Annual Report of the Chief Medical Officer

Surveillance Volume, 2012

On the State of the Public's Health

Dear Reader

My annual report is published in two volumes: one plays out my advocacy role, drawing together academic experts on a single topic, and the other displays data from a variety of sources to provide a broad brush picture of the nation's health.

The advocacy volume of this report, "Our Children Deserve Better: Prevention Pays", was published in October 2013. It focused on the economic case for investing in our children's health.

My first surveillance volume, published in November 2012, used innovative techniques to display data on over 130 health topics. This second surveillance volume builds upon the first. It examines six key topics in closer detail, presenting newly compiled data and analyses. It also uses infographics to display data in an ergonomic form and communicate key information at a glance.

All of the data used to produce this report are available at the Department of Health webpages at https://www.gov.uk/government/organisations/department-of-health to facilitate further exploration and analysis.

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Prof Dame Sally C Davies

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Summary

Introduction

The role of the Chief Medical Officer dates back to 1855, when Sir John Simon was appointed the first Medical Officer for the General Board of Health. Following the dissolution of that board in 1855, the role transferred to the Privy Council in 1858. As Chief Medical Officer to the Privy Council, Sir John started the tradition of a Chief Medical Officer's annual report, providing an independent assessment of the state of the public's health to Government.

For the first century or so, these annual reports took a consistent form. Each opened with a letter from the Chief Medical Officer which listed notable events affecting the public's health during the year, and highlighted examples of particularly good or interesting public health practice. The second section of each report set out statistics on the public's health, typically covering data such as birth rates, leading causes of mortality, cases of infectious diseases, and vaccination rates. In the third section, Chief Medical Officers typically featured the work of experts in their field. These sections gave state of the art summaries of topics as diverse as hospital design, safe import of food, and factory working conditions, advocating for action on each to improve the health of the nation.

More recent reports have been more varied in form: some have covered single topics, others a selection of topics; some have focused on presentation of data, others on advocacy.

I strongly believe that data and scientific evidence should be at the heart of policy making and advice to government. Data should be used to inform our prioritisation of action and to evaluate the effectiveness of such action; scientific evidence should be used to determine what actions should be taken. Hence, for my annual reports, I have employed a format inspired by the traditional form used by my historic predecessors. Each year, I publish a surveillance volume, setting out the data on a variety of topics affecting the public's health, and an advocacy volume, in which I set out evidence-informed recommendations to improve the health of the nation. In keeping with the long-standing tradition, these reports are named for the year of data they discuss, not the year in which they are published. My advocacy volume for 2012, *'Our Children Deserve Better: Prevention Pays'* focused on Child Health; this can be downloaded from gov.uk.

My surveillance report for 2011 was a compendium of data across a broad range of public health topics, set out at local authority level in order to maximise its value to Directors of Public Health. The data used to produce the images in the annual report was made available online for further analysis, and I am delighted that so many public health professionals have found this informative.

In this surveillance report for 2012, I have focused on six areas of public health which stood out in my previous report. Some of these – liver disease, for example – are areas which I have examined in closer detail this year after highlighting a concern last year. Others – sensory disease, for example – are areas in which I highlighted a paucity of formally collected data last year, and have worked with experts to provide some data this year. Each chapter opens with data presented in an ergonomic 'infographic' form. Directors of Public Health may find these useful for disseminating the findings of this report more widely.

I have set out the main findings of each chapter in this summary.

Health and employment

Just over three-quarters of England's working-age population are 'economically active' (employed or actively seeking employment). There is a two-way relationship between health and employment: Health status can affect ability to work, and work can have a direct impact on health, as well as an indirect effect via income, housing, environment, transport, and other factors.

In addition to the presence or absence of work, the relationship between health and employment is influenced by the quality of employment conditions. This fact has long been recognised, and is much discussed in historical annual reports. It is sometimes forgotten how quickly the nature of work has changed: in the first half of the 20th century, some 84,331 people died in disasters in the coal mining industry alone in Great Britain: an average of 1,687 deaths per year.[1] Now, less than a century later, the scale of work-related deaths has fallen by an order of magnitude: across all industries, there were 171 deaths from work-related injuries in Great Britain in 2011/12.[2] Though there is still more to be done, this represents a remarkable shift in causes of death in Great Britain in a relatively short period of time. This shift is largely explained by the changing nature of work in this country, though improved legislation, concerted effort by industries previously associated with high mortality rates, and the success of public health professionals must not be overlooked.

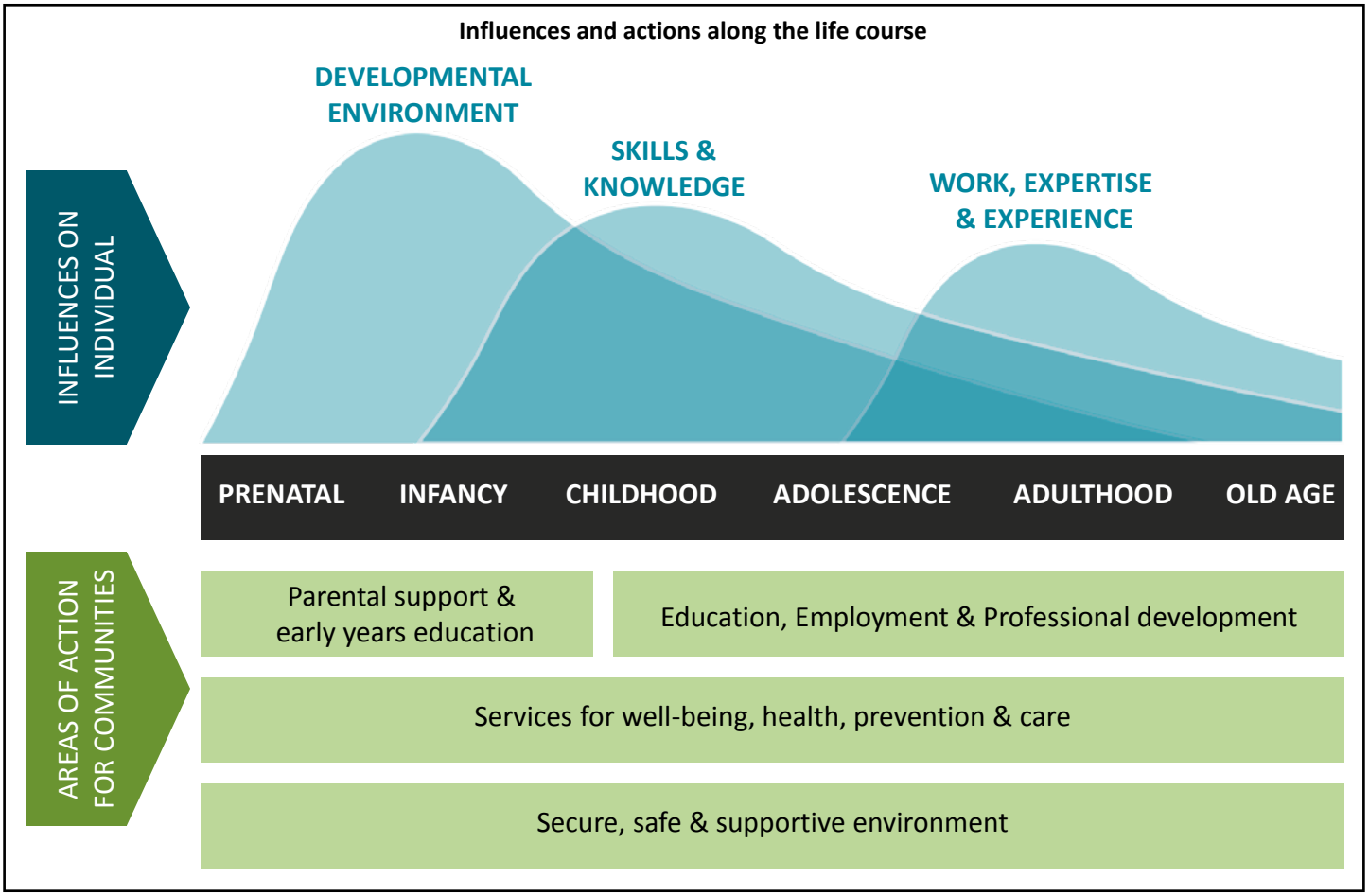
The changing nature of work has also brought new challenges. Sickness absence as a whole is estimated to cost the British economy £15 billion per year, and absences lasting more than four weeks make up around half of all lost working days.[3] A substantial portion of the burden of sickness absence is attributable to mental health problems (as defined by the Health and Safety Executive). It is important to note that this definition of "mental health problems" includes categories that would not be considered mental illnesses: "stress", for example. In 2011/12, such mental health problems were the most prevalent work-related illnesses in Great Britain, accounting for 38% of all days lost to work-related sickness absence.[4] Each year, approximately 300,000 people leave employment and receive health-related state benefits; 45% of those claiming health-related benefits are entitled to do so because of mental health problems.

I welcome initiatives such as Time to Change[5] which aims to reduce mental health stigma and discrimination. The burden of disease may be substantially reduced by employers working hard to reduce the level of work-related mental health problems in the workforce. The advocacy volume of my 2013 Annual Report will focus on public mental health, and will discuss these themes in greater detail.

Beyond work related-illness, I believe that employers have twin duties with regard to the health of their employees: to preserve, support and encourage good physical and mental health among employees, and to help those who fall ill return to work. Such approaches are not only likely to benefit the health of employees, there is also evidence that well-targeted employee health programmes can increase productivity, deliver a good return on investment,[6] and reduce the cost of sickness absence to the British economy.[7] Good employers may provide facilities to encourage healthy behaviour in their workforce, such as providing healthy options in cafeterias, and changing rooms to encourage active travel. Innovations such as the data-driven approach to improving employee health used by Google, which has successfully 'nudged' employees to eat fewer sweets and drink fewer sugary soft drinks,[8] are particularly inspiring.

Patterns of working have changed in recent years: in particular, the workforce is aging. Between 2011 and 2013, the average age at which people left the labour market was 65 years for males and 63 years for females.[9] To put this in context, the current average retirement age exceeds the typical life expectancy of 100 years ago (53 years for males and 56 years for females),[10] and is not dissimilar to the typical life expectancy of just 50 years ago (68 years for males and 74 years for females).[11] Between 2011 and 2013, 12.5% of males and 6.9% of females continued to work beyond the age of 65,[12] while many more (23.2% of males and 26.5% of females) perform a voluntary role.[13] Continued paid[14] and voluntary[15] employment after the age of 65 appears have a broadly positive impact on health; however, I believe there are some people whose financial circumstances result in them feeling compelled to continue working after the age of 65 despite failing health. Continued working in the older population may also have a negative impact on job availability for younger people. In 2012/13, unemployment in those aged 16-24 reached 21% following a decade of increase,[16] and this may have a considerable impact on the physical[17] and mental health[18] of this cohort. Unemployment in all age groups would probably reduce in the context of a growing economy.

Public health professionals regularly frame health inequalities using the life course model. In my 2011 annual report, I presented a new representation of the life course model, 'Influences and actions along the life course', emphasising where action on individual experiences and wider social



determinants can be most effective. This model reflects the changing demographic and economic profile of the nation, including the fact the average age of retirement is increasing. It emphasises that the impact of work, expertise and experience increasingly extends into old age. For example, taking part in voluntary work after retirement has been shown to be beneficial for health.

Key points

- 38% of work-related illness is due to work-related mental health problems. Reducing the burden of work-related mental health problems should benefit our economy.
- Providing facilities to encourage healthy behaviours in the workforce can benefit employers as well as employees.
- The average age of workers is increasing as a result of an increasing average age of retirement and a high rate of unemployment in the young. The wider social implications of this change are not yet fully understood.

Health and justice

The prison population in England and Wales numbers around 84,000, which is comparable to the size of the population of some small local authorities.[19] The population is dynamic – almost twice that number pass through the system each year – and largely composed of individuals at high risk of ill health. Indeed, the health status of the prison population is such that it has been suggested that, on average, prisoners aged over 50 have the same health status as those who are 10 years older in the general population.[20] Hence, the prison population represents a very vulnerable group.

Rollout of hepatitis B vaccination in prisons provides a strong example of how concentrating on prisoners as a vulnerable group can affect the epidemiology of a disease across the whole population. Prior to rollout of the hepatitis B vaccination programme in 2003, across the general population, 37% of cases of hepatitis B where a mode of transmission could be identified were transmitted through injecting drugs,[21] and only 39% of intravenous drug users had been vaccinated against hepatitis B.[22] By 2011, only 4% of cases of hepatitis B where a mode of transmission could be identified were transmitted through injecting drugs,[23] and 77% of intravenous drug users were vaccinated.[24] This represents a remarkable shift in the epidemiology of hepatitis B in England and Wales in less than a decade. This demonstrates that a careful focus on a specific problem can have wide-ranging effects.

There was a substantial increase (104%) in the number of deaths from natural causes in prison custody in England and Wales between 2000 and 2010, despite a relatively modest increase in the size of the prison population over the same period (31%).[26] The Prisons and Probation Ombudsman has expressed concerns about delays in referral to secondary care, delays in summoning emergency services, and poor monitoring of chronic conditions among prisoners. Around a fifth of prisoners dying of natural causes do not receive the level of palliative care that would be expected in the community.[27] Prison represents a uniquely challenging environment for the delivery of healthcare. However, I believe that society has a duty to ensure healthcare for prisoners is equitable to that which can be expected in the wider community, and I am confident that the Department of Health, NHS England, Public Health England, and the National Offender Management Service will continue to work in partnership to deliver improvements in prison healthcare. I am encouraged by the progress seen in the roll out of NHS Health Checks in prisons which is due to be complete by the end of 2014/15.[28]

I note that there is some limited evidence from other countries suggesting that needle and syringe exchange programmes in prisons may be an effective harm reduction measure.[25] Further exploration of the evidence, practicality and cost-effectiveness of such a programme in this country would help to inform the debate in this area.

Key points

- The hepatitis B vaccination programme in prisons has succeeded in changing the epidemiology of hepatitis B across the whole country in under a decade. This shows the potential wider value of targeted public health interventions.
- The recent increase in the number of deaths from natural causes in prison custody is concerning. The concerted effort being made by those involved in the commissioning and delivery of prison healthcare to learn lessons from the investigations into these deaths by the Prisons and Probation Ombudsman should improve services and thus outcomes.
- Further exploration of the evidence, practicality and cost-effectiveness of needle and syringe exchange programmes in prisons would help to inform the debate in this area.

Sensory impairment

Sensory diseases tend to be associated with high levels of morbidity yet low levels of mortality. The formal data collection systems used to inform service development and delivery in England are not well attuned to collecting data on diseases which exhibit this pattern. As a result, there is a paucity of data in this area.

The burden of disease caused by sensory impairment is considerable. Conservative estimates based on modelled data presented in the Global Burden of Disease Study 2010[29] suggest that 7-10% of all years lived with disability among those aged 70 or over in the UK is attributable to sensory disease. This is a similar proportion to cardiovascular disease and neurological disorders. The majority of the sensory disease burden is attributable to hearing and visual impairment. Data from the GP Patient Survey in England[30] suggests that around 12% of adults aged over 55 have deafness, blindness or both.

Data from the GP Patient Survey[31] shows a substantial and significant association between prevalence of deafness

or blindness and deprivation: in younger age groups, the prevalence in the most deprived population quintile is twice that in the least deprived quintile. The reasons for this association are unclear. It has been suggested that it may be due to historical differences in noise exposure at work[32] or that deprivation in early life may have long-term effects on hearing via an unknown mechanism.[33]

As shown in the bar chart below, there is a substantially greater prevalence of dementia (including Alzheimer's disease) in those with deafness or blindness, compared to those without deafness or blindness. This association is not well understood, but the impact of sensory impairment on the onset and management of other psychological and neurological problems represents an emerging area of research.[34]

In common with many other diseases, there are no function-related data to enable planning of services for patients with sensory impairment (beyond synthetic estimates), and no comprehensive data on the extent to which services meet the needs of the large number of people with sensory impairment. The association between sensory impairment and dementia provides an example of one area in which improved data quantity and quality could be used to improve our understanding of the causes and treatment of a disease which extends beyond the population of people with sensory impairment.

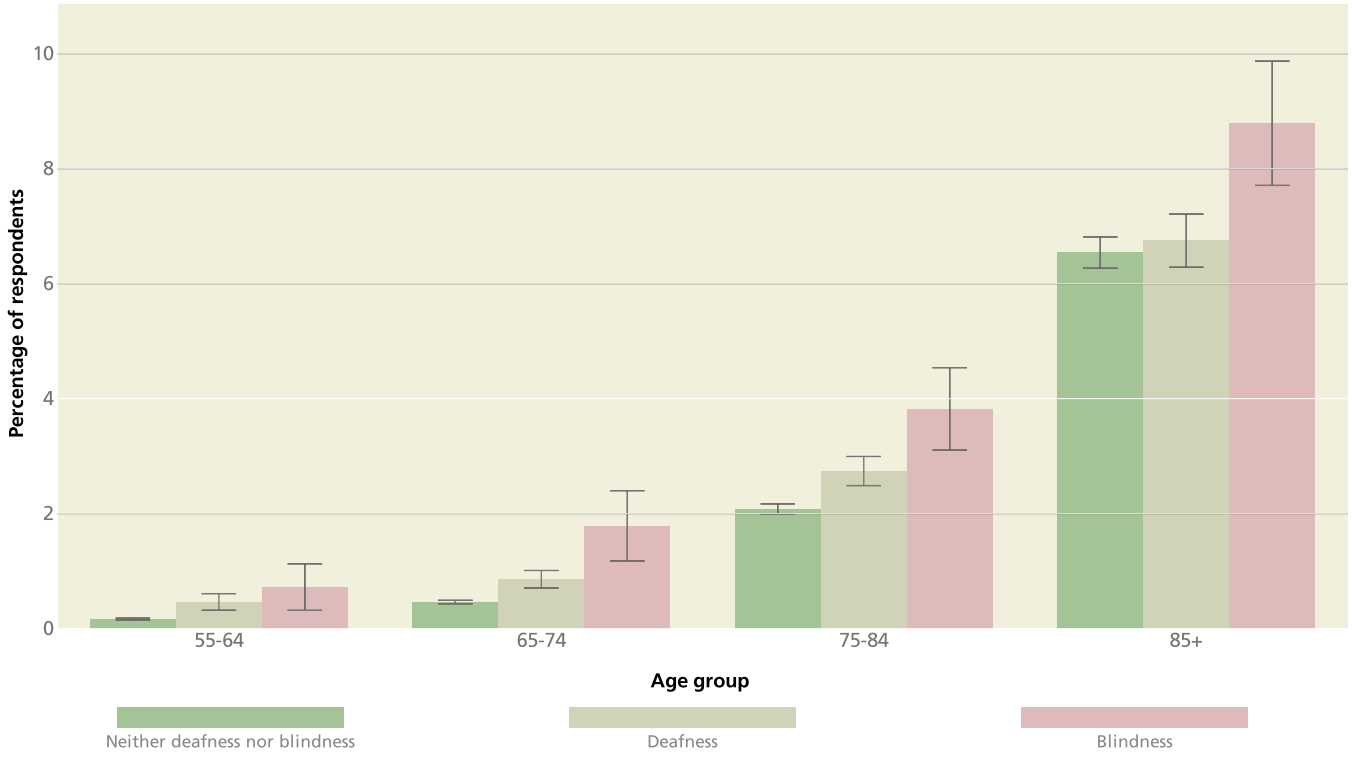
Key points

- Improvements to data quality and quantity for sensory diseases, and all diseases associated with high morbidity and low mortality, are needed.
- Further exploration of the association between sensory impairment and dementia (including Alzheimer's disease) may help to reveal more about the causes of dementia.
- Further investigation into the apparent association between deprivation and blindness or deafness should help the development of preventative strategies.

Diet, physical activity and obesity

Almost two-thirds of adults and one-third of children aged 2 to 15 are overweight or obese. This represents a profound change in the health of the nation over a relatively short period of time: in 1980, around 7% of adults were obese compared with around 25% today. Overweight and obesity are associated with increased risk of hypertension, type 2 diabetes, stroke, coronary heart disease, and several cancers. The causes of obesity are complex, multi-factorial, and not completely understood: in particular the role of the human microbiome remains an active area of research.[35] However, while the cause is unclear, there are evidence-based interventions for overweight and obesity, and the alarming prevalence of overweight and obesity makes it clear that action is required.

Figure 4.5: Percentage of GP Patient Survey respondents with dementia by age and sensory impairment, England, 2012-2013



Source: GP Patient Survey 2012-13

In England, the average man weighs around 84kg and is around 175cm tall; the average woman weighs around 70kg, and is around 162cm tall. Both the average man and the average woman are overweight.[37] Overweight is associated with an increased risk of heart disease, type 2 diabetes, and cancer.[38] Yet evidence shows that 52% of overweight men and 30% of overweight women think they are "about the right weight", along with 11% of obese men and 6% of obese women.[37] Additionally, 77% of parents of overweight children do not recognise that their child weighs more than they should.[36]

I have long been concerned about the presentation of underweight as an ideal weight, particularly in the fashion industry. Yet I am increasingly concerned that society may be normalising overweight. For example: larger mannequins are being introduced into clothes shops; "size inflation" means that clothes with the same size label have become larger in recent decades; and news stories about overweight often feature pictures of severely obese people, which are unrepresentative of the majority of the overweight population.

Average consumption of added sugar is higher than recommended among adults and children of all ages. In secondary school age children (aged 11-18), almost a third of the added sugar in the average diet comes from soft drinks (including carbonated drinks, smoothies, and fruit juices with added sugar). This is an alarming proportion; soft drinks are easily avoidable sources of added sugar. These can generally be swapped for alternatives, as the Change4Life 'Smart Swaps' campaign advises.[39] However, in order to make these dietary changes, the public needs a solid understanding of which products contain added sugar. This should be achieved through clear labelling of added sugar content.

I call on manufacturers to ramp up reformulation of products to use less added sugar. If voluntary efforts fail to deliver then we, as a society, may need to consider the public health benefits that could be derived from regulation such as a 'sugar tax'. I am pleased that some progress has been made on a voluntary basis in product reformulation for salt reduction (though there is still much further to go).[40]

I am concerned by data, such as that shown in the scatter plot below, showing an association between greater levels of deprivation and greater numbers of fast food outlets per person, and also by anecdotal reports that fast food outlets are opening near schools to serve children during lunch hours.[41] These associations should be investigated further, and I welcome the initiative shown by several local authorities in investigating the associations between fast food and deprivation at the local level. I commend Public Health England for the production of a useful briefing paper setting out actions local government can take to regulate the growth of fast food outlets near schools.[42]

Increasingly sedentary lifestyles also play a part in the obesity picture. Along with the Chief Medical Officers for Northern Ireland, Wales and Scotland, I recommend that adults complete a minimum of 150 minutes (2.5 hours) of moderate intensity activity per week. Many adults (around 40%) do not achieve this. By comparison, according to figures from the Broadcaster's

Figure 5.7: Association between fast food outlets per 100,000 population and deprivation by lower tier local authority, England, 2013

Source: OS InterestMap™ May 2013 (Provided by Public Health England); Indices of Deprivation 2010; DCLG / ONS mid-year population estimates 2010

Audience Research Board, adults watched an average of 1,648 minutes (27.5 hours) of television per week in 2013.[43]

More robust data around prevalence of obesity and its associations with other long-term conditions would be of value; I welcome the progress made by Public Health England in this area, particularly their recent publication of local level obesity data as part of the Public Health Outcomes Framework.[44]

Key points

- Obesity is a complex multi-factorial problem which is not completely understood. However, action is compelled by the combination of the alarming prevalence of overweight and obesity and a number of evidence-based interventions to tackle this.
- Manufacturers should reformulate products to reduce the amount of added sugar they contain.
- The public should be educated on the often high sugar (and thus calorie) content of fruit juices, smoothies, and carbonated soft drinks. Public understanding of the quantity of added sugar in drinks could be substantially aided through clear and consistent labelling.
- Closer investigation of the association between fast food outlets and deprivation may help to inform local and national policy.
- Improvements to data quality on the prevalence of obesity and its associations with other long-term conditions would help to improve clinical care and service planning.

Cancer trends

Cancer is the most common cause of death for people who die before the age of 75.[45] Between 1985 and 2010, the reported incidence of cancer increased by 15.1%, yet mortality due to cancer decreased by 26.3%. The fall in mortality is probably attributable to a fall in incidence of cancers associated with high mortality (such as lung cancer in males) and improvements in speed of diagnosis and clinical treatment.

People living in more deprived areas are, on average, disproportionately more exposed to avoidable risk factors for cancer, compared with people living in more affluent areas. For example, we know that cigarette smoking, obesity, poor diet, and excessive alcohol consumption all are all significant risk factors for cancer, and are all more common in deprived areas. There is substantial inequality in cancer mortality: the most recent five years of data showing slower year-on-year decreases in cancer mortality in those living in more deprived areas than those living in more affluent areas.

The cancer trends chapter presents a novel analysis of data provided in my annual report last year. Statistical software is used to detect linear trends in the incidence and mortality of a range of cancers. This type of exploratory analysis, while by no means definitive, raises interesting questions about apparent patterns in the data, and suggests temporal associations between changes in methods of cancer diagnosis and treatment, and changes in incidence and mortality. Novel analysis can challenge existing narratives about patterns in data, and suggest new and useful associations: this is a very strong reason for providing open data for others to analyse. The geographic analysis of prescribing data published by Dr Ben Goldacre and colleagues at prescribinganalytics.com provides another inspiring example of how data can be repurposed.

Key points

- Cancer remains a major contributor to mortality in England.
- While cancer incidence is increasing, cancer mortality is decreasing. This is probably attributable to both better cancer care (including diagnosis and treatment) and a reduction in the incidence of cancers with high mortality rates.
- The gap in cancer mortality between the most and least deprived areas of the country is widening. Further exploration of this trend is needed.

Liver disease

In last year's report, I highlighted liver disease as the only major disease category in which premature mortality was increasing in England while decreasing among our European neighbours.[46] The prevalence of some of the risk factors for liver disease, such as obesity and excess alcohol consumption, have markedly increased in recent decades. Yet there is a lead time of up to thirty years between the first onset of liver disease and presentation to medical services.[47] The increased exposure to risk factors that we are seeing at present may portend a huge increase in the number of patients presenting with liver disease over the coming decades. In 2010, liver disease accounted for 141,600 potential years of life lost.[48] In 2030, liver disease is likely to account for many times that number if the present trajectory continues.

While alcohol consumption has decreased in the past few years, the historic trend is one of substantial increase. In 2012, the UK population consumed about twice as many units of alcohol per person as the population fifty years ago.[49]

In popular culture, drinking alcohol to excess is sometimes portrayed as 'normal behaviour'. For example, an analysis of six weeks of soap operas in the UK in 2010 found 162 instances of characters drinking to excess, with negative consequences rarely shown.[50] Drunkenness is also commonly depicted without negative consequences in popular films,[51] and is frequently mentioned in contemporary popular music.[52] This is not necessarily a problem solely of modern culture: every one of Shakespeare's plays mentions alcohol,[53] yet there are rather fewer mentions of the negative health consequences of excess consumption.

Drinking to excess is not 'normal behaviour', and portraying it as such is irresponsible. Some 75% of the population does not consume excessive quantities of alcohol, and the proportion of the population which abstains from alcohol (15% in 2009) is increasing.[54]

Excess alcohol consumption is associated with cardiovascular disease, cancers of the digestive organs, and breast cancer. There are also strong links between alcohol and crime, disorder and anti-social behaviour. Alcohol is a factor in 47% of violent crime;[55] 30% of all violent assaults between strangers in 2010/11 took place around a pub or club;[56] and 19% of all adults engaging in binge drinking* reported committing a criminal offence in the previous year, compared with 3% of those who only occasionally or never drink alcohol.[57]

Despite these clear health and societal risks, retailers continue to sell alcohol using methods which I consider to be irresponsible. I deplore the methods which retailers use to entice consumers to purchase ever-greater quantities of alcohol. For example, supermarkets promote multi-buy offers and sell alcohol below cost price; licensed premises have redefined "small" glasses of wine, and omitted from menus the 125ml measure which they are legally obliged to offer.[58] The quantity of alcohol advertising is also concerning: one recent study found that there were 111 visual references to alcohol in every hour of broadcast football matches: almost two per minute.[59] This is particularly concerning as televised football matches are popular among children as well as adults, and the evidence shows that children exposed to alcohol marketing tend to drink alcohol at an earlier age and in greater quantities than those who are not exposed.[60]

I welcome the Government's plan to ban the sale of alcohol below the cost of duty plus VAT from April 2014;[61] however, I note that modelled data suggests that charging a minimum of 45p per unit of alcohol should be more effective in reducing premature deaths.[62] An exploration of the impact of the Alcohol (Minimum Pricing) (Scotland) Act 2012[63] would add valuable real-world data to our understanding of the problem, provided its provisions survive ongoing legal challenge and are implemented.

