; furniture makers, other craft woodworkers; nursery nurses; childminders and related occupations; weighers, graders, sorters; tyre, exhaust and windscreen fitters; scaffolders, staggers, riggers; road construction operatives; rail construction and maintenance operatives; construction operatives; farm workers; forestry workers; fishing and agriculture related occupations; labourers in building and woodworking trades; labourers in other construction trades; labourers in foundries; labourers in process and plant operations; postal workers, mail sorters, messengers, couriers; kitchen and catering assistants; bar staff; refuse and salvage occupations; shelf fillers.

## **Muscle-strengthening activities**

Activities were counted as muscle-strengthening only if carried out in bouts of 10 minutes or more.

The following activities were always included as muscle-strengthening activities: canoeing, climbing, field athletics, horse riding, kayaking, rowing, sailing, skiing or snowboarding, Tai-chi, water skiing, wind surfing.

The following activities were included as muscle-strengthening activities for participants who reported that the effort of that activity was usually enough to make their muscles feel some tension, shake or feel warm: aqua aerobics or aquafit, aerobics, basketball, body boarding, bowls, exercise (press-ups, sit-ups etc), cricket, curling, golf, hillwalking, hockey, ice skating, martial arts other than tai chi, netball, pilates, rambling, surfing, tenpin bowling, volleyball, workout at a gym (e.g. exercise bike, weight training), yoga.

For some activities the question about whether the effort of that activity was usually enough to make their muscles feel some tension, shake or feel warm was not asked:

badminton, cycling, dancing, football, rugby, running or jogging, squash, swimming, tennis.

### **Activities to improve balance and co-ordination**

The following activities were included as activities that improve balance and co-ordination: aerobics, aqua aerobics/aquafit, badminton, basketball, body boarding, bowls, canoeing, climbing, cricket, curling, cycling, dancing, field athletics, football, golf, hillwalking, hockey, horse riding, ice skating, kayaking, keep fit (workout at a gym), martial arts, netball, pilates, rambling, rugby, running/jogging, sailing, skiing/snowboarding, squash, surfing, table tennis, Tai-chi, tennis, tenpin bowling, volleyball, wind surfing, yoga, water-skiing. Exercise (press-ups, sit-ups etc) was included as balance-improving for participants who reported that the exercises involved standing up and moving about.

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