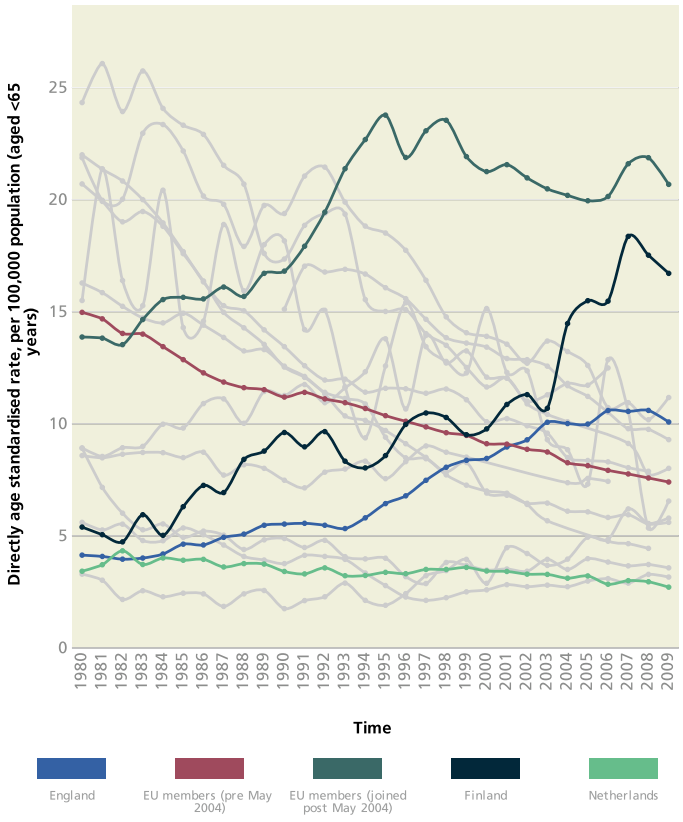
An expert group is currently reviewing the evidence to inform new guidelines on the maximum quantity of alcohol which it is safe to consume. I intend to publish these guidelines within the coming year.

Key points

- Liver disease is the only major disease category in which premature mortality is increasing in England while decreasing among our European neighbours.
- The average quantity of alcohol consumed per person in the UK remains far higher than fifty years ago. Excess alcohol consumption is associated with cardiovascular disease, cancers of the digestive organs, breast cancer, and suicide.
- On- and off-licence retailers of alcohol could refrain from using promotions to encourage individuals to purchase large amounts of alcohol. For example, they could advertise the standard 125ml measure of wine with the same prominence as they advertise other sizes.
- I intend to publish updated guidelines on the maximum quantity of alcohol which it is safe to consume.

* Binge drinking refers to consumption in a single session of 8 or more units of alcohol for men and 6 or more units of alcohol for women.

Trend in premature mortality (ages under 65) from chronic liver disease and cirrhosis, England and EU countries, 1980 to 2009



Source: EU: WHO, Health For All data set; England: ONS.

Public health miscellany 2012

In this year's annual report, I have highlighted a number of notable public health events from 2012. These include examples of good practice, such as the Street Spice Festival outbreak investigation in Newcastle upon Tyne, and examples of interesting data findings, such as the much higher per-kilometre death and injury rate for those engaging in some forms of active travel compared to those using cars.

I believe that encouraging more people to engage in active travel, such as walking and cycling, is crucial to improving the health of the nation and reducing the prevalence of obesity. I am therefore concerned to see that between 2003 and 2012, the average number of miles travelled on foot per person in Great Britain has fallen by 10%, and that cycling accounted for less than 1% of all miles travelled in 2012. However, this national figure conceals some considerable local variation: In 2012, 30% of journeys to work by Cambridge residents were by bicycle, with 47% cycling at least once per week.[64]

In order to improve uptake, we need to improve safety. The relative risk associated with journeys by active travel methods are unacceptably high and must be reduced. Compared with travelling the same distance by car, the risk of death from travelling one kilometre on foot or by bicycle is more than 17 times higher. The risk of serious injury for each kilometre

travelled is almost 16 times higher on foot than by car, and 21 times higher on a bicycle than by car.

An integrated approach to improving safety for all road users must be taken. The high number of journeys undertaken by bicycle in Cambridge may be partly linked to the extensive network of cycling routes separated from traffic: there is limited evidence that physically separating cycle networks from motorised traffic may reduce risks for cyclists.[65] It is important, however, that we also protect pedestrians. An improved understanding of methods to improve road safety for all modes of transport and how these can be applied to the road system in England would be beneficial.

Future annual reports

The advocacy volume of my annual report for 2013 will be published later this year, and will focus on public mental health. The surveillance volume will follow.

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Chapter 2

Health and employment

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Overview

It has been argued that work is 'the most important determinant of population health and health inequalities in advanced market democracies'.[1] As well as having a direct impact on health, work also has a major effect on income, housing, environment, transport and other factors. This is true for individuals, families and society. Populations with fewer and lower-paid jobs tend to have worse health than more affluent populations; this applies when looking across localities, regions and countries.

Health status can affect the ability to work and thus the economic potential of individuals and populations. People in poor health are at greater risk of unemployment and may feel less able to contribute to the wider community.

Just over three-quarters of England's working-age population are 'economically active'. People described as 'economically active' are employed, or are unemployed and actively seeking work.[a] People described as 'economically inactive' are out of work, and are not actively seeking work. This includes some students, people with long-term sickness and other groups.[2] The nature of work is changing, with more people employed in the service sector and a substantial rise in the number of small businesses. Industrial accidents were a major cause of death and injury in the past, though the number of these has now substantially reduced. In 2012, mental health problems were the most prevalent work-related illness, while musculoskeletal disorders were the second most prevalent work-related illness.

England's working population is becoming older and working life is extending. This brings challenges as well as benefits. Older people bring experience to the workplace and being employed tends to be good for health. An increasing number of people remain employed in their late 60s and 70s;[3] continuation of this trend may require greater flexibility in working arrangements.

To assess population health, we need to consider the quality of work and people's employment conditions as well as the presence or absence of work. There is compelling evidence that the conditions of work are sometimes decisive factors in influencing mental and physical health. There is also growing recognition among employers of the importance of employee health to their organisations (see, for example, the Public Health Responsibility Deal H10 which covers the construction industry).

Fair Society, Healthy Lives looked at inequalities in health; the review was led by Sir Michael Marmot.[4] It highlighted the importance of work and listed 10 core components of good work that protect and promote good health. These can be summarised as:

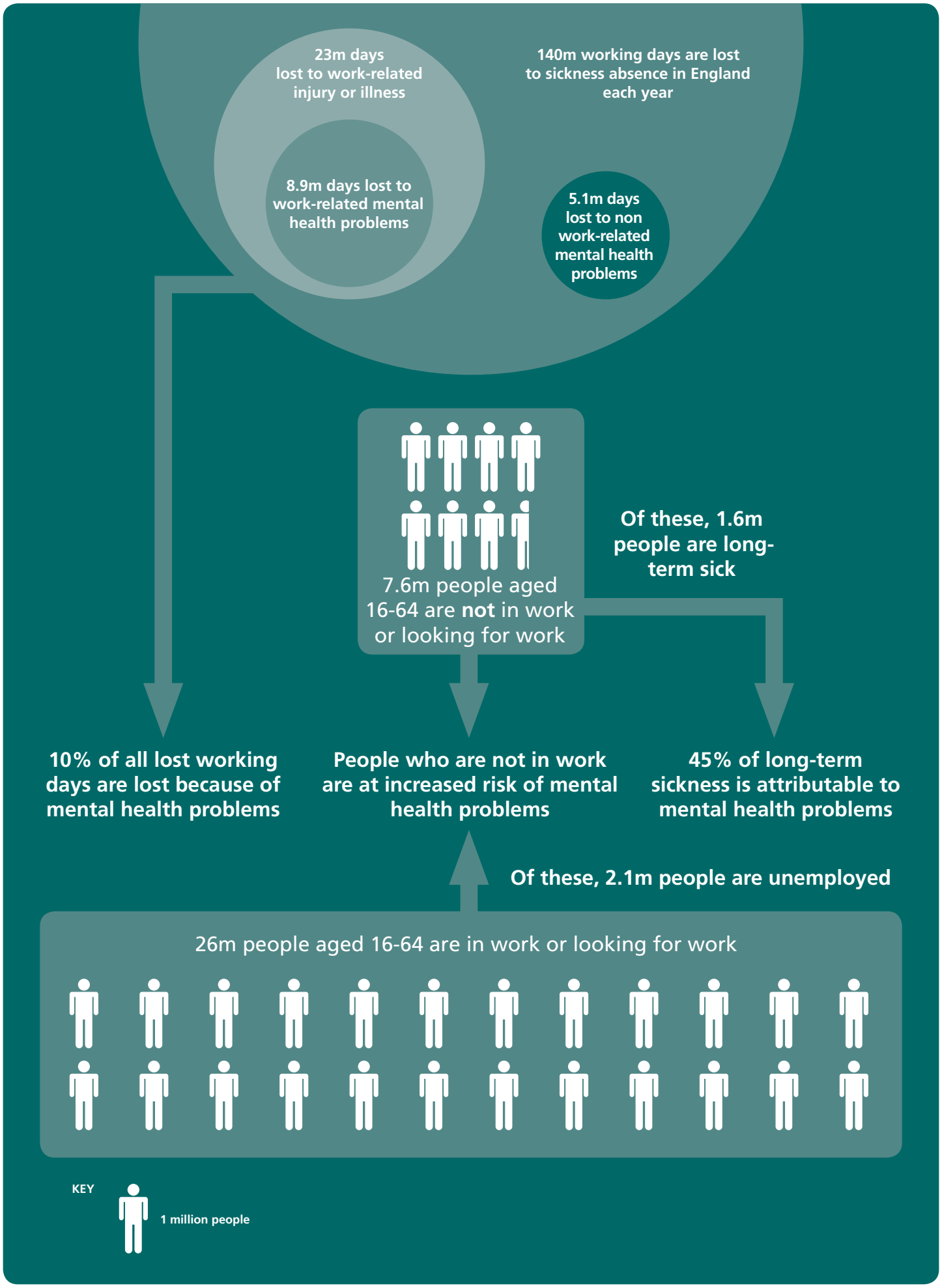
- freedom from precariousness
- having some control over work
- having appropriately high demands
- fair earnings and job security
- opportunities for training, learning and promotion
- preventing social isolation, discrimination and violence
- sharing information and decision-making
- reconciling work and other demands
- reintegrating sick and disabled people into full employment
- meeting basic psychological needs.

Better health at work can bring economic benefits. For example, sickness absence is estimated to cost the British economy £15 billion a year,[5] and it has been calculated that interventions to support people in returning to work before their absence becomes long-term would reduce this cost.[6]

As many employees spend the majority of their waking hours in work, the workplace provides a good opportunity to intervene in employee health. The World Health Organization defines a healthy workplace as 'one in which employees and managers collaborate to use a continual improvement process to protect and promote the health, safety and wellbeing of staff and the sustainability of the workplace'.[7] Increased attention to workplace health has also been seen nationally, for example in a framework for mental health and employment[8] and in National Institute for Health and Care Excellence (NICE) guidance on long-term sickness and incapacity for work (PH19)[9] and on promoting mental wellbeing at work (PH22).[10] A series of health at work pledges have recently been agreed by various employers as part of the Public Health Responsibility Deal,[11] encompassing broad approaches, such as agreed standards for occupational health, and individual programmes, such as staff health checks and smoking cessation services.

This chapter looks at the two-way relationship between health and work. It describes the changing landscape of employment, looks at how employment and unemployment affect population health, and discusses the implications of England's ageing workforce.

a People are described as "actively seeking work" if they want a job, have sought work within the last four weeks, and are available to start work within the next two weeks.


23m days lost to work-related injury or illness
140m working days are lost to sickness absence in England each year
8.9m days lost to work-related mental health problems
5.1m days lost to non work-related mental health problems
7.6m people aged 16-64 are not in work or looking for work
Of these, 1.6m people are long-term sick
10% of all lost working days are lost because of mental health problems
People who are not in work are at increased risk of mental health problems
45% of long-term sickness is attributable to mental health problems
Of these, 2.1m people are unemployed
26m people aged 16-64 are in work or looking for work
KEY
1 million people

The employment landscape

Job availability is a driver of social inequalities. One measure of this is job density (the number of jobs available per person aged 16-64 in a given geographical area). While the average is 0.78 jobs per person, there is substantial regional variation with 0.67 jobs per person in the North East compared with 0.88 in London.[12]

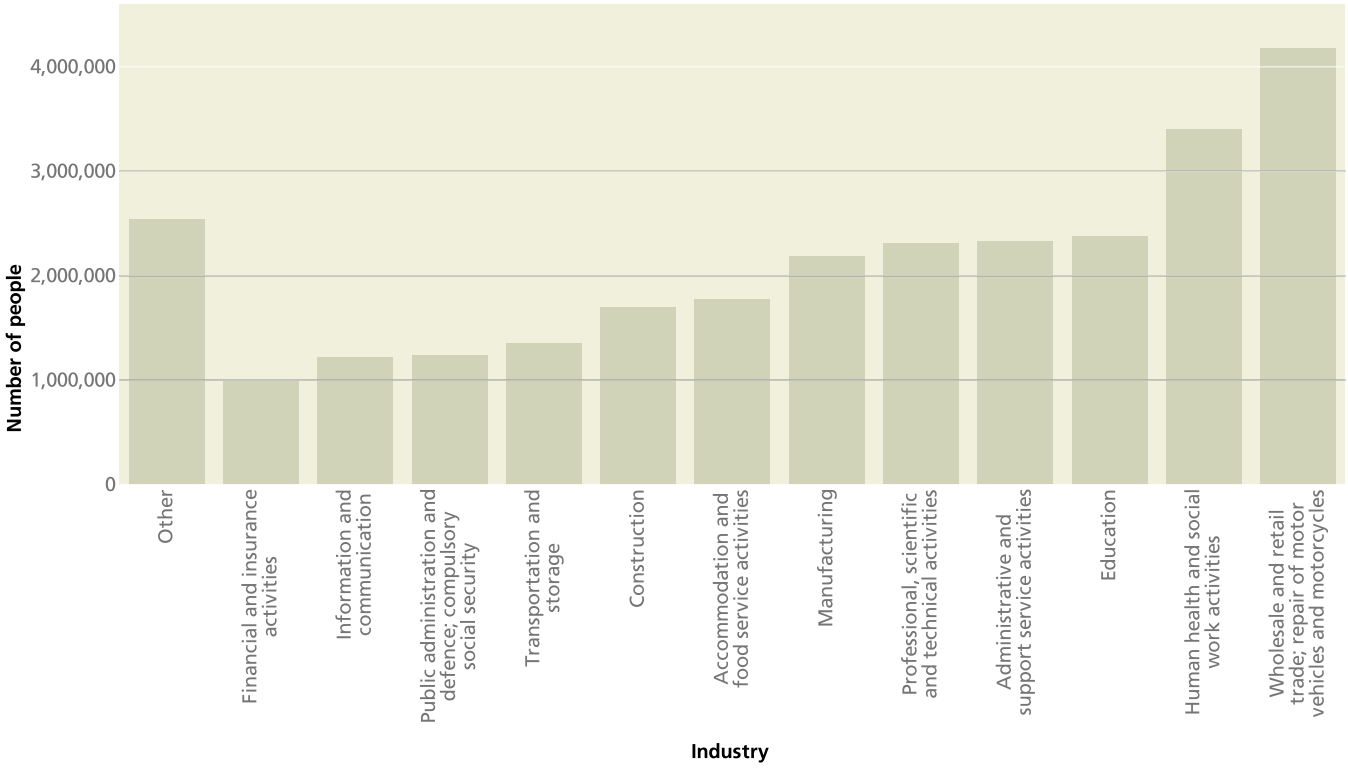
In 2012, there were 4.2 million businesses in England. The majority of these were micro-businesses employing fewer than 10 people. This growing sector includes 6.7 million people – approaching the 7.8 million figure of people who work in large businesses of over 500 employees.[13] The number of micro-businesses should be considered when developing occupational health policy and legislation; costs associated with flexible working or of making workplace modifications to support individual employees may be difficult for micro-businesses to meet.

In 2012, 74% of people in employment worked full time and 26% part time.[14] There was substantial gender variation: 88% of males and 58% of females in employment worked full time. In June 2012, the top five categories of employment were in the service sector. The biggest category of employment was retail, which employed 4.2 million people, followed by health and social care, and education.[15] There was regional variation in the pattern of employment: for example, while finance and insurance accounted for 3.6% of jobs nationally, there was a four-fold difference between the East Midlands region (1.6%) and London (7.0%).

In 2012, median full-time pay was £513 per week. Median full-time pay varied by region, from £455 in the North East to £613 in London, though regional variations have decreased slightly in the last decade. Some variation may be explained by different living costs; however, wide variation in income between communities has been cited as a driver of health inequality, affecting education, housing, food, physical activity, crime, social cohesion and other factors.[16,b] There was also gender variation: median full-time pay for females was £100 per week lower than median full-time pay for males,[17] though this too varied regionally, from £76 per week in London to £134 in the South East region. Gender variation in median full-time pay has also decreased slightly in the last decade.[18]

Between 1986 and 2011, when adjusted for inflation, median hourly earnings for full-time employees have increased by 62%. However, the range of the increase is broad: the lowest-paid decile has seen an increase in hourly pay of 47% compared with 81% for the highest-paid decile. The hourly pay of the lowest-paid 1% of employees has increased by 70% over the same period; this is largely attributable to the introduction of the minimum wage in 1998.[19]

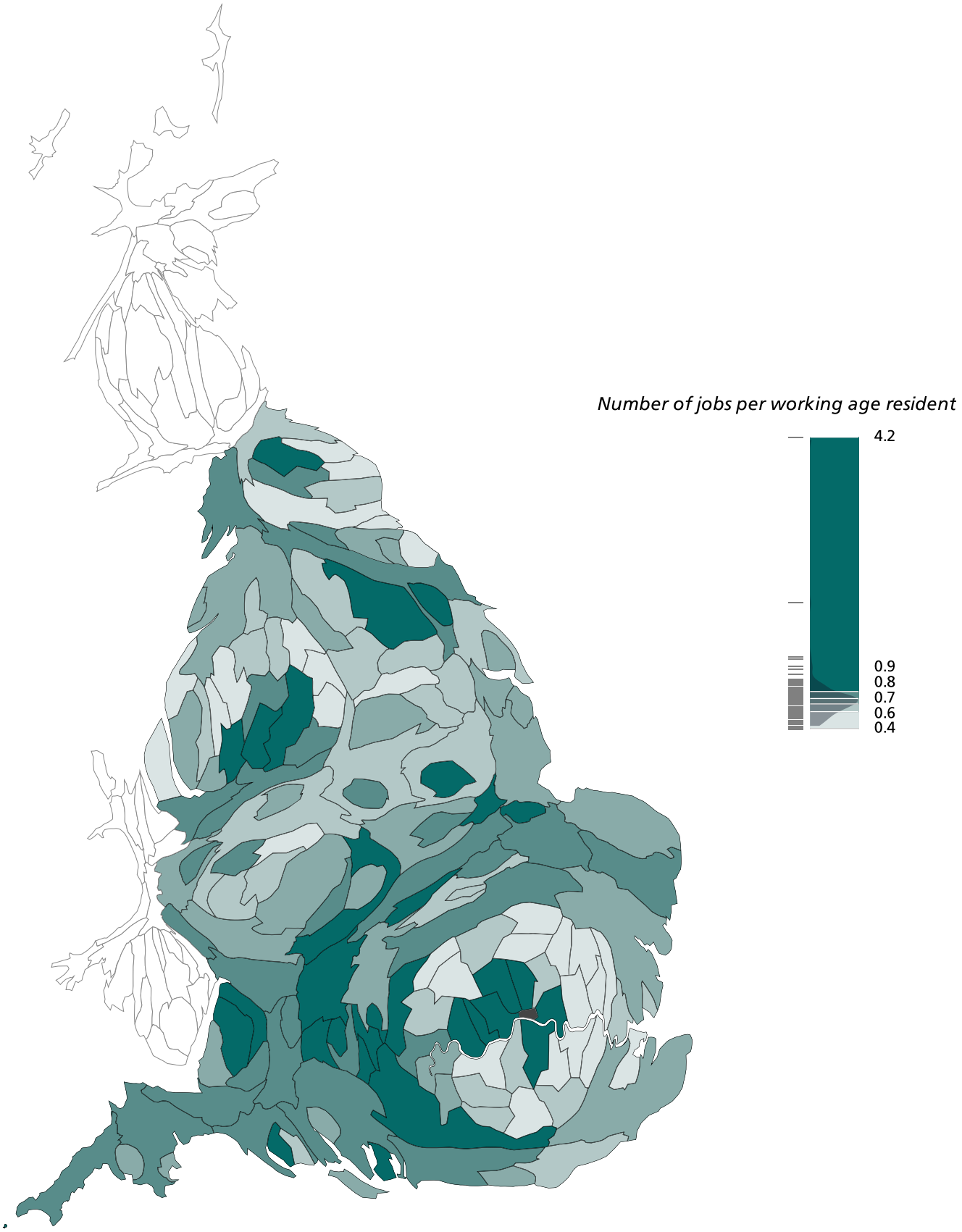
Figure 2.1: Number of people employed by industry type, England, June 2013



Source: Office for National Statistics

b The Chief Medical Officer notes that there is on-going debate about this concept, despite face validity.

Figure 2.2: Job density (jobs per person aged 16-64) by upper tier local authority, 2011



Source: Office for National Statistics

Health and unemployment

The links between unemployment and health work in both directions. Illness can lead to short, prolonged or permanent unemployment, while unemployment itself can lead to worsening health. Unemployment is associated with an increased risk of long-term illness, an increased risk of premature mortality, and a two-fold increase in the risk of both mental health problems and suicide.[20]

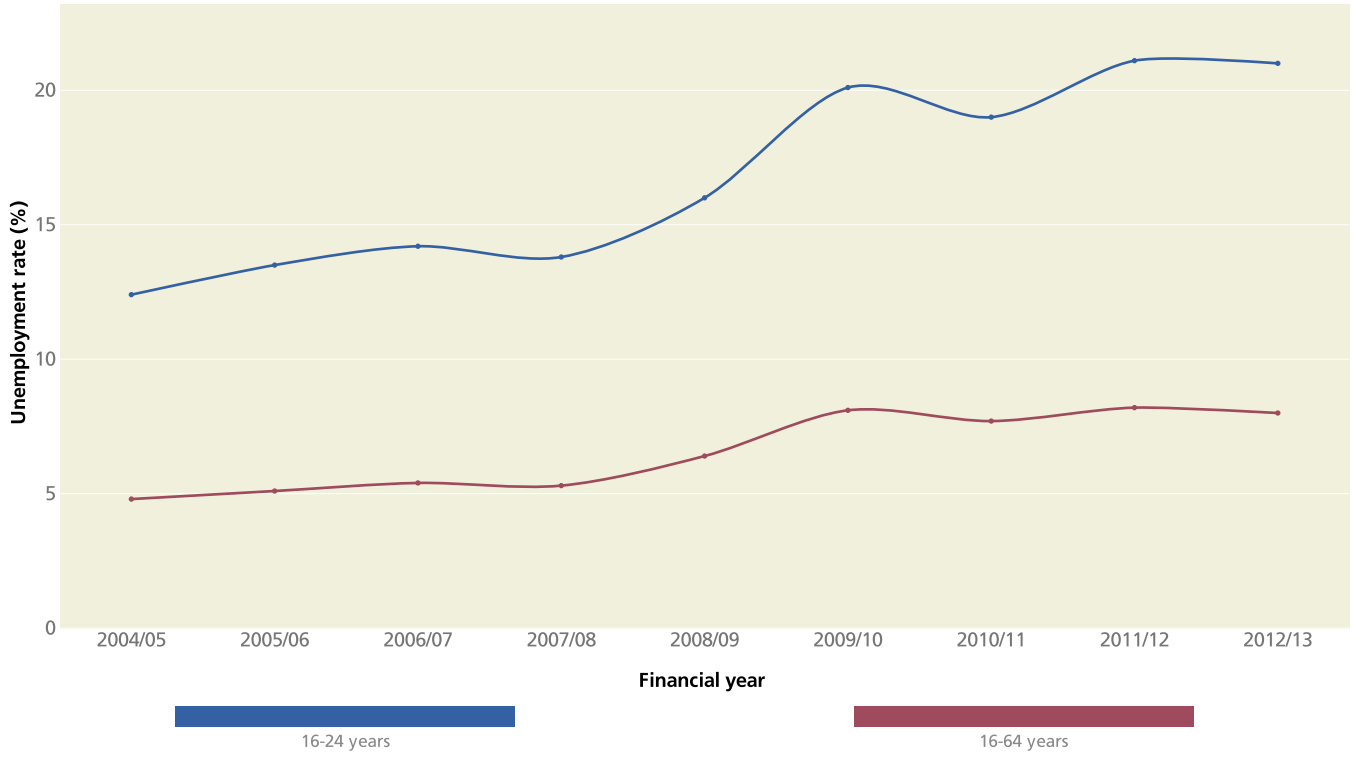
There are many complex mechanisms by which unemployment can affect physical and mental health. Unemployment can lead to financial problems, which can result in lower living standards, reduced social integration and lower self-esteem. Unemployment may trigger distress, anxiety and depression through loss of societal role or social identity. Unemployment is associated with increased smoking and alcohol consumption, poor diet and reduced physical activity.[21] There may also be a health or economic impact on the families of those who are unemployed.[22]

The health effects of unemployment appear to be influenced by context: being unemployed in a period of low unemployment seems to be worse for health than being unemployed in a period of high unemployment. Health can also change as people move in and out of employment: people who are unemployed but later gain work have a lower risk of illness than people who remain unemployed. However, their risk of illness is still higher than for people who are continuously employed.[23]

In 2012, the unemployment rate among people aged 16–64 was 8%, while the prevalence among people aged 16-24 was 21%.[24] In both groups, the rate has increased over the last decade, though some data suggest a possible recent decrease.[25] As shown in Figure 2.3, the difference in the unemployment rate between those aged 16–64 and those aged 16–24 has also risen over the last decade. In 2004, the unemployment rate was 7.6% points higher in those aged 16-24 than in those aged 16-64; in 2013, the comparable figure was 13%.

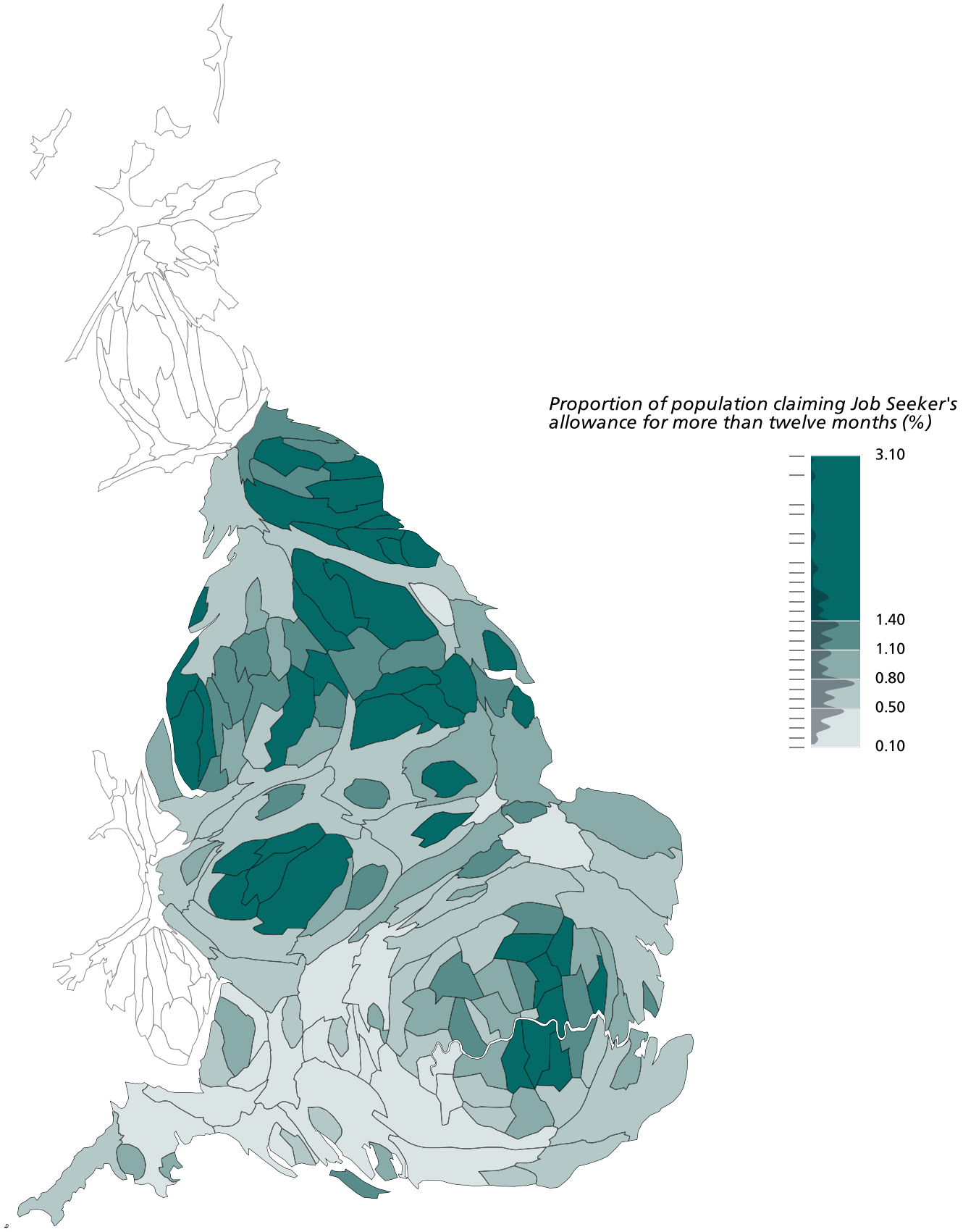
In October 2013, a total of 321,600 people had been claiming Jobseeker's Allowance for more than 12 months, representing 0.9% of the total population aged 16–64.[26] As Figure 2.4 shows, there is substantial geographical variation in the long-term unemployment rate (unemployment of 12 months or more). People who are long-term unemployed can find it harder to gain employment and can be particularly susceptible to illness. For example, long-term unemployment is associated with a substantial increase in risk of having depressive symptoms and anxiety, demonstrating that there is a large negative psychological effect of long-term unemployment.[27]

Figure 2.3: Unemployment rate for young people (16-24) and all adults (16-64), England, 2004/05 to 2012/13



Source: Annual Population Survey, Office for National Statistics

Figure 2.4: Long term unemployment rate by Upper Tier Local Authority, October 2013



Source: Office for National Statistics

Equalities and unemployment

The unemployment rate is substantially higher among younger people compared with older people, and among males compared with females. The unemployment rate is particularly high in young men: 32.6% of economically active males aged 16–19 are unemployed,[28] compared with 3.6% of females aged over 50.

Unemployment varies with ethnicity. In 2012/13, the unemployment rate was 14% among people from minority ethnic groups compared with 8% in the general population.[29]

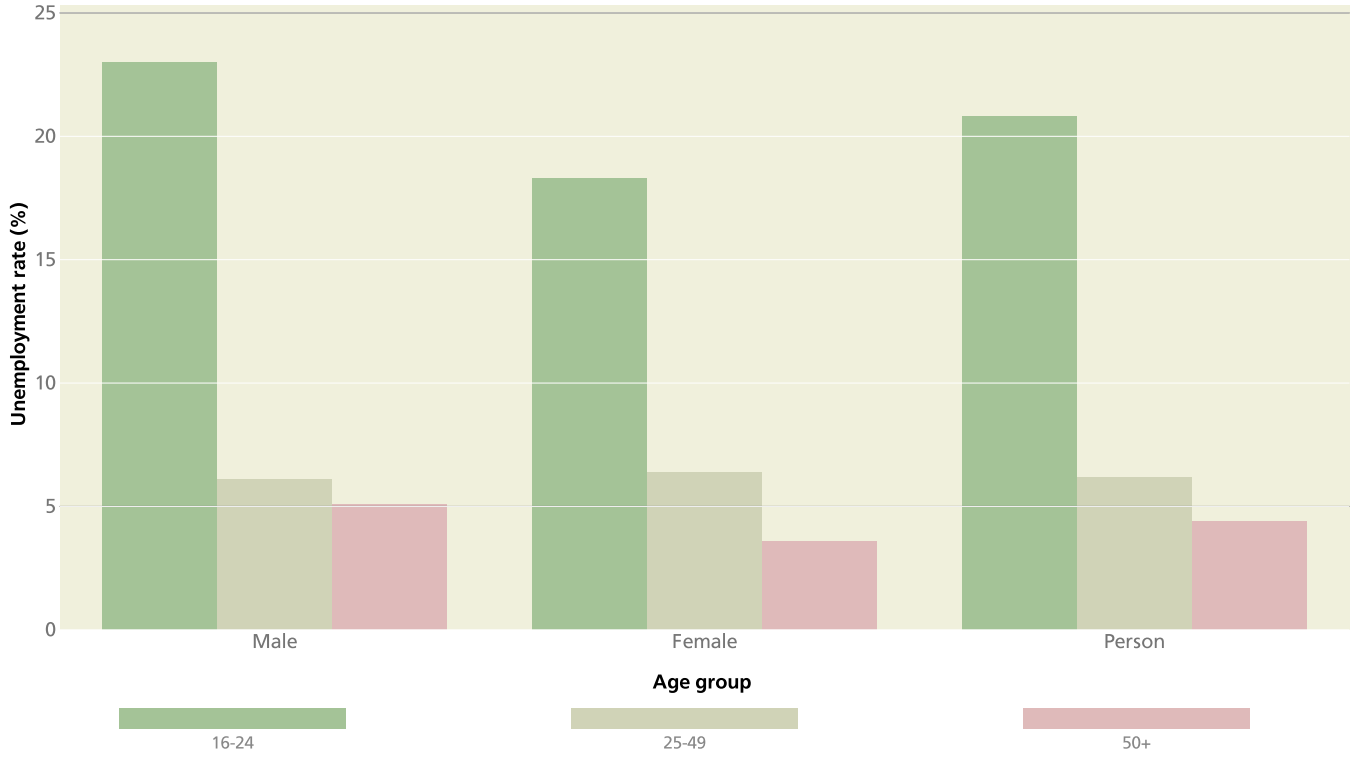
In the UK, the number of children aged 0–16 living in workless households has been decreasing since 2009, reaching 14% by the fourth quarter of 2012.[30] The percentage of children living in workless households varies with ethnicity: in 2012, using Office for National Statistics groups, 5% of children in the Indian ethnic group lived in workless households compared with 27% in the combined Black Caribbean/Black African/Black British group.[31]

Having a disability is strongly associated with unemployment and economic inactivity. The prevalence of economic inactivity among those with a disability is 43.1%, compared with 17.3% in the general population, and the unemployment rate among those with a disability is 11.7%, compared with 7.3% in the general population.[32] Returning to work can be therapeutic: benefits can include promoting recovery and rehabilitation, reducing the likelihood of long-term incapacity and improving quality of life.[33]

A recent review of evidence[34] found that vocational rehabilitation (supporting people with a health problem to stay at, return to or remain at work) can deliver a good return on investment for businesses. After less than six weeks of absence, most people with common health problems can be helped to return to work if their employer follows basic principles of good management. Such help is likely to be low cost or cost-neutral. Those with longer or more complex absences or difficulties may require more intensive, structured programmes; these can also be cost-effective.

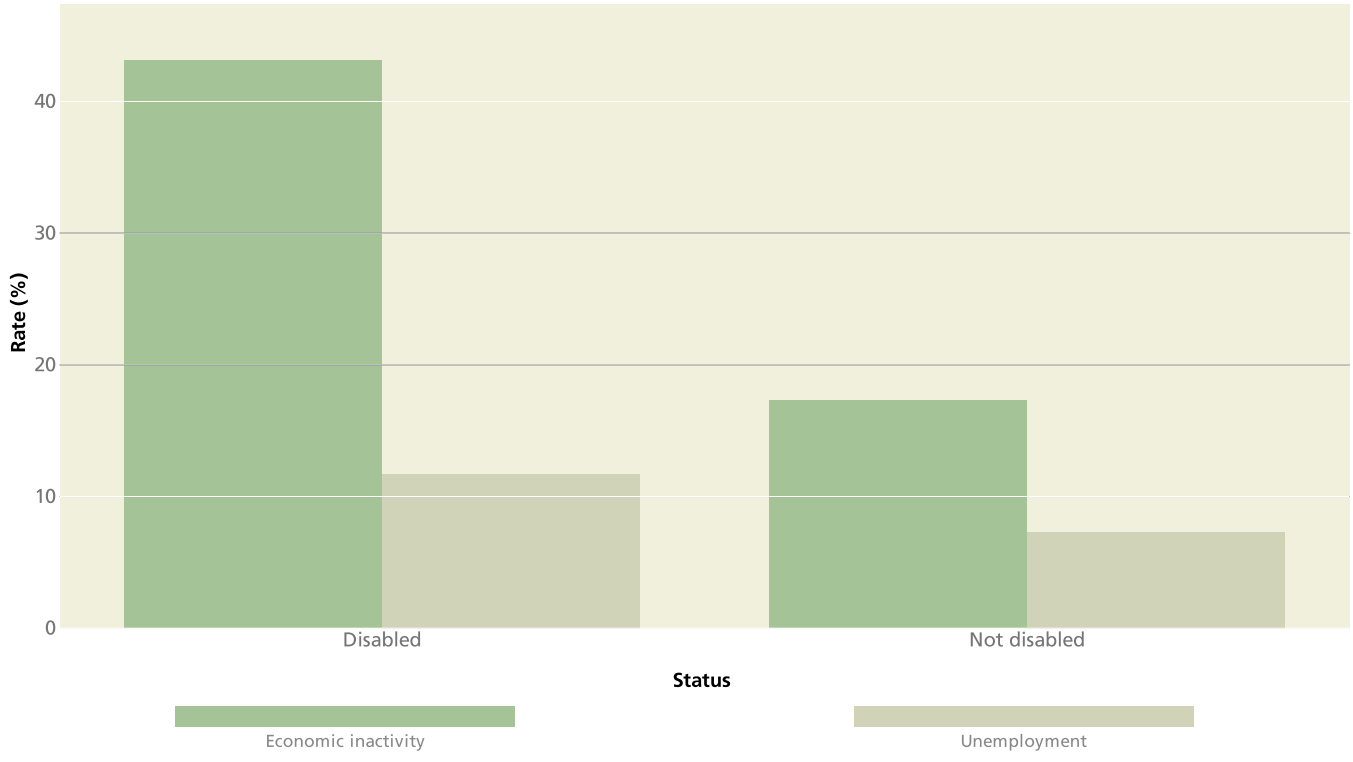
The association between employment and sensory impairment is discussed further in Chapter 4 of this report.

Figure 2.5: Unemployment rate by age group and gender, England, July 2012 - June 2013



Source: Annual Population Survey, Office for National Statistics

Figure 2.6: Unemployment, economic inactivity and disability, England, April 2012 - March 2013



Source: Annual Population Survey, Office for National Statistics

Health and employment

Sickness absence results in 140 million lost working days each year (2.2% of total working days), although this has been decreasing since 2000.[35] Presenteeism (attending work while ill) also causes a great loss to productivity. A healthy workforce is likely to have a lower incidence of absenteeism and presenteeism; good working conditions can maintain and promote good health.

A review of sickness absence in England[35] stated that:

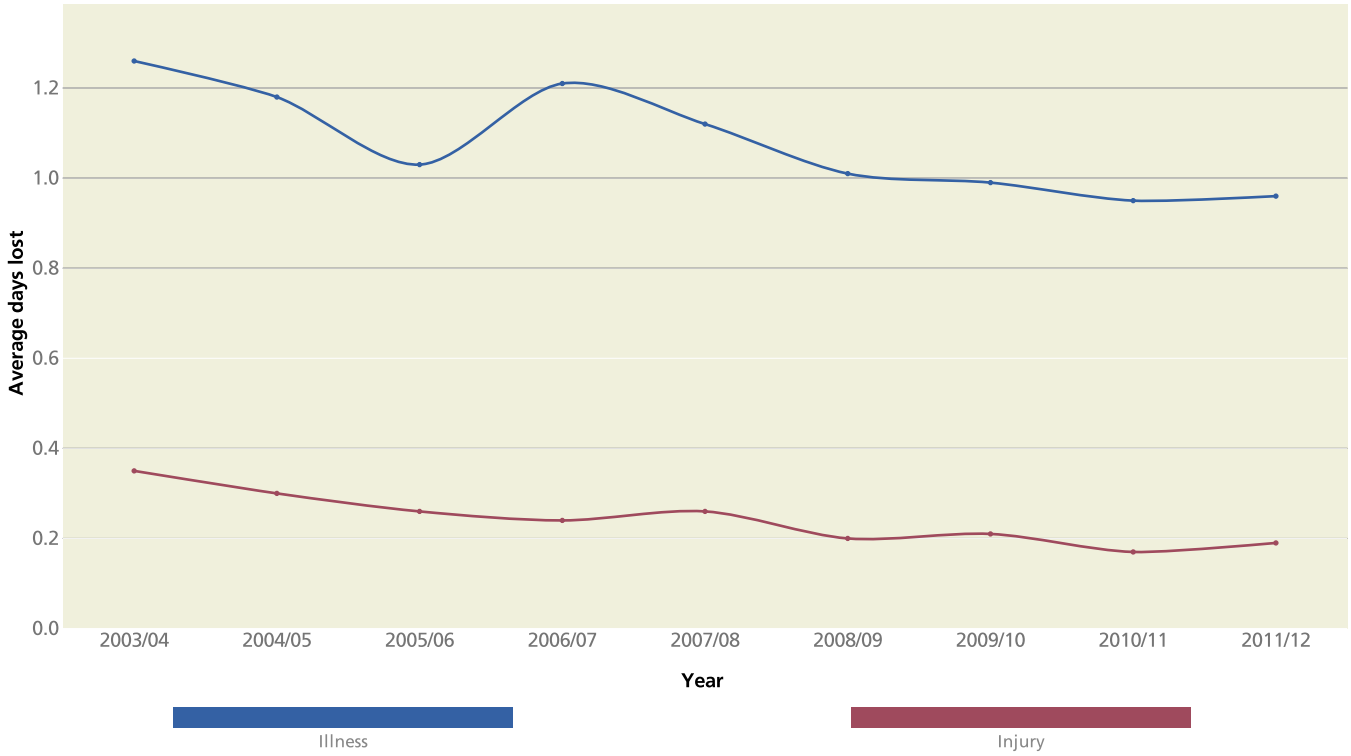
- The cost of sickness absence to the economy is approximately £15 billion per annum (mainly due to lost output).
- Each year approximately 300,000 people leave employment and commence receipt of health-related state benefits.
- The majority (80%) of sickness absences are short term (up to a week). However, while long-term absences (more than four weeks) make up only 5% of all absences, they account for almost half of all lost working days.
- Stress and mental health problems are the most common causes of long-term absence, and the number of absences attributable to these causes is increasing.
- The prevalence of work-related stress, depression or anxiety is highest in the health and social work sector.
- There are ways of reducing sickness absence that would save more money in productivity than they would cost.

In England in 2011, approximately 23.4 million working days were lost due to work-related illness or injury. The number of working days lost to work-related illness or injury has been decreasing for many years.[36] There is substantial regional variation in work-related illness and injuries, ranging from an annual average of 0.7 days per worker in London to 1.8 days per worker in the North East.

Although importation of asbestos has been banned in the UK for many years, occupational exposure is still common for electricians, plumbers, builders and others, and is the single commonest cause of work-related death in the UK. Exposure to asbestos generally precedes the development of disease by many years. For example, mesothelioma is a common cause of asbestos related death, and it is associated with historic exposure to asbestos in over 80% of cases. Deaths from mesothelioma are expected to peak towards the end of this decade.[37]

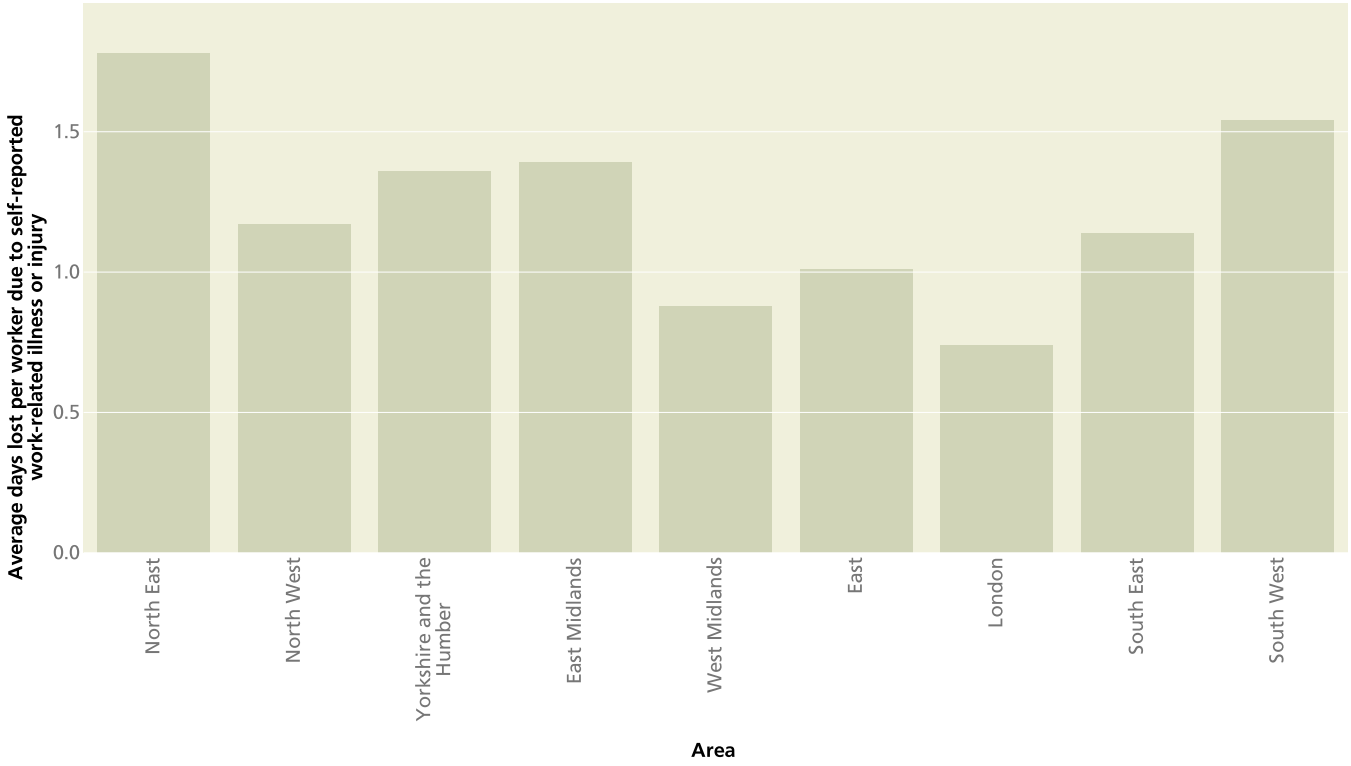
With fewer people employed in mining and heavy industry in England, the number of people exposed to the associated risks of industrial accidents and long-term conditions such as emphysema has reduced. However, in 2011/12, there were still 171 deaths as a result of injuries in the workplace. Additionally, there are approximately 8,000 occupational cancer deaths and 4,000 deaths from chronic obstructive pulmonary disease in Great Britain each year as a result of past industrial exposure.[38,39]

Figure 2.7: Average days lost per (full-time equivalent) worker due to work related illness or injury for people working in the last 12 months, England, 2003/04 to 2011/12



Source: Labour Force Survey, Health and Safety Executive

Figure 2.8: Average days lost per (full-time equivalent) worker due to self-reported work-related illness or injury, for workers in the last 12 months, by region, 2011/12



Source: Labour Force Survey, Health and Safety Executive

Mental health and employment

In 2011/12, mental health problems (such as anxiety, stress and depression) were the most prevalent work-related illnesses (38%) in Great Britain, with musculoskeletal problems second at 28%.[40] This reflects the prevalence of mental health problems in the population; at least one in four people will experience a mental health problem at some point in their life, and one in six adults has a mental health problem at any one time.[41]

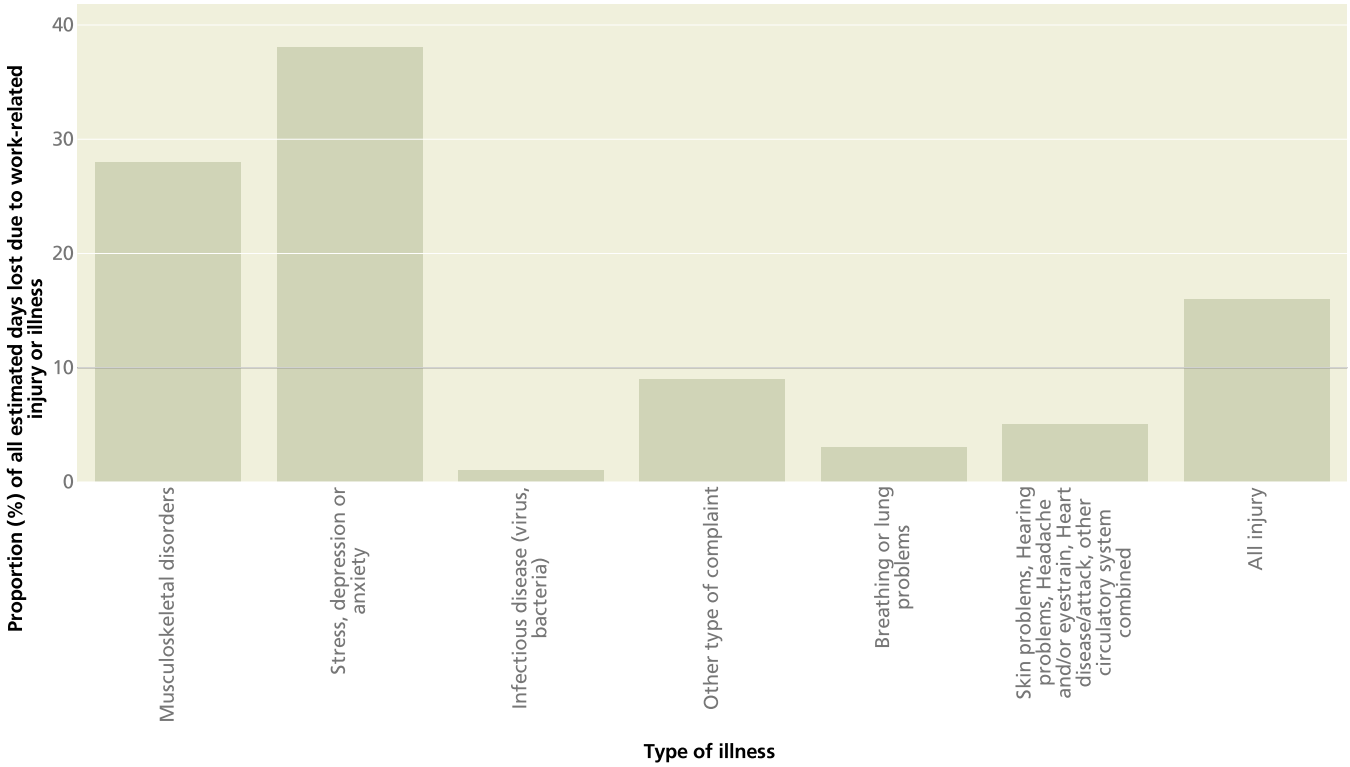
Every year, approximately 300,000 people leave employment and commence receipt of health-related state benefits.[42] Mental health problems represent the most common reason for claiming health-related benefits, accounting for 45% of all claimants. In May 2013, 653,000 people were in receipt of Employment and Support Allowance because of mental health problems.[43] There can be a grey area between 'employment' and being 'out of work': many people have a precarious working situation, including temporary work or zero-hours contracts.

Poor quality employment, which can include jobs with a low level of control, long and unsociable hours, low income and a precarious working situation, can be as damaging to health as unemployment. Health effects can include increased stress, fatigue, headache, backache, muscular pains and a higher risk of developing depression.[44]

In England, approximately 6 million people (a quarter of all workers) work 45 or more hours a week. The proportion of employed males working these hours (34.9%) is much higher than the proportion of employed females (13.5%).[45] A recent survey of 8,000 people found that work-related anxiety increased with longer hours and that the effect was more pronounced in females.[46] Long hours, shift working and sleep deprivation are associated with negative effects including fatigue and increased risk of accidents at work.

Fair Society, Healthy Lives points to evidence regarding interventions to improve mental health in the workplace;[47] these include a participatory approach involving employee representatives and management, task variety, organisational and personal development, and improving job control and degree of autonomy at work. The review cites evidence that an approach combining several of these elements has a greater effect, and is more sustainable than, approaches involving only a single element. The review also suggests that better awareness of mental health at work could help reduce stigma and improve outcomes and productivity for the workforce as a whole.

Figure 2.9: Estimated days lost due to work-related injury or illness, % by type of illness, Great Britain, 2011/12



Source: Labour Force Survey, Health and Safety Executive

The ageing workforce

In 2013, there were 6.3 million people aged 50–64 in employment, representing 73% of males in this age group and 62% of females.[48] A further 800,000 people aged over 65 were in employment, representing 12.5% of males in this age group, and 6.9% of females. The average age at which people left the labour market was 64.7 years for males and 63 years for females.[49]

Paid employment has been associated with higher levels of 'psychological wellbeing' among older people. There is, however, a pronounced socio-economic gradient (with more affluent older people enjoying a higher level of 'wellbeing').[50]

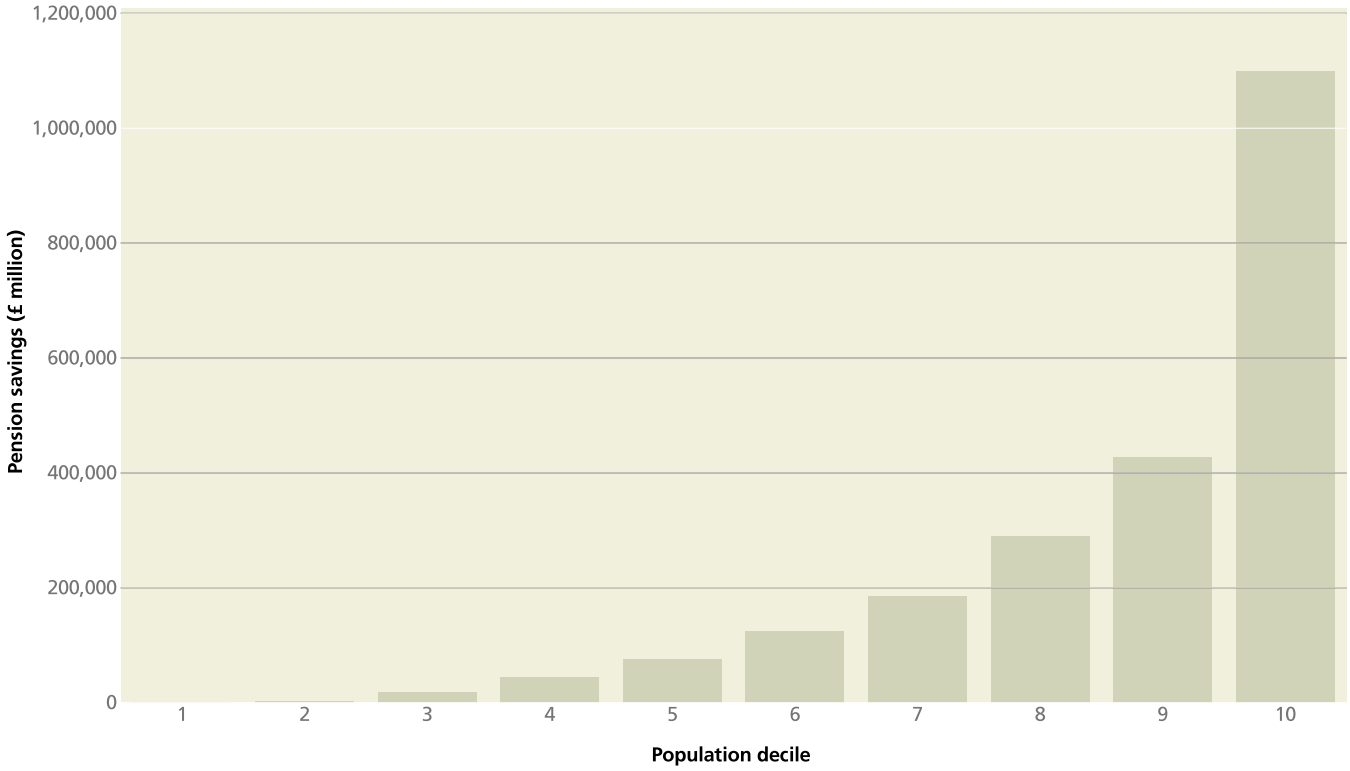
Many people, including those aged over 65, combine work with unpaid activities and evidence suggests that volunteering may benefit mental health and even length of life.[51] Data from a longitudinal study shows that 26.5% of females and 23.2% of males over retirement age perform some voluntary role. Two-thirds of these people volunteer twice a month or more. The study found that volunteers had improved quality of life and life satisfaction, and reduced depression and social isolation, compared with non-volunteers.[52]

While healthy life expectancy is increasing, many older or retired workers have long-term conditions or disabilities that require support. Older people may also spend time providing unpaid care, which can, in turn, affect their availability to work. On average, 10.2% of the population provide unpaid care; this proportion is higher among older people.[53]

Some 83% of households with a 'head of household' aged 50–64 have some form of pension saving in addition to the basic state pension,[54] but there is substantial variation in pension savings among people in this age group, as shown in Figure 2.10.[55]

Longer working lives, increased retirement age and a healthier old age may make it appropriate to review what is meant by the term 'working-age population'. Traditionally, the age group '16 to 64' is used in national statistics and this forms the basis of many population indicators. Similarly, the 'over 65' age group has often been used as the basis for describing people beyond working age but this may not reflect the changing reality.

Figure 2.10: Pension savings held where the household head is aged 50-64, by population decile, Great Britain, 2008-2010



Source: Wealth and Assets Survey, Office for National Statistics

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Chapter 3

Health and justice

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Overview

The inequality in health between those in contact with the criminal justice system and the general population is marked. Research indicates that, as a group, offenders and those who are vulnerable to offending experience a greater burden of disease than their peers in the general population. They experience substantially more infectious diseases, chronic illnesses, mental health problems and substance misuse.[1,2] These underlying health problems are often exacerbated by the difficulties offenders experience in accessing the full range of health and social care services available in the local community.

The prison population in England and Wales is around 84,000, which is equivalent to the population of a small local authority. However, unlike a local authority, the prison population is very dynamic: the number of people passing through the prison system each year is almost double the population at any one time. Males make up around 95% of the prison population, and most prisoners are aged between 18 and 39. In the last 10 years, considerable changes have been seen in the prison population. The population has grown by an average of 4% per year, and the number of foreign nationals has doubled. At least 13% of all prisoners are foreign nationals.

Those on probation (offenders serving a court sentence in the community) number approximately twice the prison population. Males make up over 80% of cases.

There is a strong link between alcohol and crime, disorder and anti-social behaviour, and alcohol is a factor in an estimated 47% of violent crime.[3] A fifth of all violent incidents in 2010/11 took place around a pub or club. Yet there is evidence that sharing Accident and Emergency department data and targeting interventions can reduce alcohol-related disorder by around 40%.[4]

Drug users are estimated to be responsible for between a third and a half of acquisitive crime[5] and treatment can cut the level of crime they commit by about half.[6] The lifetime cost to the health and criminal justice systems for an intravenous drug user is estimated to be £480,000,[7] and the annual cost of drug-related offending is £13.9 billion per year.

Between 2000 and 2010, there was a substantial increase in the number of deaths from natural causes among those in prison custody, exceeding the proportional increase in the size of the prison population. The Prisons and Probation Ombudsman attributes the excess mortality, in part, to healthcare in prison being inequitable with what could be expected in the community. Access to palliative care for prisoners dying of natural causes was also inequitable with what could be expected in the community in about 20% of those whose deaths could reasonably be foreseen.

In 2003, the hepatitis B vaccination programme was introduced in prisons and detention centres in England and Wales. This targeted programme has changed the epidemiology of hepatitis B in England, with a considerably smaller proportion of hepatitis B being transmitted through intravenous drug use.

Between 2010 and 2012, the number of diagnosed cases of hepatitis C in prisons increased substantially. The prevalence of hepatitis C is considerably higher among prisoners than in the general population.

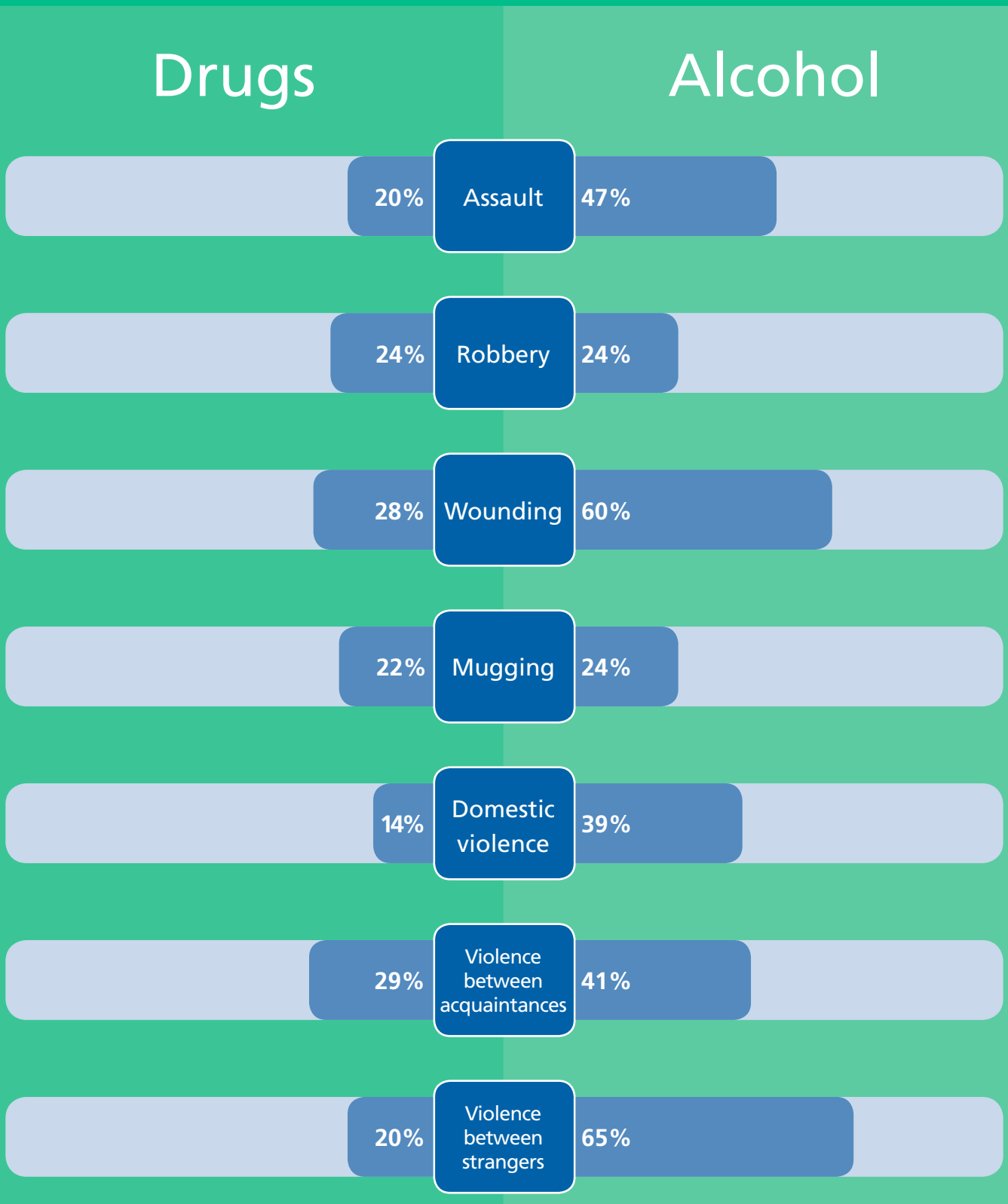
Between 2010 and 2012, there was a steady increase in the number of cases of tuberculosis in prisons: from 51 to 90. There is also increasing evidence of in-prison transmission of tuberculosis, with at least one outbreak in prisons every year since 2010. While the numbers affected are relatively small, the operational impact on prisons caused by each case is substantial. The increase in case numbers (including those that are multi-drug-resistant and extensively drug-resistant) is likely to have a growing impact on the prison service in the coming years.

Commissioning healthcare for offenders in England

Several organisations share responsibility for the commissioning of healthcare for offenders:

- The **Department of Health** (Public Health Directorate) sets policy.
- **NHS England** commissions all health services (with the exception of some emergency care, ambulance services, out-of-hours and 111 services) for people in prisons in England. This is achieved through health and justice commissioning teams in 10 of NHS England's 27 area teams, supported by a small national Health and Justice Team.
- **Public Health England** provides evidence, intelligence, data and guidance to advise policy makers, local authority and criminal justice based commissioners. This is undertaken via the national Health and Justice Team in Public Health England which works in partnership with NHS England commissioners. In addition to the national team, 10 health and justice public health specialists are located in Public Health England centres, mapping to the 10 NHS England area teams with specialist health and justice commissioning functions.
- The **National Offender Management Service** co-commissions health, wellbeing and substance misuse services through the national Health, Wellbeing and Substance Misuse Co-commissioning Team and its four regional leads.

Proportion of incidents in which offender was thought to be under the influence of...



The lifetime cost to the health and criminal justice systems for a single intravenous drug user is estimated to be £480,000

Adults who binge drink are six times more likely to have committed an offence in the last year than those who do not drink

The prison population

The prison population in England and Wales is made of up those who have received a custodial sentence from the courts and those who are remanded in custody to await trial. Remand prisoners are presumed innocent until proven guilty under British law. Over 55,000 people are sent to prison each year to await trial; these people make up more than half of all first-time receptions into prison.[8] Prison population statistics in England also include people detained in immigration removal centres operated by the National Offender Management Service. Immigration removal centres are used for the temporary detention of people who have no legal right to be in the UK but who have refused to leave voluntarily. Those detained in immigration removal centres can leave at any time to return to their home country. Some detainees in these centres are foreign national prisoners who have completed prison sentences for serious crimes but who then refuse to comply with the law by leaving the UK.[9]

The total number of prison receptions during 2012/13 was 108,892. Data from the Ministry of Justice show that the prison population on 30 June 2013 was 83,842, and that 95% of the prison population were males and 5% females. A large proportion of offenders serving a prison sentence are aged 18–29 years (41%) or 30–39 years (28%). Some 1% of all prisoners are aged under 18 years. Around 95% of offenders are incarcerated in the male adult estate, and around 5% in the female adult estate. The youth estate and immigration removal centres each hold less than 1% of those who are incarcerated.[10] The prison population does not include those detained in hospitals under the Mental Health Act.

In the last 10 years, the number of foreign nationals in prison has doubled. In 2013, at least 13% of all prisoners in England and Wales were foreign nationals, coming from over 150 different countries. Ten countries accounted for over half of the foreign nationals in prisons; and Jamaica, Poland and the Irish Republic are the countries with the most nationals in prison establishments in England and Wales. A slightly higher proportion of foreign national prisoners (5%) compared with British national prisoners (4%) were female; this is thought to be due to involvement in drug smuggling activities. The nationality of 1% of prisoners is not recorded.[11]

In England and Wales, 149 people per 100,000 of the national population are imprisoned. This compares with 100 and 77 per 100,000 population in France and Germany, respectively.[12] In the World Health Organization European Region, the highest rate of incarceration is seen in the Russian Federation, at 472 per 100,000 population. In terms of numbers of people detained, England and Wales rank fourth in Europe with about 84,977 people imprisoned at any one time (compared with the Russian Federation, 677,200; Ukraine, 127,830; and Turkey, 145,615).

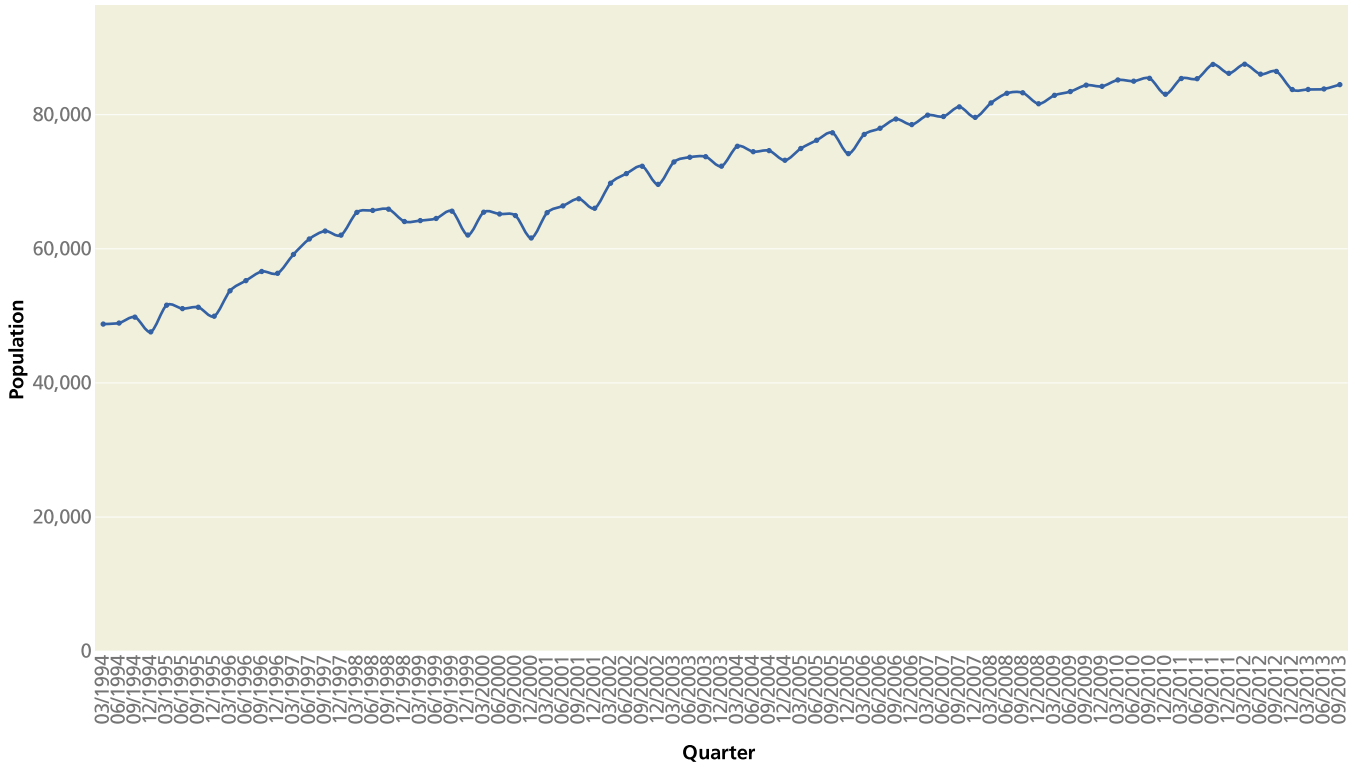
The vast majority of custodial sentences issued by the courts in England and Wales are for short periods of imprisonment. In 2011, 76% of adult custodial sentences were for 18 months or less, including 57% which were for six months or less.[13] Of those offenders who are serving a custodial sentence, the most common types of offence are violent offences (27%), sexual offences (15%), and drug-related offences (14%). Almost half of all offenders released from custody in 2010 re-offended within a year.[14]

Between 1993 and 2008, the prison population grew by an average of 4% per year. This rapid rise was driven by increased numbers of people sentenced to immediate custody, increased average length of custodial sentences, increased use of indeterminate sentences, increased numbers of recalls to prison following breaches of the conditions of licence, and increased average length of time spent in prison following recall.[15]

The rise in the prison population slowed considerably from the summer of 2008, in part due to the introduction of the Criminal Justice and Immigration Act 2008, which changed the sentencing and offender management system, resulting in a reduction in the growth of the prison population (see Figure 3.1).

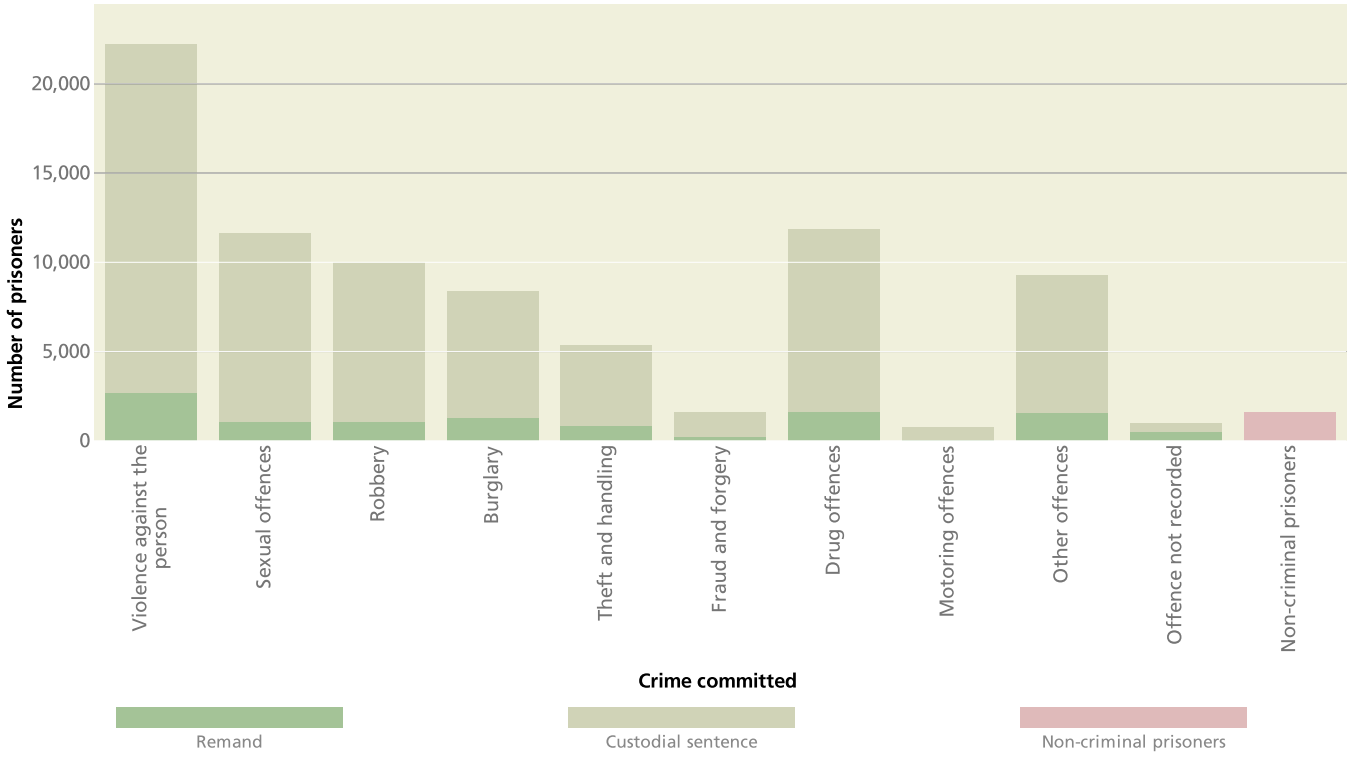
This flatter trend continued until the public disorder seen in UK cities from 6 to 9 August 2011, which had an immediate but temporary impact on the prison population. During 2012 and into 2013, the prison population began to fall due to a falling remand population and a continued decline in the number of under-18s in custody. The falling remand population during 2012 reflected falling volumes going through the courts plus the introduction of measures restricting the use of remand for offenders unlikely to receive a custodial sentence.[16]

Figure 3.1: Population in prison establishments and police cells, England and Wales, 1994-2013



Source: Ministry of Justice

Figure 3.2: Prison population by crime committed, England and Wales, 30 June 2013



Source: Ministry of Justice

Probation

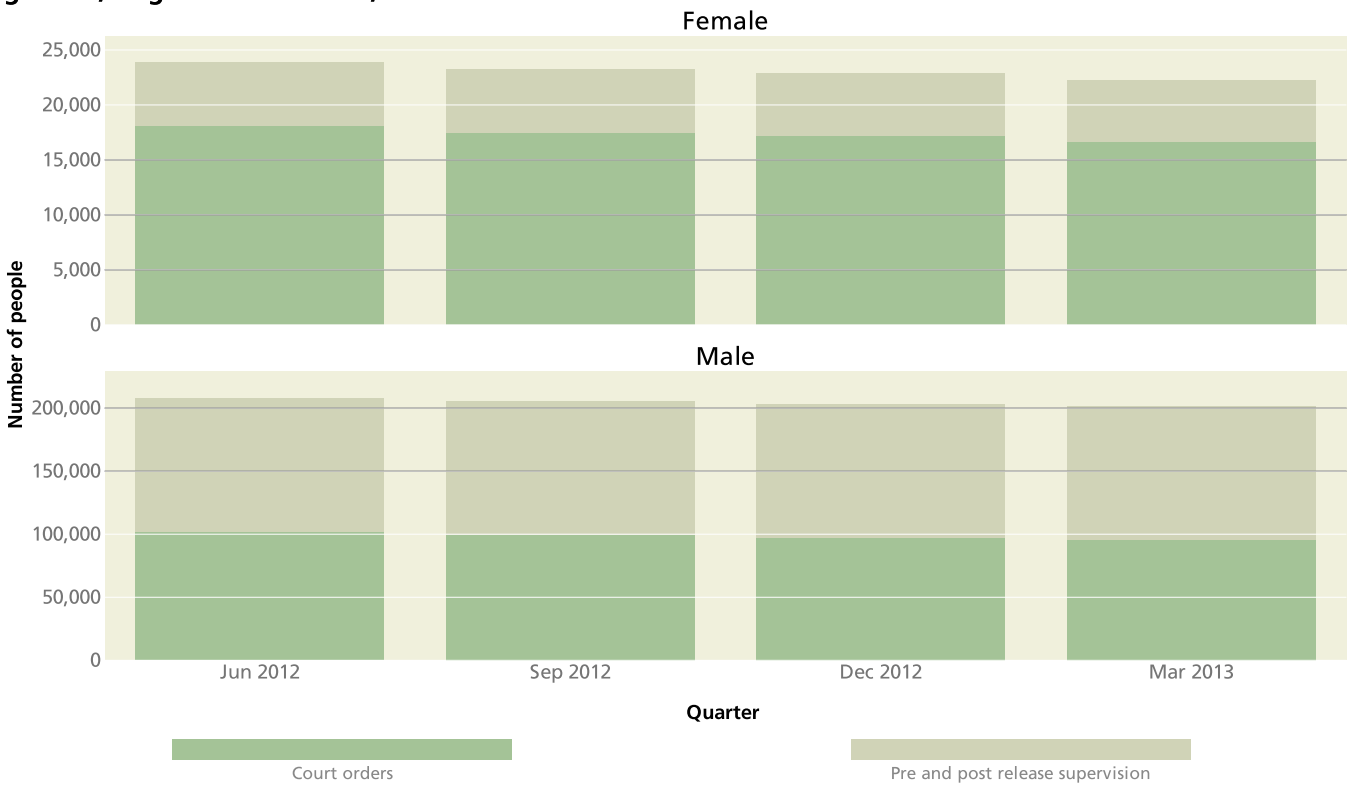
Those on probation are offenders serving a court sentence in the community; this can include unpaid work or being supervised after leaving prison. According to data from the Ministry of Justice, men make up over 80% of all cases.[17]

The number of people supervised by the probation service in the community is nearly double that of the adult prison population. Therefore, the majority of people in contact with criminal justice system are in the community under the supervision of the probation service. Such supervision currently excludes former prisoners released into the community with sentences of less than 12 months. However, this will change from April 2014 with the introduction the measures outlined in *Transforming Rehabilitation: A Strategy for Reform*, which sets out the Government's plans to transform the way in which offenders are managed in the community in order to bring down re-offending rates.[18]

The total annual probation caseload (court orders and pre-release and post-release supervision) increased by 39% between 2000 and 2008 to 243,434. Since then the probation caseload has fallen year-on-year, reaching 224,283 at the end of 2012. The rise between 2000 and 2008 was partly driven by the introduction of new court orders, in particular the Suspended Sentence Order in 2005. The supervision caseload has increased due to continued growth in the number of offenders serving custodial sentences of 12 months or more (who require supervision on release from custody) and offenders spending longer periods on licence after release from custody under the Criminal Justice Act 2003.[19]

The cost to the Ministry of Justice of delivering sentences in the community (including probation) is approximately £1 billion per year. This compares with a cost of around £3 billion for prisons. The total resource spending for community sentences (including probation) has increased by around 70% since the late 1990s, compared with around 20% for prison spending. Over 6,000 offenders sentenced to short custodial sentences of less than 12 months in the year to June 2012 had previously received more than 10 community sentences.[20]

Figure 3.3: Number of offenders supervised by the Probation Service by type of supervision and gender, England and Wales, 2012-13



Source: Ministry of Justice

Deaths in prison custody

In England and Wales, the number of deaths from natural causes in prison custody has generally increased each year between 2000 and 2010. In 2000, there were 61 deaths from natural causes in prison custody; in 2010, there were 124. This is a 103% increase, against a prison population increase of 31% (from an average of 64,602 prisoners in 2000, to 84,725 in 2010).[21]

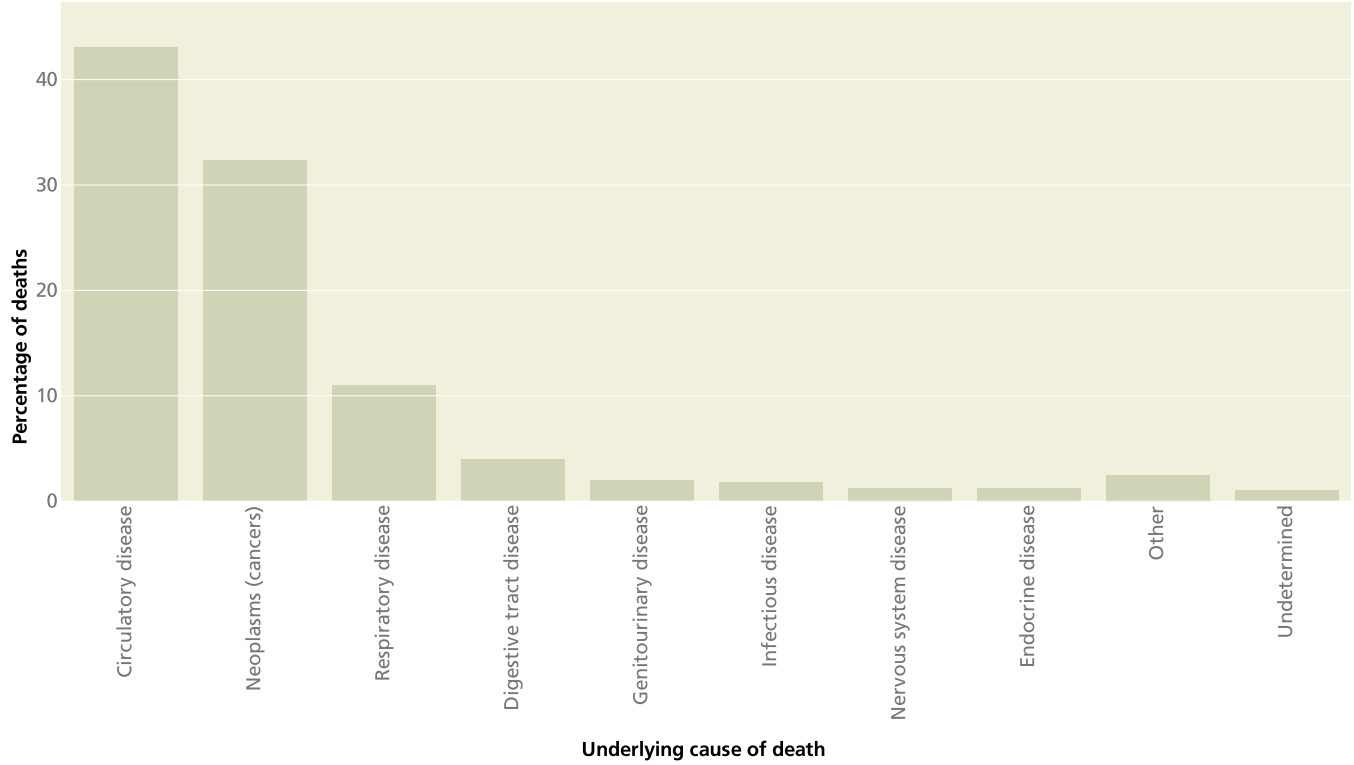
In 2012, the Prisons and Probation Ombudsman published an analysis based on 402 investigations into deaths from natural causes between 1 January 2007 and 31 December 2010.[22] The most common causes of death in this sample were diseases of the circulatory system (43%) and cancer (32%).

The review noted that the number of prisoners aged over 50 years had increased considerably between 2004 and 2011, from around 5,000 (then 7% of the prison population) to 9,000 (10.5% of the prison population). However, among prisoners dying of natural causes in custody, the average age of death did not change significantly. The mean age of death for the 402 deaths included in the review was 56 years, with 70% of the deaths occurring in those aged between 45 and 74.

In the review, 88% of deaths were of white prisoners, who made up 73% of the prison population. Foreign national prisoners accounted for 11% of the deaths, compared with 15% of the prison population. The review found that 80% of those dying of natural causes in prison custody had received clinical care equitable to that which might be expected in the community. However, there was considerable variation between groups: among those who died aged 15 to 34 years, the proportion receiving equitable clinical care was 54%; among those of all ages who had been in prison custody for less than 12 months, the proportion receiving equitable clinical care was 70%. The Prisons and Probation Ombudsman expressed particular concerns about delays in referral to specialist services, delays in summoning emergency services and poor monitoring of chronic conditions.

Some 40% of deaths occurred in an NHS hospital, 33% in a normal prison cells, 12% in a cell in a prison healthcare centre, 8% elsewhere in prison and 7% in a hospice. Around 79% of prisoners received palliative care which the Ombudsman considered equitable to that which could be expected in the community. For the 41% of deaths classed as reasonably foreseeable, the proportion receiving equitable palliative care was 84%. However, some prisoners received no specialist palliative care input.

Figure 3.4: Underlying cause of death for deaths from natural causes in prison custody, England and Wales, 2007-2010



Source: Prisons and Probation Ombudsman

Connections between alcohol and offenders

There is a strong link between alcohol and crime, disorder and anti-social behaviour, particularly violent crime. According to the 2011/12 British Crime Survey,[23] the victim believed the offender to be under the influence of alcohol in 47% of violent incidents (around 762,500). This was the case in 65% of incidents of stranger violence and 39% of domestic violence incidents.

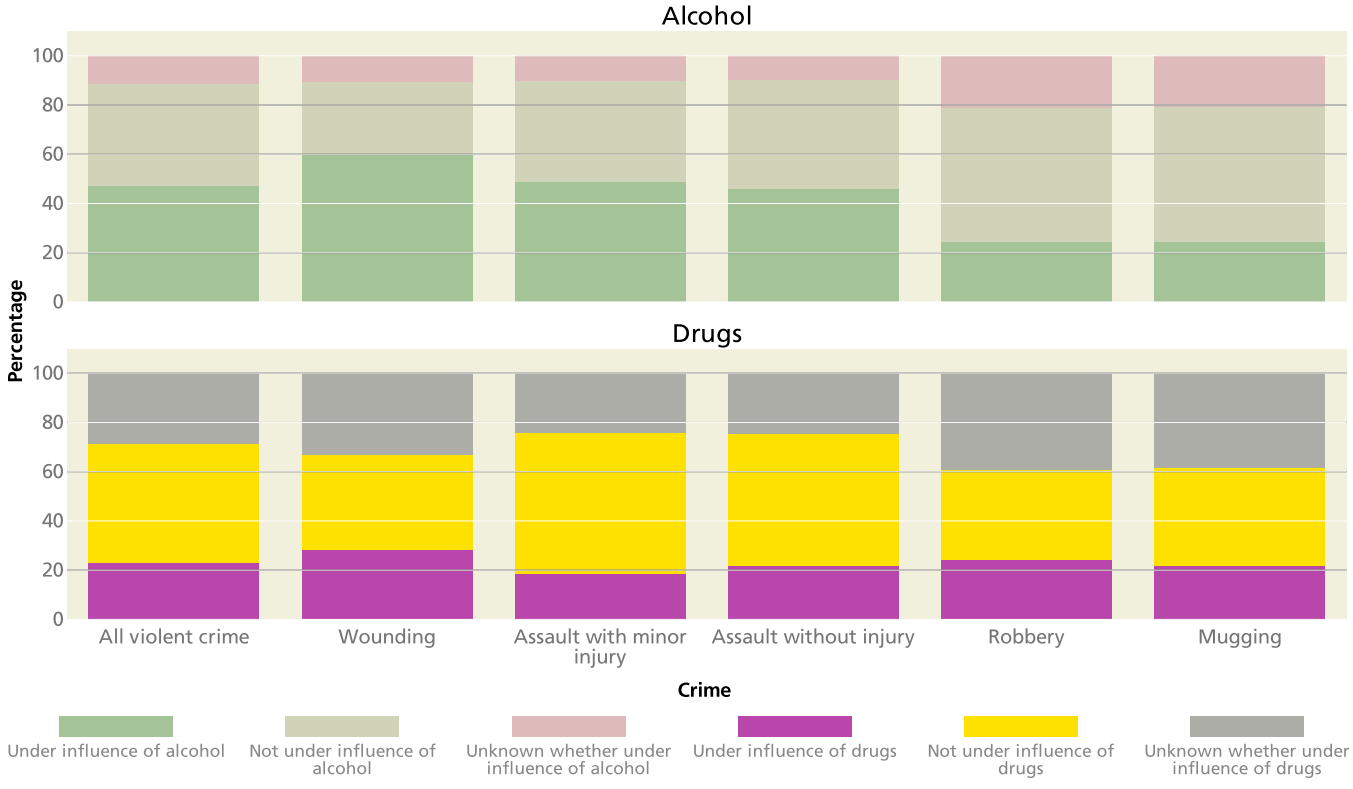
The amount of alcohol consumed appears to have an impact. The Offending, Crime and Justice Survey[24] reveals that adult binge drinkers were significantly more likely to have offended in the past year than any other drinking group: 19% of all adult binge drinkers reported committing an offence in the previous year, compared with 6% of other regular drinkers and 3% of those who occasionally or never drank alcohol.

Those who consume low-price alcohol before going out for further drinking appear to be more likely to become involved in violent crime.[25] Many of these, however, are not long-term or repeat offenders: a recent evaluation of alcohol arrest referral schemes[26] found that around 60% of individuals participating in the schemes had no previous arrest history in the preceding six months.

A significant amount of violence is linked to the night-time economy. A fifth of all violent incidents in 2010/11 took place in or around a pub or club. This rises to 30% for stranger violence. More than two-thirds (67%) of violent offences occur in the evening or at night and 45% at the weekend.[27]

While the evidence for the contribution of alcohol to offending is comprehensive, few large-scale studies exist to quantify the impact of alcohol treatment on re-offending. One independent study[28] found no significant difference in re-offending rates between alcohol-misusing probationers assigned Alcohol Treatment Requirements, and those not assigned Alcohol Treatment Requirements. However, over the life of the Alcohol Treatment Requirement, there was a 37% reduction in the self-reported number of drinking days, with 46% of probationers assigned Alcohol Treatment Requirements moving from dependency during the course of the requirement. In 2011, only 3% of community orders issued included an Alcohol Treatment Requirement.[29]

Figure 3.5: Proportion of violent incidents where the victim believed the offender(s) to be under the influence of alcohol or drugs, England and Wales, 2011/12



Source: Crime Survey for England and Wales, Office for National Statistics

Connections between illicit drugs and offenders

The connection between illicit drug use and offending is well recognised, with the Home Office estimating that drug users commit a third to a half of all acquisitive crime and that the annual cost of drug-related offending is £13.9 billion per year. The lifetime cost to the health and criminal justice systems for an intravenous drug user is estimated to be £480,000.[30]

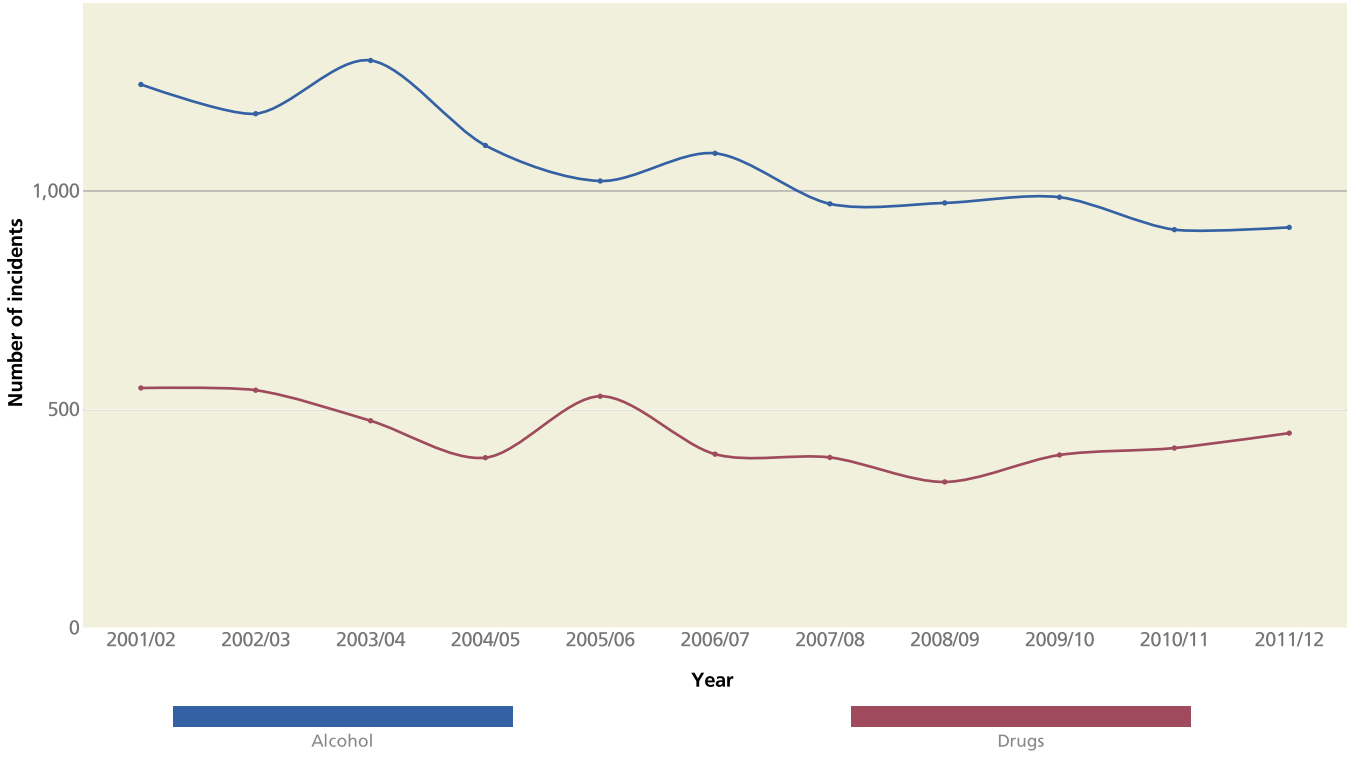
Prisoner data from the Surveying Prisoner Crime Reduction survey,[31] a longitudinal cohort study, found that 81% of adult prisoners said they had used illicit drugs at some point prior to entering prison. For comparison, in the 2012/13 Crime Survey for England and Wales,[32] 8.2% of adults aged 16 to 59 in the general population reported taking an illicit drug (excluding mephedrone) within the last year.

Engaging drug users and promoting the importance of completing treatment successfully can help to maximise reductions in offending, particularly if individuals use opiates and/or crack cocaine. Recent work estimated that drug treatment prevented 4.9 million offences in 2010/11, with an estimated benefit to society of £960 million.[33] For comparison, the 2012/13 Crime Survey for England and Wales[34] estimated that a total of 8.5 million crimes were experienced by households and resident adults in 12 months; the police recorded 3.7 million offences in the year ending June 2013.

The Drug Treatment and Testing Orders,[35] a national, multi-site, longitudinal study with a cohort of 1,796 adults in a range of structured treatment settings, showed a 50% reduction in self-reported offences for all clients between baseline measurements at the start of treatment and first follow-up. In terms of cost, for every £1 spent by government on these programmes, the societal benefit was valued at £2.50; drug treatment was found to be cost-beneficial in 80% of cases.[36]

If spending on drug treatment is maintained, it is estimated there will be between 14.7 million and 24.5 million fewer offences between 2011/12 and 2014/15, and the societal value of that reduction in crime will be between £2.7 billion and £4.5 billion. Conversely, for every £1 million disinvested in treatment it is estimated that there would be 10,000 more crimes per year, costing society around £1.8 million.[37]

Figure 3.6: Number of violent incidence where the victim believed the offender(s) to be under the influence of alcohol or drugs, England and Wales, 2001/02 to 2011/12



Source: Crime Survey for England and Wales, Office for National Statistics

Hepatitis B in prisoners

Effective preventative public health strategies in prison and detention centres can and do affect public health in the general community. A good example is the decline over the past 10 years in acute hepatitis B infection among people who inject drugs.

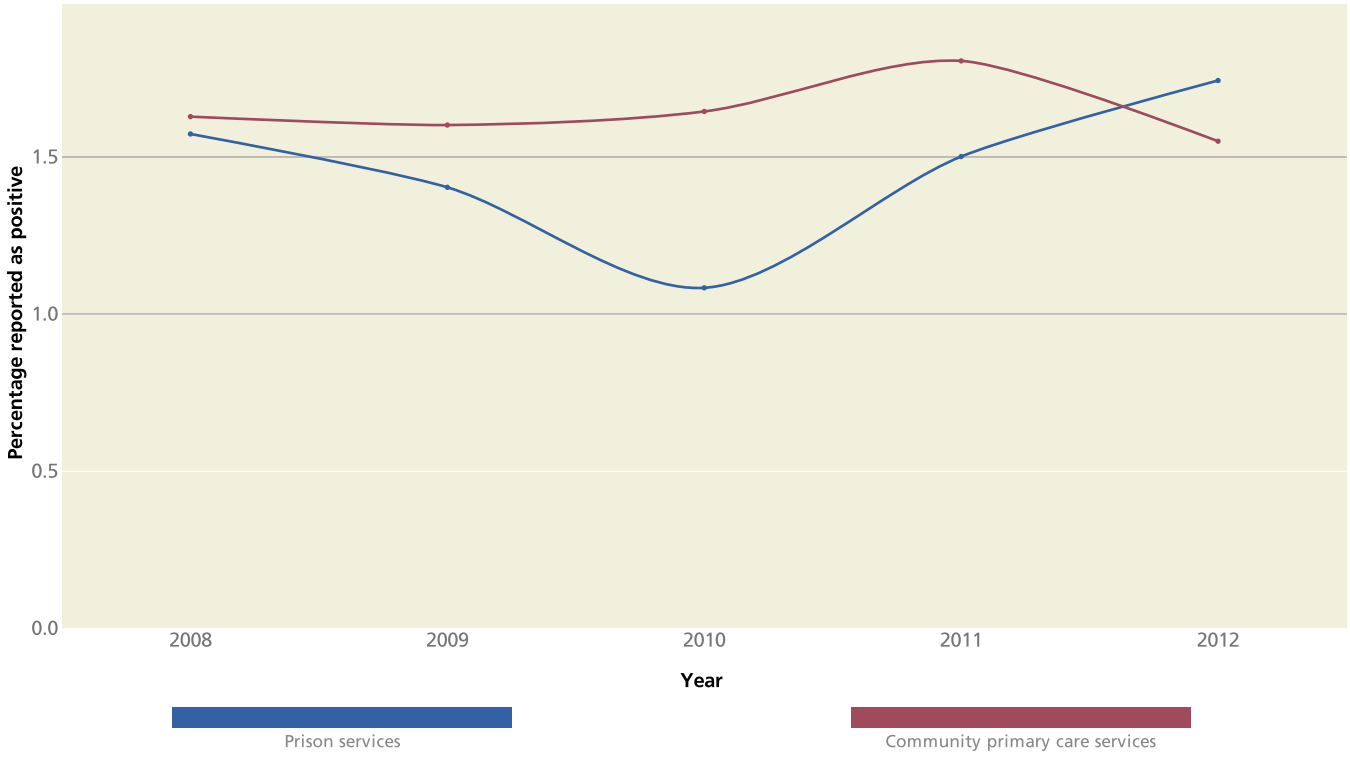
The incidence of hepatitis B in England has long been among the lowest in the world, at just over 1 new case per 100,000 population per year. In 2003, 37% of those cases of hepatitis B where a mode of transmission could be identified were due to injecting drugs. In 2011, the comparable figure is around 4%. This represents a considerable decline, and a marked change in the epidemiology of hepatitis B.[38]

In 2003, the hepatitis B vaccination programme was introduced in prisons and detention centres in England and Wales. Under this programme, all prisoners admitted to prisons are offered vaccination against hepatitis B using a hyper-accelerated course. The uptake of the hepatitis B vaccine in prisons across England has increased almost three-fold in the last 10 years, from 27,161 vaccinations administered in 2003 to 77,379 in 2012/13. Research[39] indicates that the uptake of hepatitis B vaccination among injecting drug users has increased from 39% in 2001 to 77% in 2011, and the majority of those vaccinated report prison as the place where they received the vaccination. This provides strong evidence that the prison vaccination programme is responsible for the marked change in hepatitis B epidemiology across the whole population.

In 2011, a total of 589 cases of hepatitis B, classified as acute or probable acute infections, were reported; only 13 (4.4%) were associated with injecting drug use.[40] However, a reduction in the coverage for hepatitis B vaccination among this population could rapidly result in an increase in susceptibility to this infection among the drug-injecting population. Vaccination needs to continue if the current low level of new infections is to be sustained.

Figure 3.7 shows the incidence of hepatitis B (as defined by those testing positive for hepatitis B surface antigen) between 2008 and 2012 in the prison population compared with the general primary care population. For hepatitis B, the percentage testing positive among prisoners and other detainees is slightly lower than for primary care generally (1.4% vs 1.6%), though hepatitis B may be under-reported in prisons. Hepatitis B in the general population is discussed further in Chapter 7.

Figure 3.7: Percentages of tests for Hepatitis B surface antigen reported by service type (excluding antenatal screening), England, 2008-12



Source: Sentinel Surveillance, Public Health England

Hepatitis C in prisoners

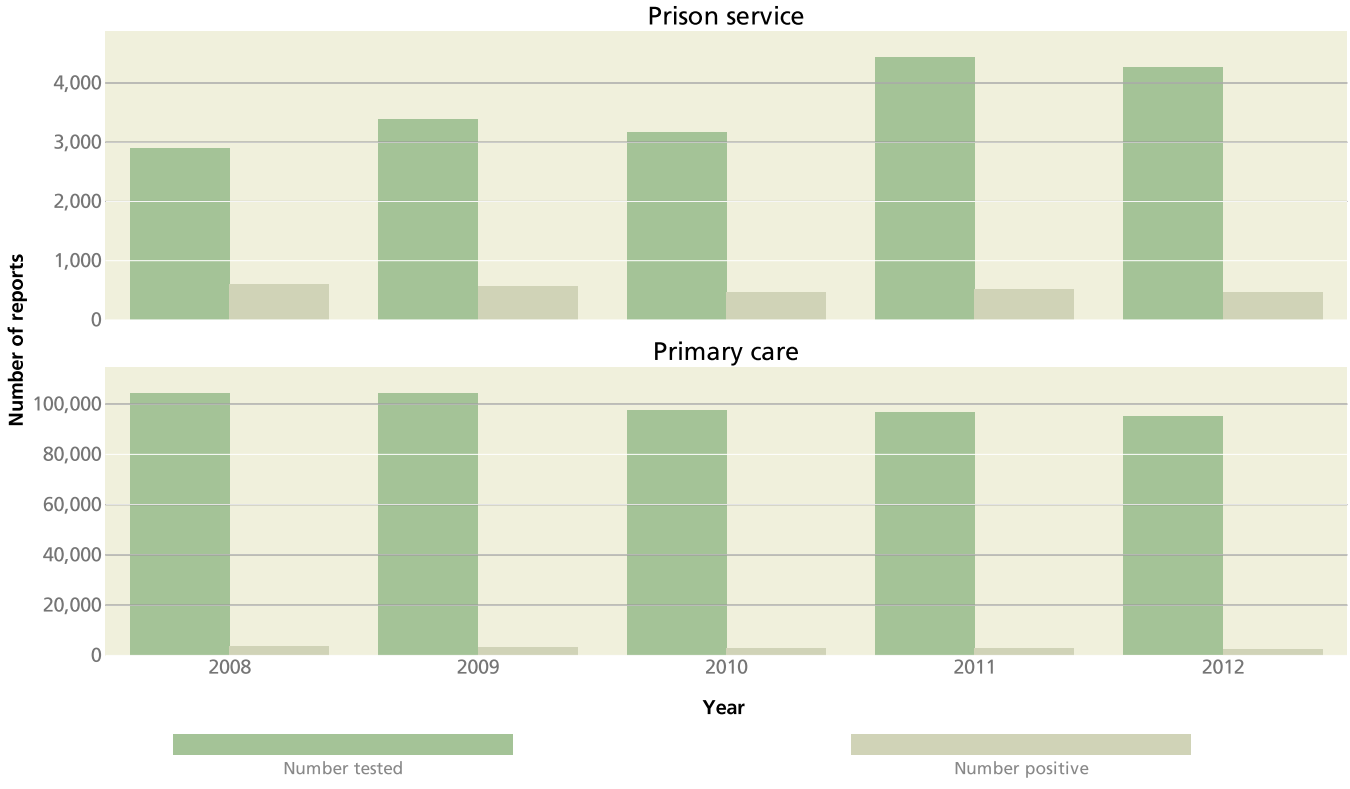
Among those tested between 2008 and 2012, anti-hepatitis C virus (anti-HCV) antibodies were discovered in a greater proportion of prisoners (14%) than in people in the general population (3%), suggesting that prevalence of hepatitis C is considerably higher in the prison population than in the general population. Over 90% of new hepatitis C infections are acquired through injecting drug use.[41]

Between 2010 and 2012, reports of hepatitis C in prisons increased substantially. The prison population is dynamic with a high turnover; this means that there is no clear denominator for calculation of incidence rates. Therefore, absolute case numbers are reported, but these must be interpreted in the context of a growing prison population. In 2010, there were 106 antibody-positive cases and 9 polymerase chain reaction (PCR)-positive cases; in 2012, there were 417 antibody-positive cases, and 205 PCR-positive cases. This increase is likely to be an artefact of increased testing. Extensive work has been undertaken to increase hepatitis C testing in prisons, through increased awareness among prisoners and prison staff. However, it is very likely that these reports still under-estimate the actual number of infections and cases of hepatitis C in prisons and other places of detention.

There are a number of data sources which measure blood-borne virus infection in the prison and detention centre population. These include Public Health England surveillance systems such as the Public Health in Prisons monitoring system based with the national Health and Justice Team; the Survey of Prevalent HIV Infections Diagnosed; the Genitourinary Medicine Clinic Activity Dataset; and Sentinel surveillance of blood-borne virus testing. The Prison Health Performance and Quality Indicators commissioned by NHS England monitor the uptake rate and coverage of hepatitis B vaccination, and the uptake and coverage of hepatitis C testing. Together, these systems provide an indication of the current state of blood-borne virus infection among this population.

Since its introduction on 1 April 2013, the Public Health England Health and Justice Team has started to work closely with partners to look at increasing the coverage of blood-borne virus testing in prisons. The Health and Justice Team recently published *An Audit of Hepatitis C Services in a Representative Sample of English Prisons, 2013* and the *National Survey of Hepatitis C Services in Prisons in England* (July 2012). Both documents provide insight into the hepatitis C services available to prisoners and detainees and also analyse the data available at national level regarding hepatitis C infection.

Figure 3.8: Trends in individuals tested and testing positive for anti-HCV in prison and primary care, England, 2008-2012



Source: Public Health in Prisons Team, Public Health England

Tuberculosis in prisoners

Tuberculosis (TB) is a serious but treatable infection and rates are high and rising among people in prison. Prisoners, their social networks, and those who 'rotate' between prison and the community have long been recognised as being at risk of TB, due to the over-representation of risk factors including homelessness, drug use and alcohol misuse. Some forms of TB, particularly those affecting the lungs or larynx, can be transmitted to other prisoners and to staff.

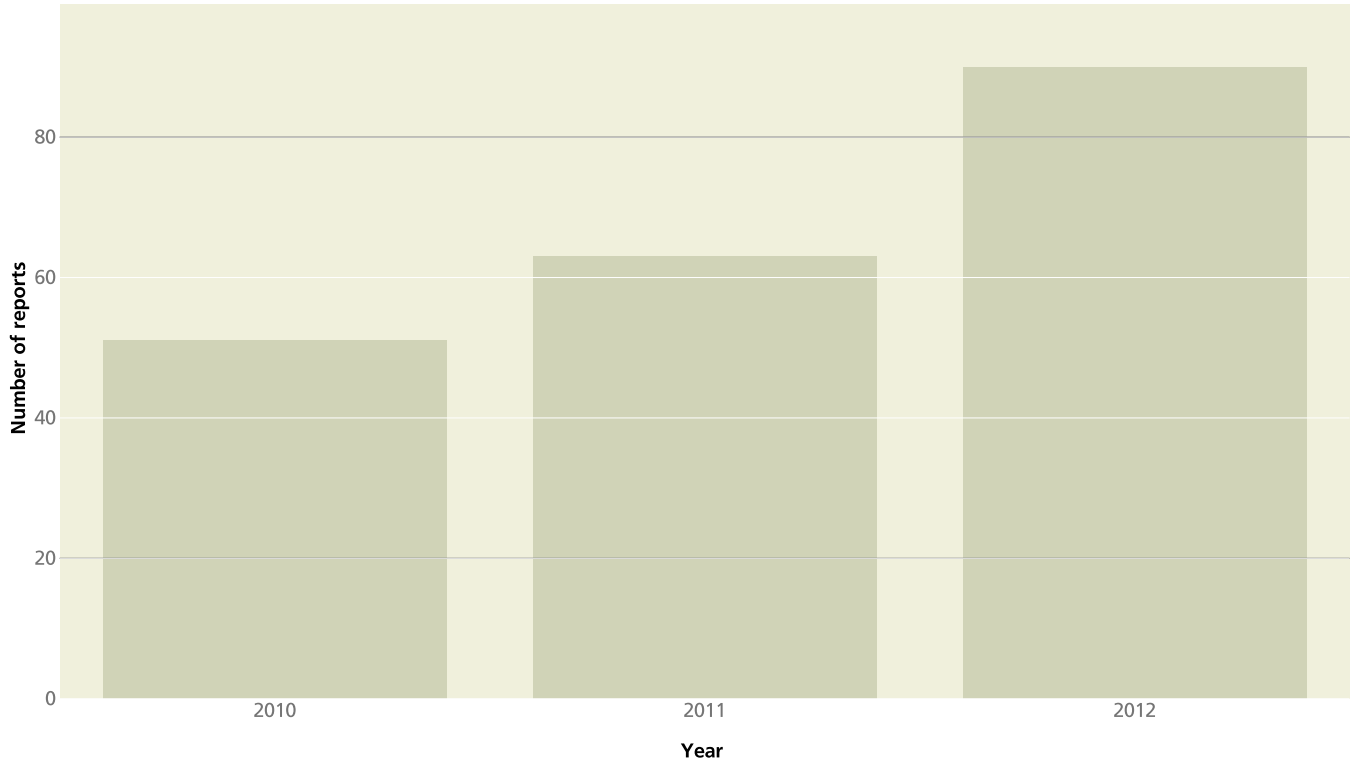
In England, there has been a steady increase in cases among people in prisons from 51 in 2010 to 84 in 2012. Through the use of variable number tandem repeat typing (which uses genome sequences that show variation between unrelated strains of TB) and detailed epidemiological analyses of cases and contacts, we are seeing increasing evidence of in-prison transmission of TB, with at least one outbreak of TB in prisons every year since 2010.[42]

While the number of cases of TB remains relatively small, the operational impact on the prison estate can be substantial. Prisoners may need to be transferred to NHS facilities for initial treatment and isolation, or isolated in prisons, which often lack suitable facilities. For example, no prisons in England have negative pressure rooms. Contact tracing can also be challenging. Contacts of infectious cases may include prisoners who have subsequently been transferred around the estate or released back to the community. Staff may also be contacts.

There are increasing numbers of multi-drug-resistant and extensively drug-resistant tuberculosis cases, often complicated by homelessness, mental health issues and non-compliance with treatment. This poses a risk to prisoners, their social networks and staff.

Prisons were identified as a key setting for TB control in the Chief Medical Officer's action plan, *Stopping Tuberculosis in England*, published in 2004.[43] The need to target other 'hard-to-reach' populations was also highlighted. In March 2008, the Chief Medical Officer announced the intention of the Department of Health to fund the installation of static digital X-ray machines in large local prisons receiving people from areas with a high prevalence of TB to improve active case finding.[44] There are now eight static machines in the five male London prisons as well as one each in Birmingham, Manchester and the North East region prisons. The effective use of these machines is part of a national work programme which has been identified as a priority for 2013/14 for Public Health England, the National Offender Management Service and NHS England.

Figure 3.9: Number of cases of tuberculosis reported to the Public Health in Prisons Team, England, 2010-2012



Source: Public Health in Prisons Team, Public Health England

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Chapter 4

Sensory impairment

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Overview

As highlighted in the summary of the *Annual Report of the Chief Medical Officer 2011, Volume One*, there is a paucity of formally collected data about the prevalence and impact of conditions that cause high levels of morbidity and low levels of mortality, including sensory impairment. This chapter presents estimated UK data from the Global Burden of Disease Study 2010[1] and data from the GP Patient Survey for England[2] to provide an indication of the prevalence of visual impairment (including severe visual impairment, referred to in this chapter as 'blindness'), and hearing impairment (including severe hearing impairment, referred to as 'deafness'),[3] and the impact that these impairments have on the individuals affected.

The Global Burden of Disease Study 2010 estimated that, among those aged 70 or over, sense organ disease accounts for around 7–10% of all years lived with disability in the UK. Visual impairment accounts for around 4% of years lived with disability in this group, while hearing impairment accounts for around 3%. The proportion of years lived with disability attributable to sense organ disease is, by this measure, similar to that for cardiovascular disease or neurological disorders; however, it should be noted that the estimate for sense organ disease is likely to be a substantial underestimate, as discussed later in this chapter.

The causes of visual impairment in the UK are changing. Between 1990 and 2010, the number of disability-adjusted life years attributable to glaucoma and macular degeneration has increased by around 50%, while that attributable to cataracts has fallen by around 25%. It is likely that these increases will have had a substantial impact on the cost of treatment and monitoring services for visual impairment.

In the GP Patient Survey in England, around 5% of all adults reported deafness or blindness. Among those aged 55 or over, around 9% reported deafness, 2% blindness and 1% both. Among those aged 55 or over, 62% of those with blindness were female, while 53% of those with deafness were male. The reasons for these differences between the sexes are not fully understood.

Both deafness and blindness exhibit a strong association with age. This pattern is particularly marked in those aged 55 and over. At all ages, there is a substantial and significant trend for higher prevalence in areas with a higher level of socio-economic deprivation. This effect is more prominent in younger people, and in some age groups the prevalence of deafness and blindness is almost doubled between the least deprived quintile and the most deprived quintile. This may be partly attributable to differences in the occupational hazards encountered by people in different deprivation quintiles, though it has also been suggested that deprivation at an early age may have long-term effects on hearing.[4]

There appears to be substantial variation in the prevalence of deafness between regions: the North East has the highest prevalence (10%), while London has the lowest (6%). This may be related to the types of very noisy industry which were concentrated in the north of England when people who are now in their 70s and 80s were at the start of their working lives. There is less regional variation in the prevalence of blindness: all regions have a prevalence of approximately 2%, with an absolute range of less than 0.5%.

Around 30% of those reporting either deafness or blindness, and 69% of those reporting both, have at least four long-term conditions. Additionally, compared with those without deafness or blindness, fewer people with deafness or blindness feel confident in managing their own health.

Deafness and blindness have a substantial effect on quality of life as measured on the EQ-5D scale (a standardised instrument for use as a measure of health outcome). However, this effect is substantially mitigated if people feel that local services and organisations have provided appropriate support to help them manage their long-term conditions.

Between the ages of 18 and 65, those with deafness or blindness are significantly less likely to be in full-time employment than those without deafness or blindness. Around 53% of those with neither deafness nor blindness are in full-time employment, compared with 38% of those with deafness, and 22% of those with blindness.

The impact of sensory impairment on the onset and management of other psychological or neurological problems is an emerging area of research. Of GP Patient Survey respondents aged 55–84, the proportion with deafness or blindness who report dementia or Alzheimer's disease is 1.8%. This is substantially greater than the comparable figure of 0.7% among those who report neither deafness nor blindness. This association is not understood, but may have implications for the prevention and management of dementia.

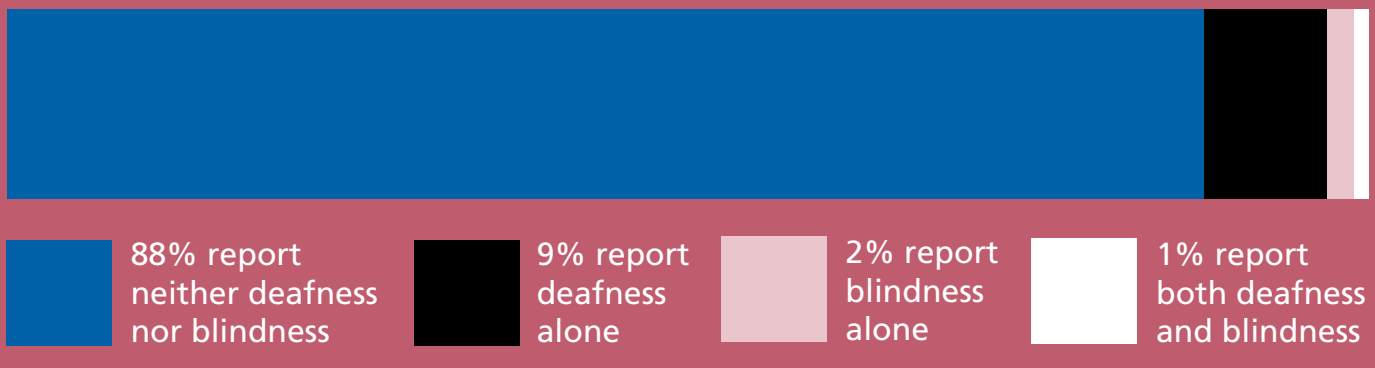
Improvement in the quantity, regularity and quality of data on hearing and visual impairment, as well as other sensory impairments, would help to inform future local service development, and aid further research in this area.

Employment status in ten average working aged people with…

The majority of those with deafness or blindness have at least one other long-term condition

Those in more deprived areas are substantially more likely to have deafness or blindness

Among those aged over 55…



Sensory disease in context

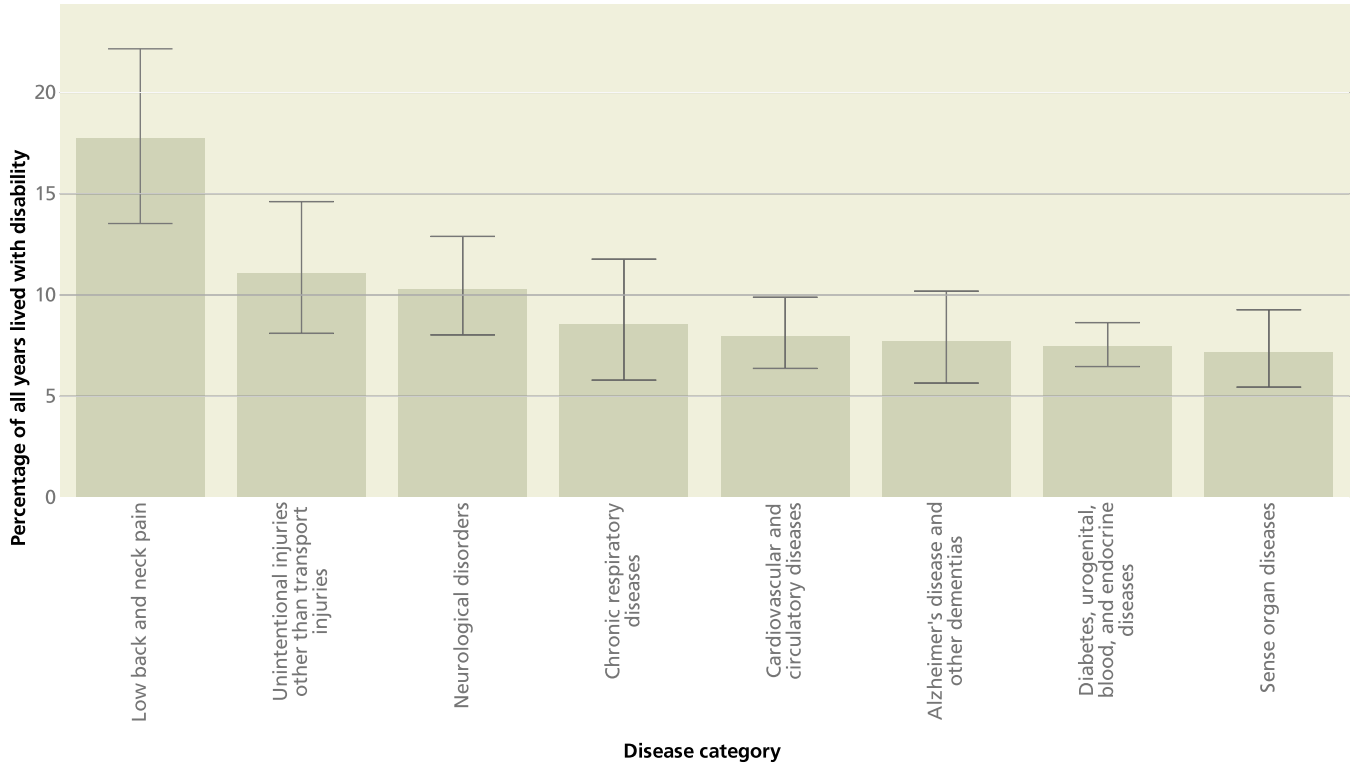
There is a paucity of data about the impact of conditions that cause high levels of morbidity and low levels of mortality, including sensory disease. One way to address this is through the use of modelled estimates of disease burden, which often calculate estimated years lived with disability for populations. Years lived with disability are calculated by multiplying the prevalence of each condition by a weighting which reflects the importance that the population attaches to sequelae of the disease.[5] This involves estimation of both the prevalence of the condition and the importance of sequelae, with complex methods often used for both. One of the largest studies in this area, the Global Burden of Disease Study 2010,[6] estimated years lived with disability among the UK population for each of several major disease categories.

Figure 4.1 shows the contribution to years lived with disability of eight major disease sub-categories among those aged 70 and over in the UK. The 95% uncertainty intervals around each value are also illustrated. ('Uncertainty interval' is used here in place of 'confidence interval' due to the increased uncertainty inherent in the estimation method.)

Figure 4.1 shows that sense organ diseases contribute around 7–10% of all years lived with disability among those aged 70 or over in the UK. This is a similar proportion to several other illustrated sub-categories, such as cardiovascular and circulatory disease and neurological disorders.

The estimates generated by the Global Burden of Disease Study[7] have proven somewhat controversial; some commentators have argued that the contribution of hearing and visual impairment to years lived with disability should be greater, since hearing impairment is very prevalent in the UK and visual impairment is often ranked very highly in terms of impact on daily life. The weightings attached to hearing and vision loss in the Global Burden of Disease Study were considerably lower than those used in many previous studies.[8] However, regardless of the exact contribution to years lived with disability, it is clear that hearing and visual impairment generate a substantial and growing burden of ill health in the UK, particularly among older people.

Figure 4.1: Estimated percentage of all years lived with disability for persons aged 70 and over attributable to disease categories, United Kingdom, 2010



Source: Global Burden of Disease Study 2010

Prevalence of deafness and blindness

The GP Patient Survey for England includes questions for patients to report whether they have been diagnosed with "deafness or severe hearing impairment" (referred to in this chapter as "deafness") and "blindness or severe visual impairment" (referred to in this chapter as "blindness"). These data can be used to provide an estimate of the prevalence of these conditions. However, it should be noted that such estimates can only be considered as rough and illustrative, since they rely on patient reports of doctor-diagnosed conditions. Nevertheless, comparisons with estimates from the literature are favourable, suggesting some face validity, and until more definitive surveys are completed, these estimates are among the best available.

Combining the data from the 2012 and 2013 surveys, there were 1,907,685 respondents, of whom 89.3% gave valid responses to the questions about deafness or blindness. A total of 643,215 of those who gave valid responses were aged 55 or over. Respondents' data were weighted to reflect the overall England population.

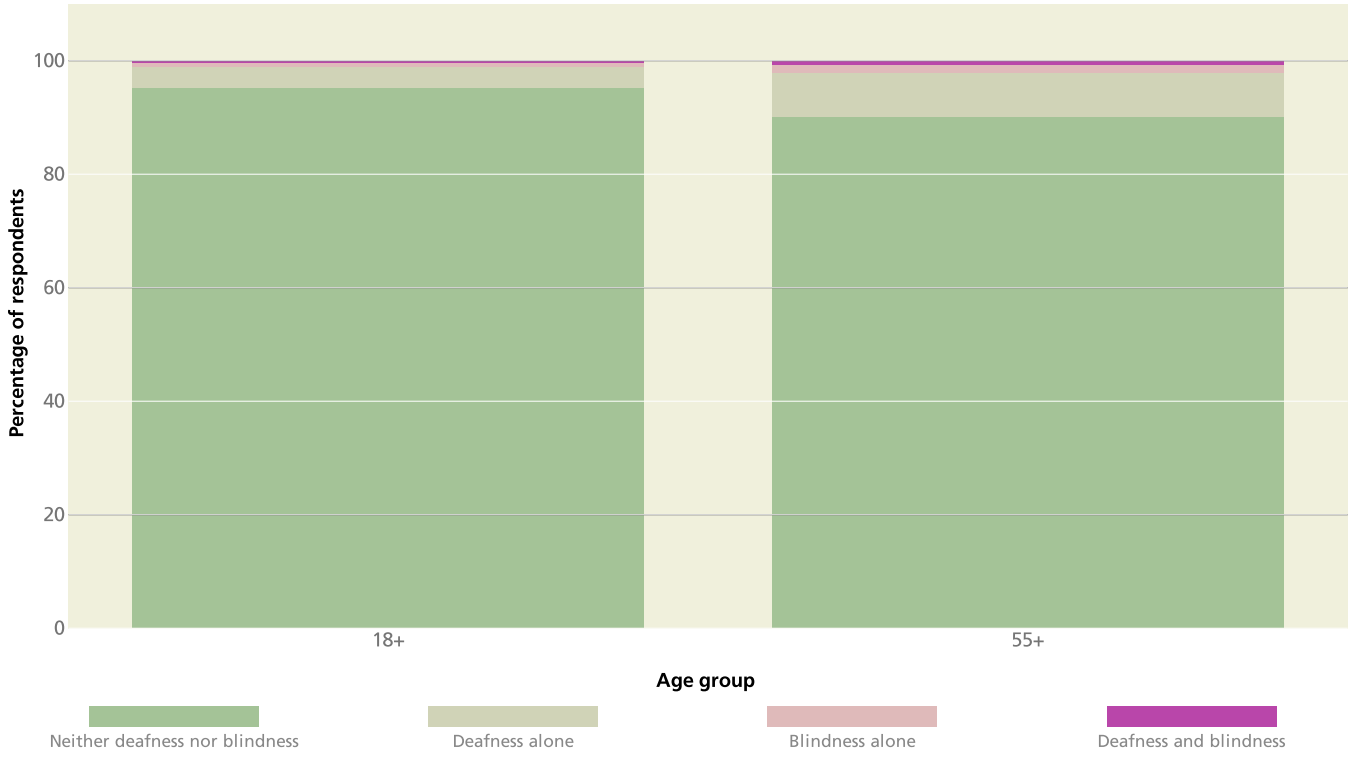
Figure 4.2 shows the proportion of respondents who reported diagnoses of deafness, blindness or both, among respondents aged over 18, and those aged over 55.

Among all adults, around 5% reported deafness or blindness, increasing to around 11% among those aged 55 or over. Among those aged 55 or over, around 9% reported deafness, 2% blindness and 1% both.

The reported prevalence of deafness and blindness varied by sex in those aged 55 or over. In this age group, 59% of those reporting blindness were female, and 62% of those reporting both blindness and deafness were female. The Global Burden of Disease Study reported a 2:1 ratio of females to males with blindness in the UK (across all ages). It is not known why the prevalence of blindness appears to be disproportionately high among females. The difference may be partly explained by demographics: for example, there are more older females than males, and age is strongly associated with deafness. The limited nature of the available data makes further investigation of the sex-related difference in prevalence difficult.

Conversely, of those reporting deafness, 53% were male, representing a small but significant difference in prevalence compared with females. This difference is probably attributable to occupational exposure to noise.

Figure 4.2: Percentage of GP Patient Survey respondents reporting deafness, blindness, or both deafness and blindness, England, 2012-2013



Source: GP Patient Survey 2012-13

Regional variation in prevalence of deafness and blindness

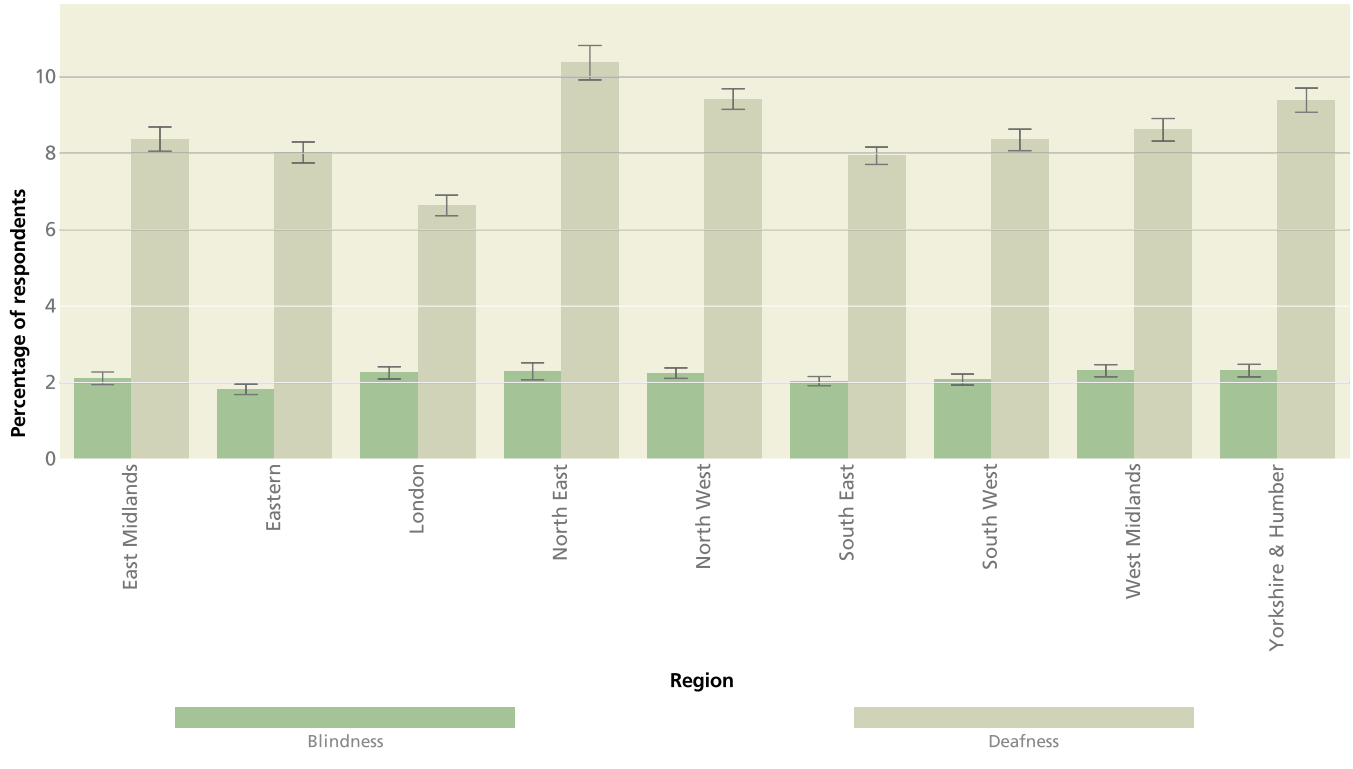
Figure 4.3 gives a regional breakdown of the GP Patient Survey data for those aged 55 and over. The 95% uncertainty intervals are also shown.

There is substantial variation in the regional prevalence of deafness reported in this survey: the North East has the highest prevalence (10%), while London has the lowest (6%). When the data are additionally broken down into area-level deprivation quintiles (not shown in Figure 4.3), the North East has the largest difference in prevalence between the most deprived quintile (13%) and the least deprived quintile (8%). It is likely that this reflects the types of very noisy industry which were concentrated in the north of England when people who are now in their 70s and 80s were at the start of their working lives.[9] The reported prevalence of deafness in London is substantially lower than that in any other region. London is also the only region in which there is no clear relationship between level of deprivation and reported prevalence of deafness: the prevalence in the most deprived quintile (6%) is equal to that in the least deprived quintile (6%). It is not known why London exhibits such a markedly different pattern.

There is less regional variation in the prevalence of blindness: all regions have a prevalence of approximately 2%, with an absolute range of less than 0.5%. However, in all regions there is a clear progression in prevalence from the least deprived to the most deprived areas. This may be related to differences in exposure to risk factors for blindness. For example, there is an association between age-related macular degeneration and smoking, and the prevalence of smoking is higher in more deprived areas.

GP Patient Survey data provide no information on take-up of services for deafness and blindness, nor on the level to which the impact of deafness and blindness is mitigated for those who access services. Service planning at a local level, for example by local authorities and clinical commissioning groups, could be helped through better data on these topics. The Public Health Outcomes Framework[10] contains several measures for the incidence of new blindness registrations, which may prove useful at a regional and national level. However, it does not currently provide any local-level data on the prevalence of sensory impairment, nor on the benefit local patients derive from interventions.

Figure 4.3: Percentage of GP Patient Survey respondents aged over 55 reporting deafness or blindness by region, England, 2012-2013



Source: GP Patient Survey 2012-13

Diseases associated with hearing and visual impairment

Figure 4.4 shows the proportion of total years lived with disability attributable to various diseases associated with hearing and visual impairment among those aged 18 and over, and aged 70 and over, in the UK. The 95% uncertainty intervals are also illustrated. The estimates shown are based on those in the Global Burden of Disease Study.

Around 1.4% of years lived with disability in the adult population in the UK are attributable to hearing impairment. Among those aged over 70, the proportion is substantially greater (3.2%). The proportion of years lived with disability attributable to all causes of visual impairment (as shown in Figure 4.4) is 2.0% among adults, and 4.0% among those aged over 70. In both age groups, these proportions are of a different order of magnitude from all other sense organ diseases.

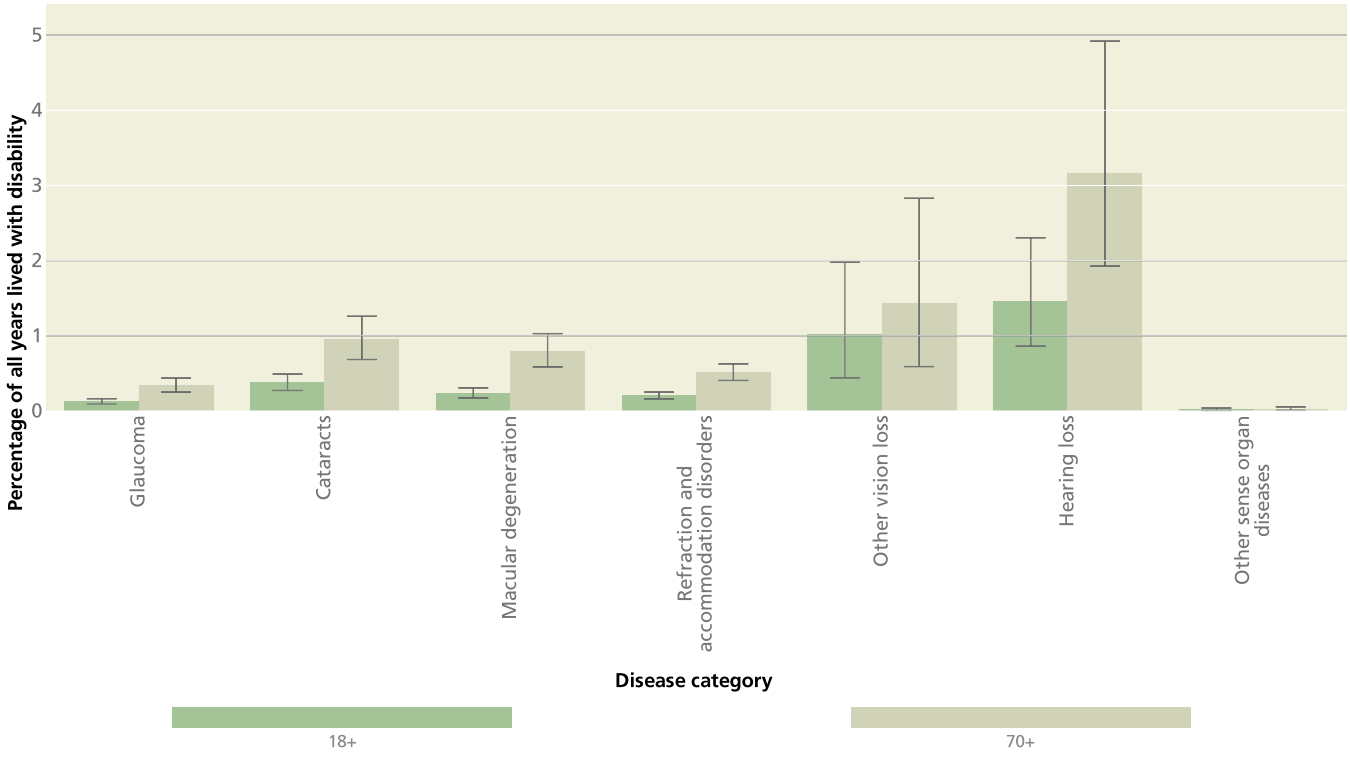
The causes of visual impairment in the UK appear to be changing. It has been estimated that between 1990 and 2010, the number of disability-adjusted life years (which combines years lived with disability and years of life lost to a particular condition) attributable to glaucoma and macular degeneration has increased by around 50%.[11]

Conversely, the number of disability-adjusted life years attributable to cataracts has fallen by around 25% over the same period.[12] This represents a substantial shift in the causes of visual impairment in the UK over two decades. A similar pattern has been reported globally.

Since glaucoma and many cases of macular degeneration require life-long monitoring, and since both glaucoma and macular degeneration require expensive treatments, it is likely that these increases will have had a substantial financial impact. Improvements to the quality of aggregated data on the prevalence of these diseases could aid understanding of the drivers of the increases and may also help future service planning.

Similar changes have not been seen in the disability-adjusted life years attributable to hearing impairment. While the estimated disability-adjusted life years attributable to hearing impairment have decreased by around 13%, the confidence intervals for the 1990 and 2010 estimates overlap by 70%, and so the difference is not statistically significant.[13]

Figure 4.4: Estimated percentage of all years lived with disability attributable to different causes of sensory impairment, by age, United Kingdom, 2010



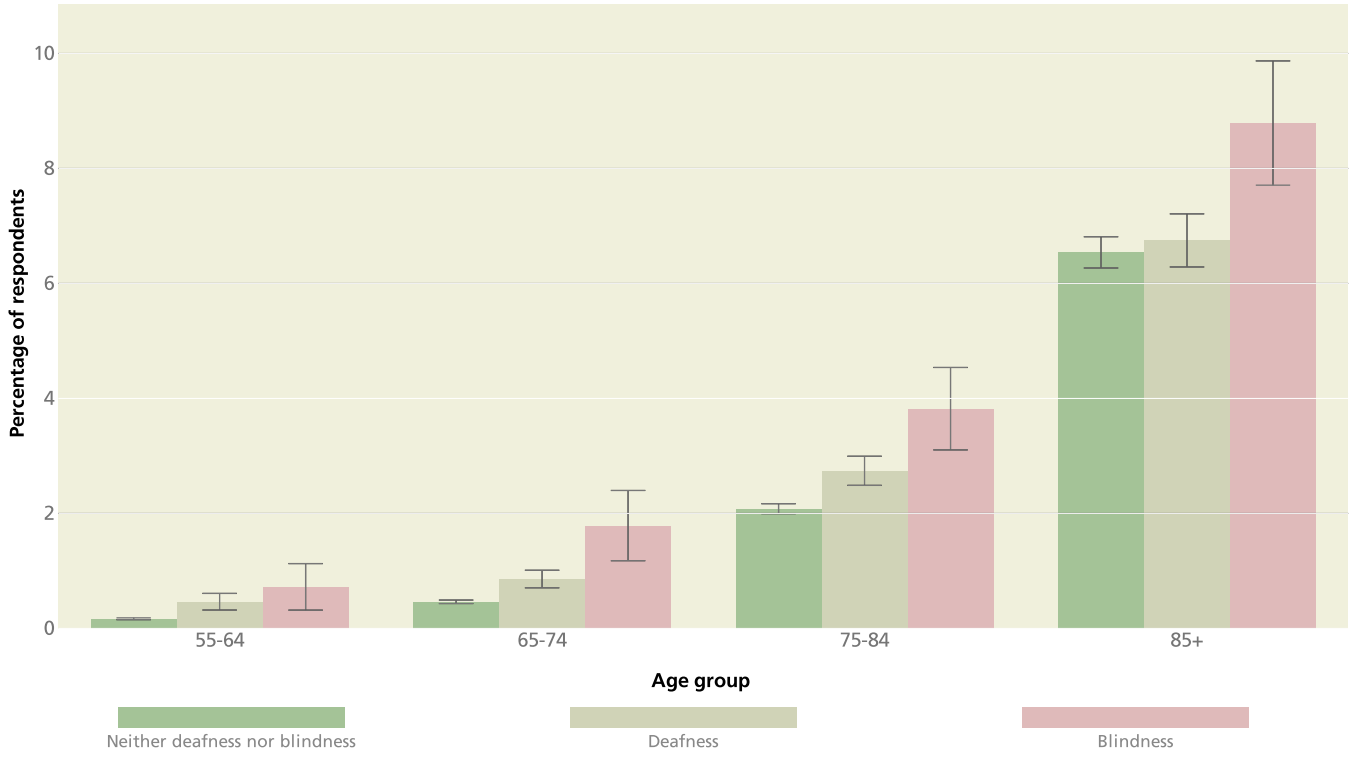
Source: Global Burden of Disease Study 2010

Deafness, blindness and dementia

The impact of sensory impairment on the onset and management of other psychological or neurological problems is an emerging area of research.[14] Figure 4.5 shows the percentage of GP Patient Survey respondents who report having been diagnosed with Alzheimer's disease or dementia, broken down by age and self-reported sensory impairment. These data show the substantially greater probability of those with deafness or blindness reporting Alzheimer's disease or dementia, compared to those without deafness or blindness. In those aged 55-84, the odds of people with deafness or blindness reporting dementia or Alzheimer's disease were more than twice those for people without deafness or blindness (odds ratio 2.74; 95% confidence interval 2.53 – 2.99). This association is not understood. More research in this area is likely to be beneficial, and may have implications for prevention and management of dementia in those without sensory impairment, as well as in those with blindness or deafness.

Given the pattern of multi-morbidity of those with sensory impairment, and the impact of sensory impairment on health-related quality of life, disability, unemployment, confidence in managing one's own health, and potential impact on dementia, an integrated approach to care is likely to be beneficial. Other than synthetic estimates, there are currently no function-related data that would enable local authorities or clinical commissioning groups to plan local services. There are also no comprehensive data on the extent to which services meet the needs of people with sensory impairment. Improvements in quantity and quality of data on sensory impairment are important in order to inform future service development.

Figure 4.5: Percentage of GP Patient Survey respondents with dementia by age and sensory impairment, England, 2012-2013



Source: GP Patient Survey 2012-13

Deafness, blindness and other long-term conditions

The pattern of multi-occurrence of long-term health conditions is increasing, partly because life expectancy has increased substantially over the last two or three decades.[15] The GP Patient Survey collates data on 16 long-term conditions reported by patients, and so allows examination of the multi-morbidity of those with blindness and deafness.

The data in Figure 4.6 show the proportion of those with blindness, deafness and both blindness and deafness who report having long-term conditions. Since blindness and deafness are long-term conditions in themselves, those reporting blindness or deafness are counted as having reported at least one long-term condition, and those with blindness and deafness at least two. It is clear from these data that those who report deafness or blindness as their only long-term condition are in the minority (19% and 18% respectively). Of those who report neither deafness nor blindness, only 3% report four or more long-term conditions, compared with 29% of those who report deafness, 32% of those who report blindness and 69% of those who report both deafness and blindness.

In the context of multi-morbidity, confidence in managing one's own health conditions is likely to be an important contributor to quality of life, as well as a factor in influencing long-term outcomes. The impact of deafness and blindness on mean level of confidence in managing one's own health conditions is considerable. Among those aged over 55 with neither blindness nor deafness, 91% feel confident in managing their own health; this compares with 84% among those with deafness, 72% among those with blindness and 64% among those with both blindness and deafness. There is a negative association between confidence in managing one's own health conditions and age, which is consistent across those with all levels of sensory impairment and none.

Improved confidence in the ability to manage one's own health may be associated with a lower risk of emergency admissions to hospital, though there are currently no data to support or refute this hypothesis. It would be useful to know the extent to which improved access to appropriate support for those with severe sensory impairment (e.g. treatment, implants and appropriate supportive aids) promotes greater confidence in managing co-morbidities.

Figure 4.6: Number of long term conditions reported by GP Patient Survey respondents, by type of sensory impairment, England, 2012-13

Source: GP Patient Survey 2012-13

Associations of deprivation and age with deafness and blindness

Both deafness and blindness exhibit a strong association with age. This pattern is particularly marked in those aged 55 and over. Figure 4.7 shows the percentage of GP Patient Survey respondents reporting deafness and blindness by area-level deprivation quintile and age. The 95% uncertainty intervals are also shown.

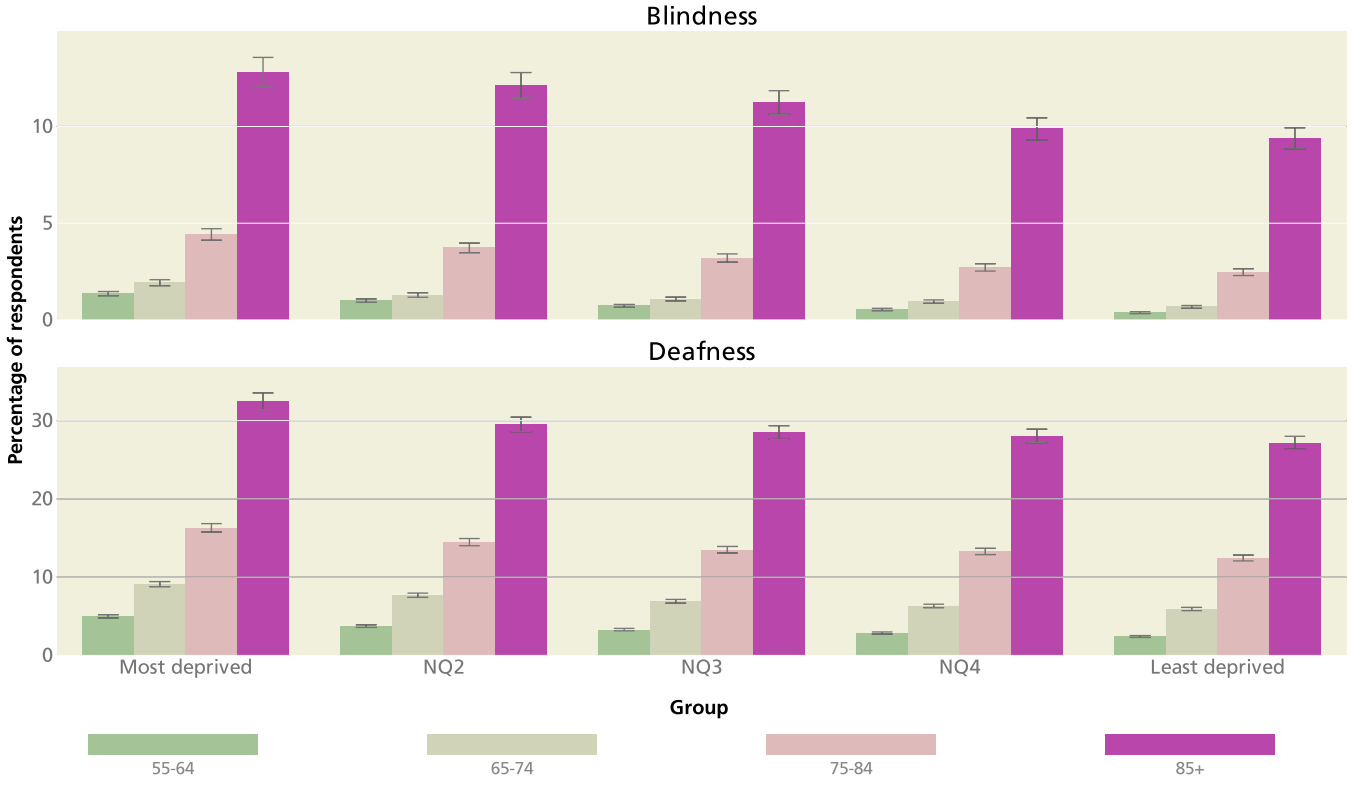
These data demonstrate a marked increase in prevalence with age for both blindness and deafness, especially in the 75–84 years and 85 and over age groups. In the 85 and over age group, around 30% of respondents reported deafness, and 10% blindness.

Within each age group, there is a substantial and significant trend for higher prevalence in areas with a higher level of socio-economic deprivation. In some age groups, the prevalence of deafness and blindness is almost doubled between the least deprived quintile and the most deprived quintile. This effect is more prominent in younger people. This pattern is probably maintained in the older population, though the increase in the background prevalence masks it somewhat, such that the prevalence does not double.

It has been suggested, therefore, that the variation in prevalence of both deafness and less severe hearing impairment between different area-level deprivation quintiles is likely to be attributable to the differences in the occupational hazards encountered by people in different area-level deprivation quintiles. That is, those who live in more deprived areas may be more likely to be exposed to greater levels of noise at work. This is more likely to be the case for those whose working lives largely predated the introduction of modern legislation on noise exposure at work, such as those who are now aged over 70.[16]

However, the dose–response effect is somewhat more pervasive in nature, and the impact of noise is seen more clearly at mild to moderate levels of hearing impairment than at the severe level shown in Figure 4.7. Given that the difference in prevalence of deafness across areas with differing levels of deprivation can be seen from a young age, it has also been suggested that deprivation at an early age may have long-term effects on hearing, though the causal mechanism for this is not understood.[17]

Figure 4.7: Percentage of GP Patient Survey respondents reporting deafness or blindness by age and deprivation quintile, England, 2012-2013



Source: GP Patient Survey 2012-13

Social impact of deafness and blindness

The EQ-5D Health Questionnaire[18] provides a measure of health-related quality of life. It is a standardised instrument that can be used to compare health status, as it provides a single index value (between 0 and 1) describing health status, with a higher score indicating a better health-related quality of life.

Figure 4.8 shows mean EQ-5D scores (and 95% uncertainty intervals) for groups with varying types of sensory impairment at different ages. Age impacts on quality of life regardless of sensory impairment: this is largely attributable to the development of long-term conditions. Excluding those who have long-term conditions, the mean score at age 55 is around 0.9.

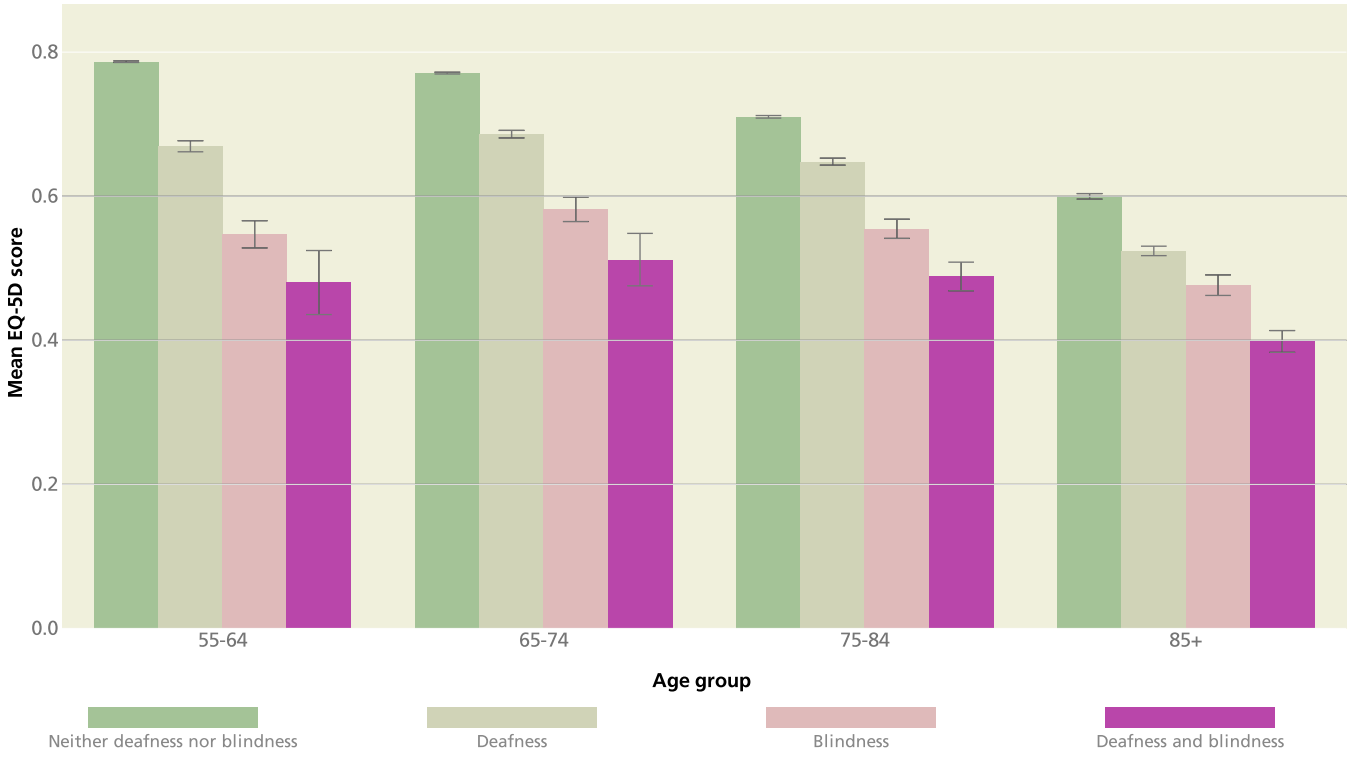
At all ages, deafness and blindness have a large impact on quality of life, with combined deafness and blindness having a larger impact still. Those with deafness or blindness are more likely to have other long-term conditions. The EQ-5D score does not separate out the impact of sensory impairment from these co-morbidities, so it is not possible from this analysis to quantify the portion of the deficit in EQ-5D score (compared with the non-impaired population) which is attributable to sensory impairment.

The EQ-5D score contains questions about anxiety and depression, which can be summarised on an anxiety and depression scale (between 1 and 3): a higher score indicates a higher level of anxiety and depression.

The mean score for those aged 55 or over who have no sensory impairment is 1.4; the score is higher among those with deafness (1.7), blindness (1.8) or both (2.0). While these scores do not imply a difference in the prevalence of formally diagnosed anxiety or depression between these groups, they provide some limited insight.

Appropriate support can decrease the difference in EQ-5D scores between those with and without sensory impairments. Those aged over 55 with deafness who report not receiving appropriate support from local services and organisations to manage their long-term conditions have a mean EQ-5D score of 0.6. For those who report receiving appropriate support, the EQ-5D score was 0.88, which is only slightly (yet significantly) below the mean for people with neither deafness nor blindness (0.91). Similar increases exist for those aged over 55 with blindness (0.6 without support; 0.8 with full support) and both deafness and blindness (0.5 without support; 0.7 with full support). This demonstrates that appropriate support can have a substantial impact on quality of life for those with sensory impairment.

Figure 4.8: Mean EQ-5D scores for GP Patient Survey respondents with different sensory impariments by age, England, 2012-2013



Source: GP Patient Survey 2012-13

Deafness, blindness and employment

The impact of sensory impairment on employment is sometimes overlooked, yet is often important to individuals' quality of life. Figure 4.9 shows the proportion of GP Patient Survey respondents aged 18-64 who report being in full-time employment, broken down by age and sensory impairment. This shows that while around 60% of those aged 25–54 without sensory impairment are in full-time employment, the equivalent proportions for those with sensory impairment are considerably smaller: less than 50% for those with deafness and less than 30% for those with blindness.

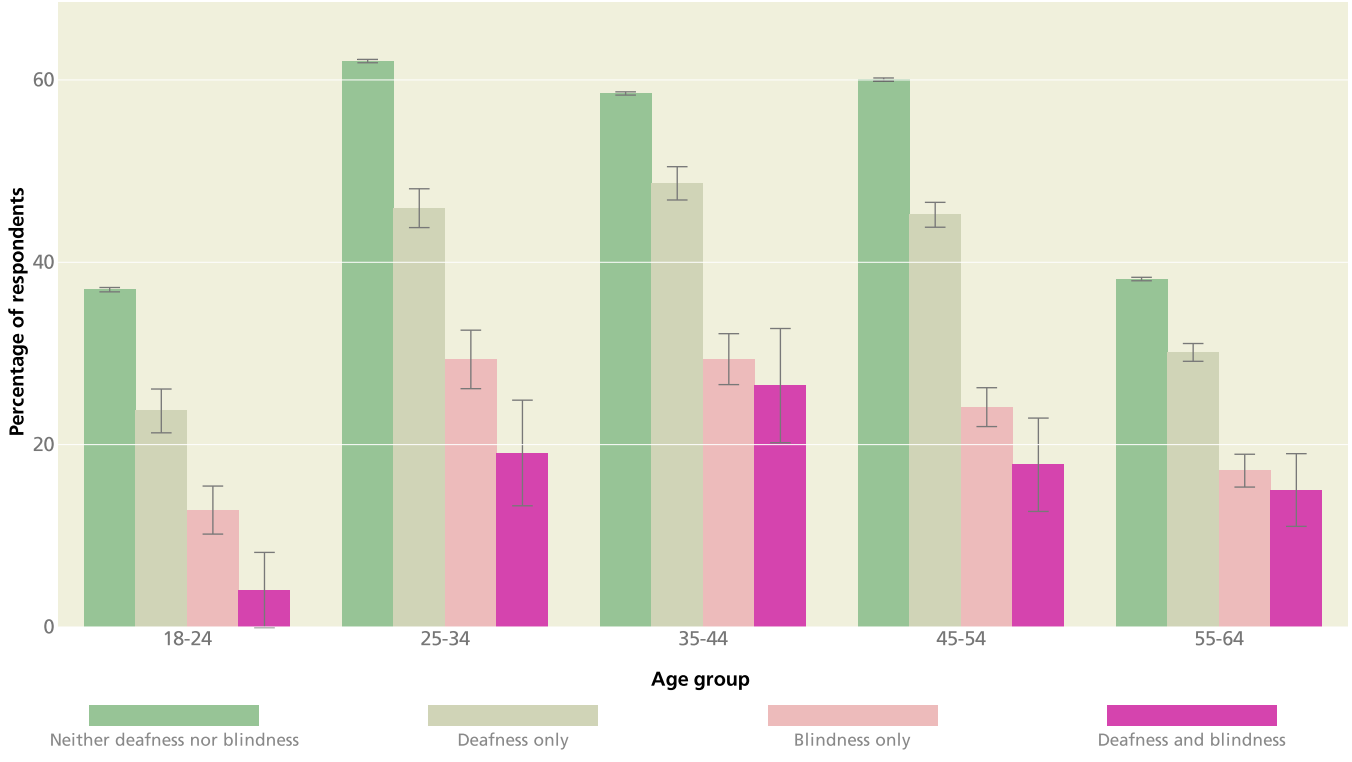
There are also substantial differences in the proportions of people who report unemployment or long-term sickness absence: 10% in the adult population without sensory impairment, 12% in the adult population with deafness and 25% in the adult population with blindness.

When the prevalence of deafness and blindness is taken into consideration, the economic impact of the excess worklessness related to deafness is likely to be similar to that related to blindness; however, it is likely that other factors are involved, such as the higher prevalence of co-morbidities in those with sensory impairment.

There have been major advances in technology over recent decades to support those with deafness and blindness in the workplace. Much of this innovation has been stimulated by investment in supporting returning armed forces personnel in the UK and the USA.[19] It would be useful to have more data about the return on investment (both for individual companies and for wider society) from supporting individuals with deafness and blindness in the workplace.

Health and employment is discussed in more detail in Chapter 2 of this report.

Figure 4.9: Percentage of GP Patient Survey respondents in full time employment by sensory impairment and age, England, 2012-2013



Source: GP Patient Survey 2012-13

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Chapter 5

Diet, physical activity and obesity

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Overview

Most adults (around 62%) are overweight or obese. Overweight and obesity are associated with increased risk of hypertension, type 2 diabetes, musculoskeletal disease, stroke and coronary heart disease, among other conditions.

In 2012, around 32% of females aged over 18 and 42% of males aged over 18 were overweight, and a further 25% of females and 24% of males were obese. As a comparison, around 2% of females and 1% of males were underweight. The proportion of adults aged over 18 who were overweight has remained approximately constant since 1993, but the prevalence of obesity has increased substantially: from around 16% in females and 13% in males.[1]

In 2012, around 28% of children aged 2 to 15 were overweight or obese, with no substantial difference in prevalence between the sexes.[2] The differences between prevalence of obesity in the most and least deprived areas are shown by the National Childhood Measurement Programme: in 2012/13, almost 25% of Year 6 children living in the most deprived areas were obese, compared with 12% in the least deprived areas. These differences appear to be increasing over time. Obesity in children is associated with an increased risk of type 2 diabetes, asthma, obstructive sleep apnoea, musculoskeletal problems and cardiovascular disease.

From 2006/07 to 2012/13, the National Childhood Measurement Programme identified an annual mean of 27,860 severely obese children. The reported prevalence has been declining in Reception year children (typically aged 4–5 years) since 2006/07; in Year 6 children (typically aged 10–11 years), it increased until 2011/12. Severe childhood obesity has been associated with mental health problems, absenteeism and poorer school performance.[3] It should be noted that there are particular data quality challenges for severe childhood obesity, as heavier children may be under-represented in the National Childhood Measurement Programme as a result of opting out.

The majority of people who are overweight or obese have an accumulation of fat in their liver cells, which is a condition known as non-alcoholic fatty liver disease (NAFLD). NAFLD causes no harm in the majority of those who are affected, but a small proportion will develop non-alcoholic steatohepatitis, which can in turn progress to more serious forms that are associated with increased mortality. The natural history of the disease is not yet fully understood. There has been a 12-fold increase in the number of hospital admissions attributed to NAFLD since 1998, with around 18,000 admissions in 2010.

The majority of people consume more calories than they need and there is no evidence of inadequate energy intake at the population level. People in the UK generally eat more saturated fat and added sugar than is recommended by the Scientific Advisory Committee on Nutrition; consumption of high fat, high sugar foods and drinks can contribute to excess energy intake which increases the risk of weight gain and obesity. Epidemiological studies have suggested that energy-dense dietary patterns, characterised by consumption of foods and beverages that are high in fat and sugar and low in nutrients and fibre, are associated with obesity.[4]

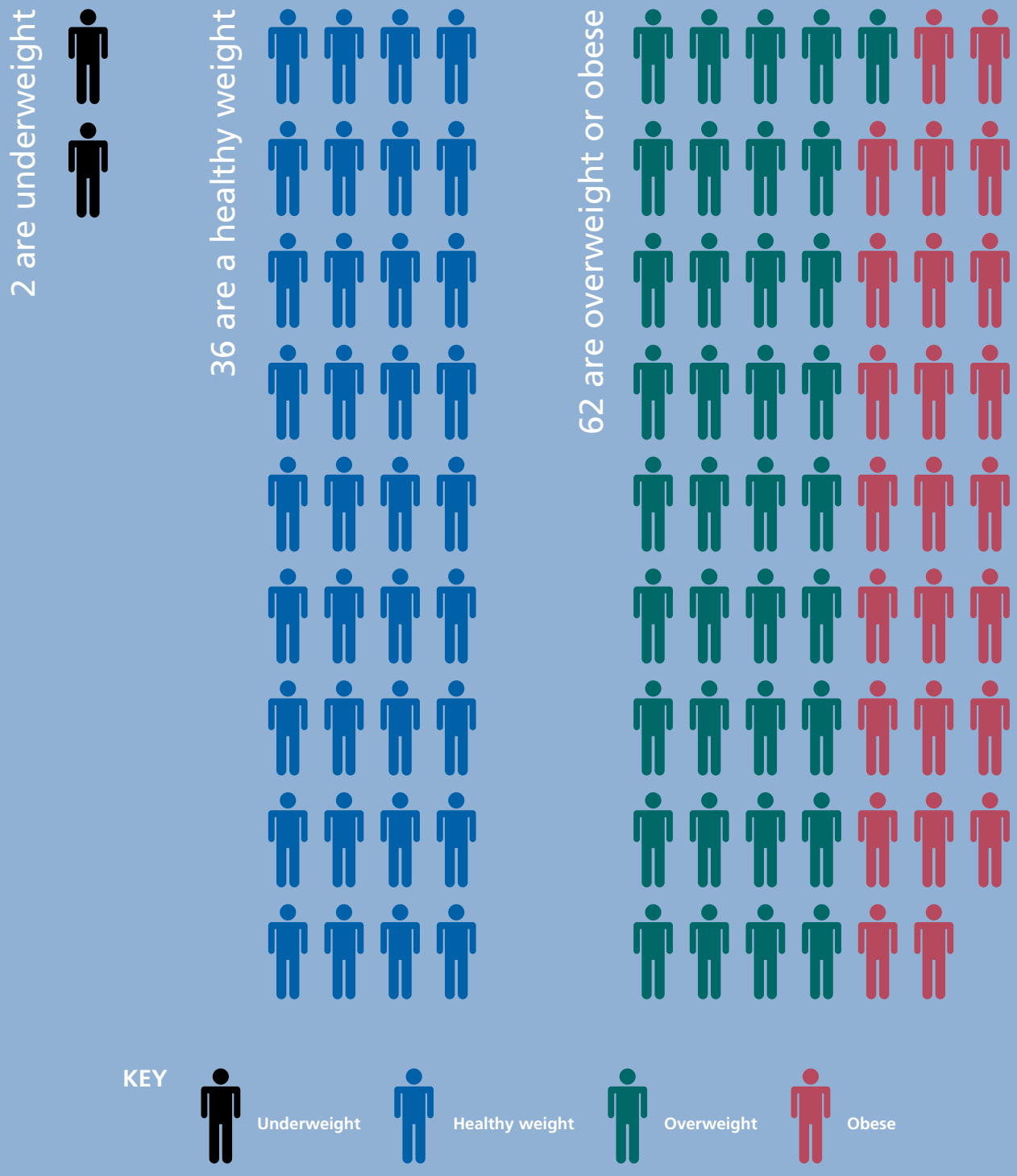
There is clear socio-economic patterning of the consumption of fruit and vegetables among adults. Those living in the highest-income households eat, on average, 1.3 more portions of fruit and vegetables than those in the lowest-income households. Yet, even among those living in the highest-income households, only around a third (34%) have an average daily dietary intake which includes the recommended five portions of fruit and vegetables.

The density of fast food outlets varies across the country, with a strong association between the density of fast food outlets and deprivation. Obesity is closely associated with deprivation, so it is likely that the areas with the highest prevalence of obesity are also likely to have the highest density of fast food outlets, though these observational data give no evidence of causation. The association between food availability and obesity is not yet fully understood.

The Chief Medical Officers of England, Scotland, Northern Ireland and Wales published updated physical activity guidelines in 2011.[5] While the total duration of activity recommended remained the same as before (a minimum of 150 minutes of moderate intensity activity per week, in place of five sessions of 30 minutes per week), the new guidelines presented more ways for people to achieve the recommended levels of physical activity. This has led to changes in the interpretation and analysis of the data that have resulted in a substantial increase in the reported prevalence of people assessed as sufficiently active, despite no actual change in the underlying level of physical activity. Hence, trends in the reported prevalence of people assessed as sufficiently active must be interpreted with caution.

This chapter provides further data on overweight and obesity; it also discusses data about diet in children and adults, and the physical activity guidelines published by the Chief Medical Officers of England, Scotland, Northern Ireland and Wales in 2011.

Of every 100 adults in England…



More women than men are a healthy weight

In England, average weight is now overweight

Having too much weight increases risk of diabetes, heart disease, and cancer

Socio-economic patterning of childhood obesity

As the prevalence of obesity has increased around the world, the social patterning of the condition has changed. In developing countries the condition tends to develop first in the more affluent members of society. As development progresses and diets high in fats and carbohydrates increase in line with what has been termed the 'nutrition transition',[6,7] obesity is generally found to move from a disease associated with affluence to one associated with poverty.

There is substantial variation in the distribution of obesity in England between socio-economic groups; the variation is especially large among children. The National Child Measurement Programme has consistently shown a near-linear relation between area-level deprivation and prevalence of obesity, with approximately double the prevalence in the most deprived decile relative to the least deprived decile.

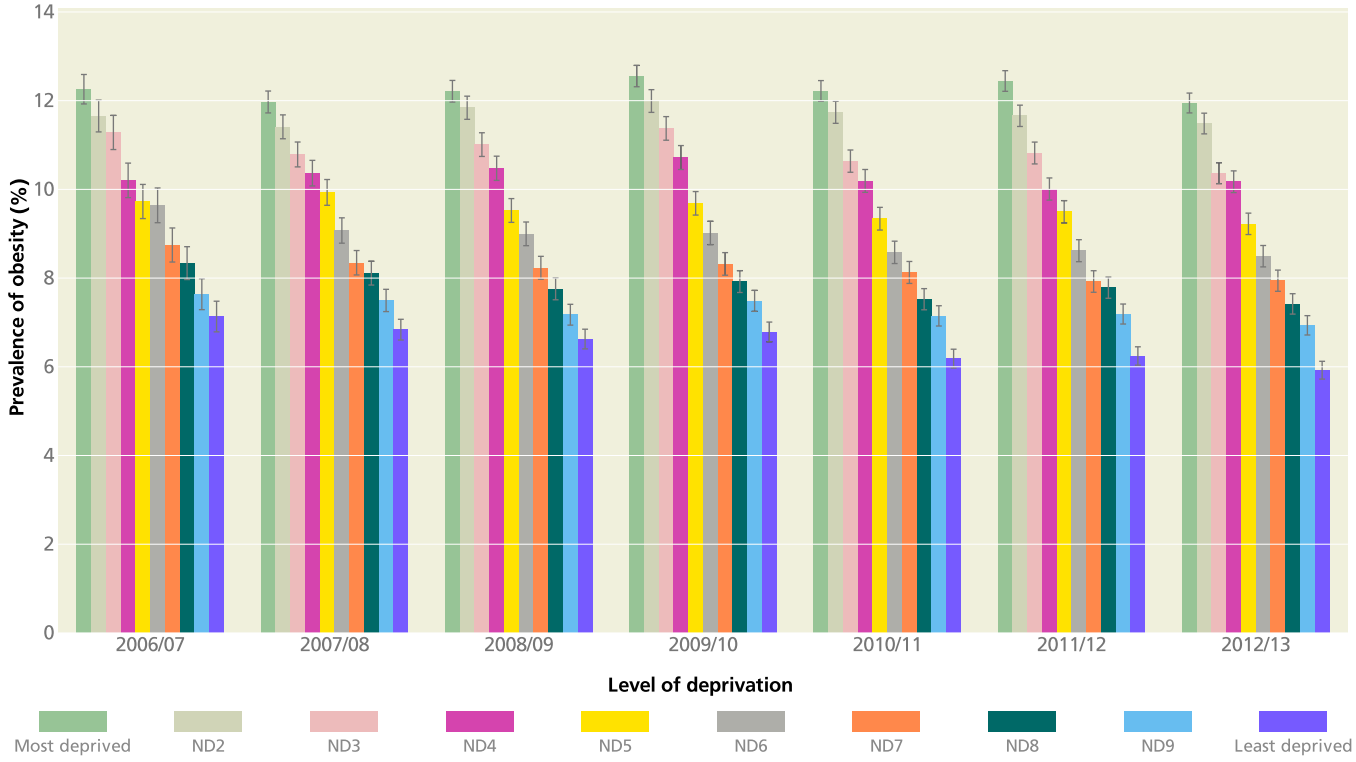
Over the course of the National Childhood Measurement Programme to date, the difference in obesity prevalence between the most and least deprived deciles increased for both the Reception year (typically aged 4–5 years) and Year 6 (typically aged 10–11 years) groups, though the cause of the increased difference in prevalence varied between the groups.

Among Reception year children, the overall pattern suggests that obesity prevalence is decreasing in the least deprived areas but remaining constant in the most deprived. Although this pattern is similar for both boys and girls, the evidence is stronger for boys: there have been statistically significant decreases in obesity prevalence among those boys living in the least deprived 50% of areas, but only among girls from the least deprived 10% of areas.

Among Year 6 children, the difference in prevalence appears to be growing at a more rapid pace. In Year 6, obesity prevalence is increasing at a rate of around 0.5% per year in the most deprived areas, while remaining relatively stable in the least deprived areas. These increases are statistically significant for both boys and girls living in the most deprived 50% of areas.

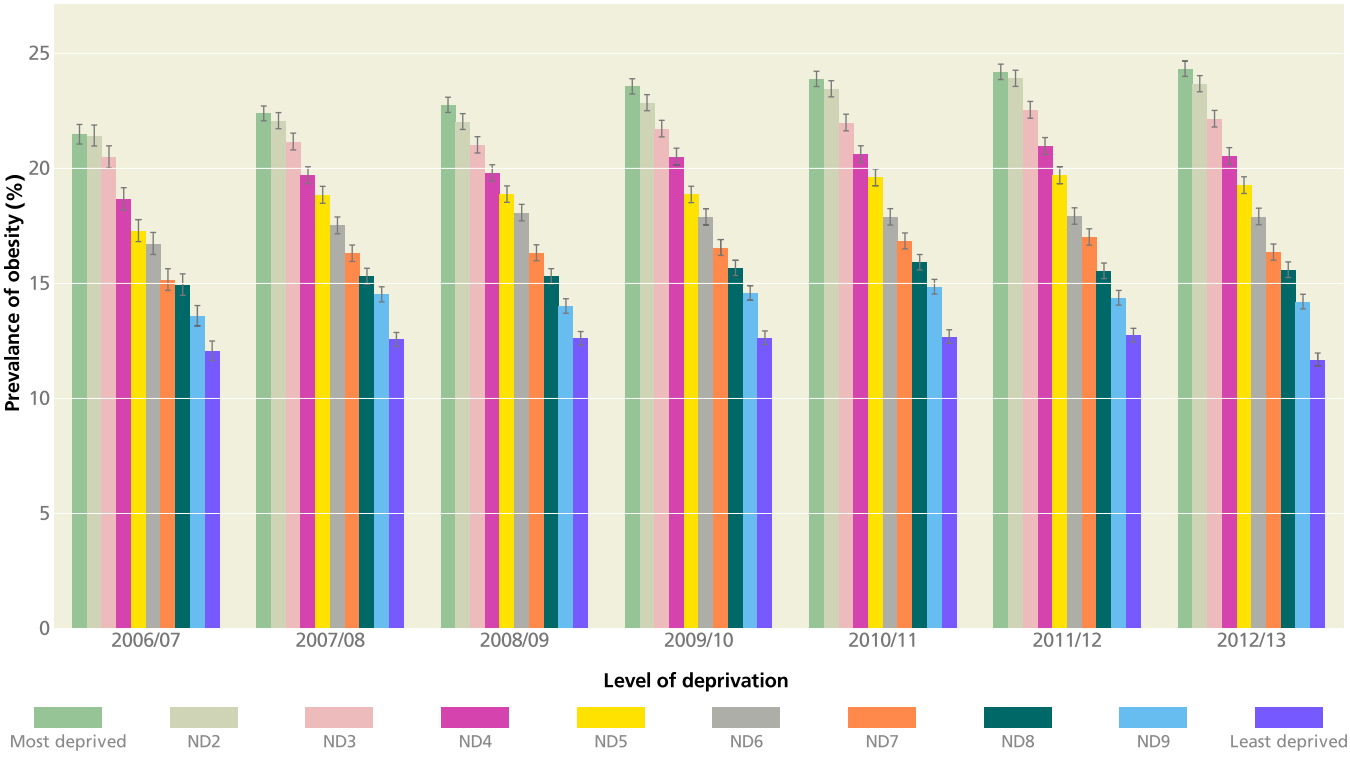
These increasing socio-economically patterned differences in prevalence, which appear to be driven by different patterns of change in different age groups, can be masked by overall figures which suggest that the prevalence of obesity may have reached a plateau. While much of the activity that is required to reduce childhood obesity takes place across all parts of the population, these differences illustrate the importance of high-quality data and analysis to support effective targeting of those interventions that are aimed at particular groups within the population.

Figure 5.1: Prevalence of obesity among reception year children by deprivation decile, England, 2006/07 to 2012/13



Source: National Child Measurement Programme

Figure 5.2: Prevalence of obesity among Year 6 children by deprivation decile, England, 2006/07 to 2012/13



Source: National Child Measurement Programme

Severe childhood obesity

There is no agreed standard definition for severe childhood obesity; in common with many academics, this report defines severely obese children as those falling on or above the 99.6th centile, which is the highest line marked on the UK 1990 growth reference charts.[8]

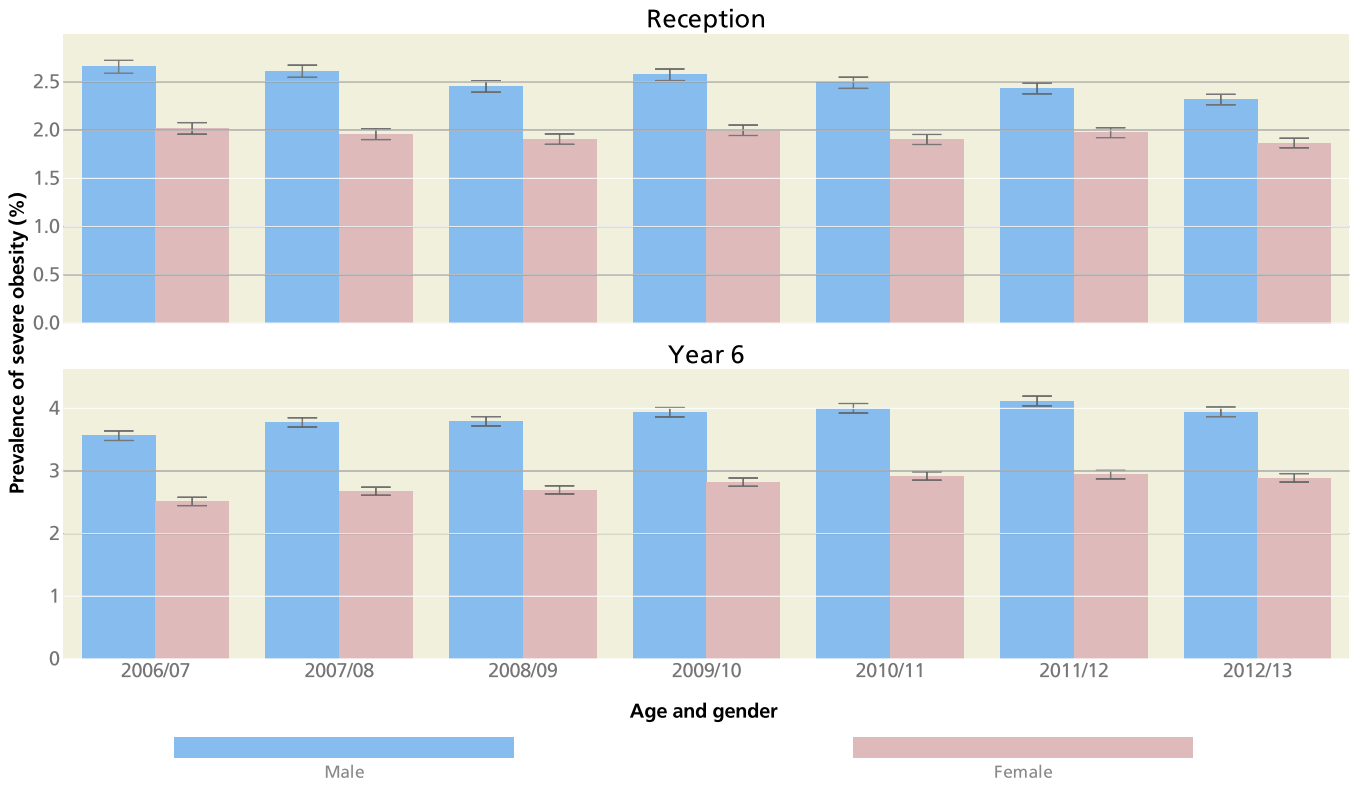
Severe obesity can have a substantial impact on the health of children. Compared with children of healthy weight, children with obesity of all severities are at increased risk of diseases including type 2 diabetes,[9] asthma,[10] obstructive sleep apnoea,[11] musculoskeletal problems[12] and cardiovascular disease.[13,14] Children with severe obesity may benefit from specialised weight management interventions, yet there remains a lack of data on the effectiveness of approaches to treat severe obesity in children.

Over the seven years of the National Child Measurement Programme that have been completed to date (2006/07 to 2012/13) there was an annual mean of 27,860 severely obese children. For these children, obesity may have appreciable impacts on daily life; severe obesity in children has also been associated with mental health problems, absenteeism and poorer school performance.[15]

Data shown in Figure 5.3 demonstrate a significant increase in the prevalence of severe obesity in Year 6 children between 2006/07 to 2012/13, and a higher prevalence in boys compared to girls for both year groups. However the increasing trend appears to have halted in the 2012/13 school year. It is possible that these figures underestimate the prevalence of severe obesity, as analyses of National Child Measurement Programme data, and anecdotal evidence, suggest that heavier children may be under-represented in the programme due to opting out of being measured. This makes it difficult to define the extent of the problem. It is also important to note that any changes may not be equally distributed across all population groups.

There are several gaps in our knowledge of this problem which would benefit from further research: for example, the associations between severe obesity and socioeconomic and ethnic inequalities are not fully understood. Linkage to health outcome data to assess short and long-term health impacts, and longitudinal analyses tracking individual children over time, would help to identify potential predictive factors.

Figure 5.3: Prevalence of severe obesity in Reception and Year 6 children, England, 2006/07 to 2012/13



Source: National Child Measurement Programme

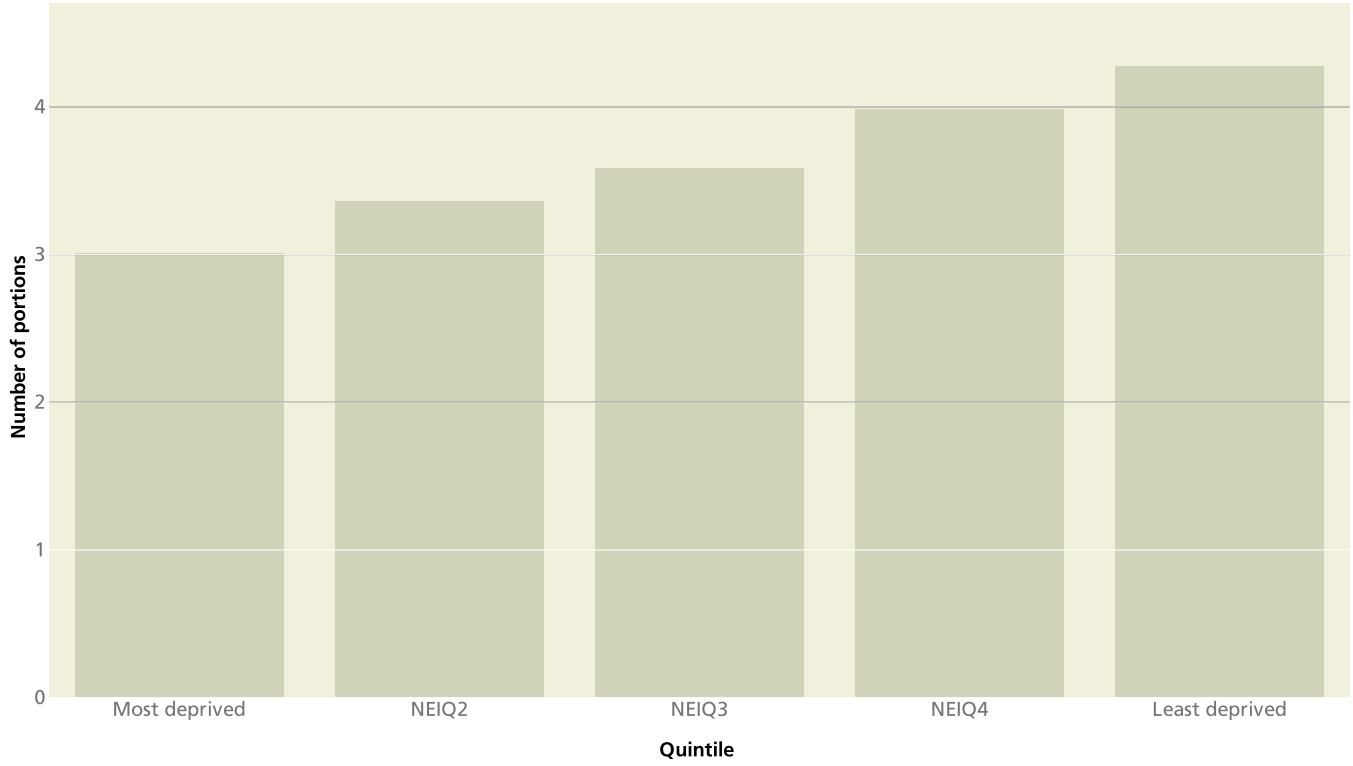
Socio-economic patterning of dietary intake

Consumption of fruit and vegetables is important for a healthy diet. Survey data show clear socio-economic patterns in dietary intake. Data from the Health Survey for England 2011 indicate that fruit and vegetable consumption varies significantly by equivalised household income.[16]

Figure 5.4 shows the mean number of portions of fruit and vegetables consumed by adults aged 16 and over per day by equivalised income. These data show that average consumption increased from the lowest to highest-income quintiles, with a mean of 3 in the lowest quintile and 4.3 in the highest. Additional statistical testing has indicated that there is a statistically significant difference between quintiles 1 and 2, 2 and 3, 3 and 4, and 4 and 5. Data from other sources, such as the Low Income Diet and Nutrition Survey, show a similar pattern.[17] The proportion of adults who reported eating the recommended five or more portions per day also varied by equivalised income level. In the highest-income quintile, 34.6% met the recommended levels compared with 19.7% in the lowest-income quintile.

These descriptive data are unable to provide the reasons for these findings, but there are several possible explanations. These include: possible differential reporting of fruit and vegetable consumption by people in different income quintiles; different access to fruit and vegetables, and the availability of transport to get to supermarkets; socio-cultural influences on diet; and the affordability of different foods relative to their energy content and other aspects of nutrition.

Figure 5.4: Average number of portions of fruit and vegetables consumed by adults per day by equivalised income quintile, England, 2010



Source: Health Survey for England

Childhood obesity, energy-dense foods and soft drinks

The National Diet and Nutrition Survey is a continuous rolling survey of the diet and nutritional status of adults and children aged 1.5 years and older in the general population. It provides detailed quantitative information on food consumption, nutrient intakes, nutritional status and related characteristics in the general population.

Data from the National Diet and Nutrition Survey (2008/09 to 2010/11)[18] show that the mean daily intake of total energy for children aged 1.5 to 3 years is 1,137 kcal. It is 1,555 kcal for children aged 4 to 10 years, 1,791 kcal for children aged 11 to 18 years, 1,882 kcal for adults aged 19 to 64 years and 1,690 kcal for adults aged 65 years and over. The latest estimates of energy requirements made by the Scientific Advisory Committee on Nutrition are based on accurate measures of total energy expenditure in the general population. However, people who are less active than the reference group will require less energy from their diet. The average energy intake reported in dietary surveys in the UK is lower than that recommended by the Scientific Advisory Council on Nutrition; however, the majority of people consume more calories than they need and there is no evidence of inadequate energy intakes at a population level. The mismatch between reported energy intake and requirements may be at least partially explained by people under-reporting food consumption and perhaps also over-reporting levels of physical activity. The challenges of accurately measuring diet and physical activity are discussed elsewhere in this chapter.

In 1991, the Committee on Medical Aspects of Food Policy (the predecessor to the Scientific Advisory Council on Nutrition) recommended[19] that total fat should provide no more than 35% of food energy, and saturated fat and 'non milk extrinsic sugars'[20] should each provide no more than 11% of food energy.

Consumption of high fat, high sugar foods and drinks can contribute to excess energy intake which increases the risk of weight gain and obesity, the main risk factor for type 2 diabetes. Epidemiological studies have suggested that energy-dense dietary patterns, characterised by the consumption of foods and beverages that are high in fat and sugar and low in nutrients and fibre, are associated with obesity.[21] Sugar-sweetened beverages, for example, can contribute to the consumption of excess calories in children.

A systematic review of the association between body weight and the intake of sugar-containing foods and beverages, commissioned by the World Health Organization,[22] found that reducing sugar intake in adults without imposing any other food restriction led to a decrease in body weight. Similarly, evidence investigating the effect of increasing sugar intake showed that body weight increased.

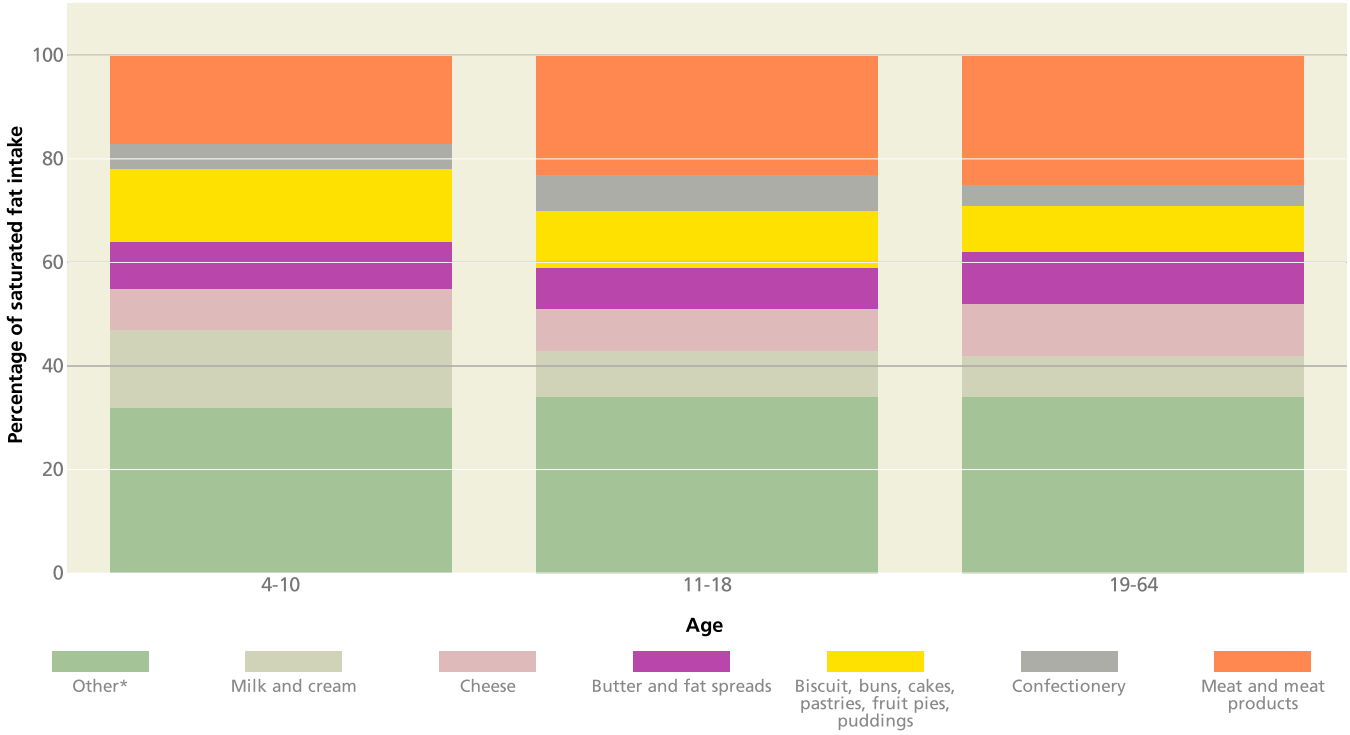
Data from the National Diet and Nutrition Survey (2008/09 to 2010/11) show that people in the UK generally eat more saturated fat and added sugar than is recommended by the Scientific Advisory Committee on Nutrition. However, reported total fat intakes are in line with recommendations, providing 34–36% of food energy across all age groups.

For males and females in all age groups, the mean intake of saturated fatty acids exceeded the level recommended by the Scientific Advisory Committee on Nutrition. Mean intakes of saturated fatty acids provided 13.3% of food energy for children aged 4 to 10 years, 12.6% for children aged 11 to 18 years, 12.7% for adults aged 19 to 64 years and 14.2% for adults aged 65 years and over. Figure 5.5 shows that the largest contributors to saturated fat intake are meat and meat products, milk and dairy products, butter and fat spreads, and biscuits, buns, cakes, pastries and fruit pies. The "other" food group in Figure 5.5 includes vegetables, fish and fish dishes, eggs and egg dishes, sugars, preserves, other cereal and cereal products, yoghurts, ice creams and dairy desserts, soups, sauces, condiments and beverages.

For males and females in all age groups, the mean intake of added sugars exceeded the level recommended by the Scientific Advisory Committee on Nutrition. Mean intakes of added sugars provided 14.6% of food energy for children aged 4 to 10 years, 15.3% for children aged 11 to 18 years, 12.3% for adults aged 19 to 64 years and 11.4% for adults aged 65 years and over. Figure 5.6 shows the largest contributors to added sugar intake, with soft drinks being the largest contributor in school-aged children. The "other" food group in Figure 5.6 includes other cereal and cereal products, yoghurts, ice creams and dairy desserts, fruit and vegetables, meat and meat products, fish and fish products, soups, sauces and condiments.

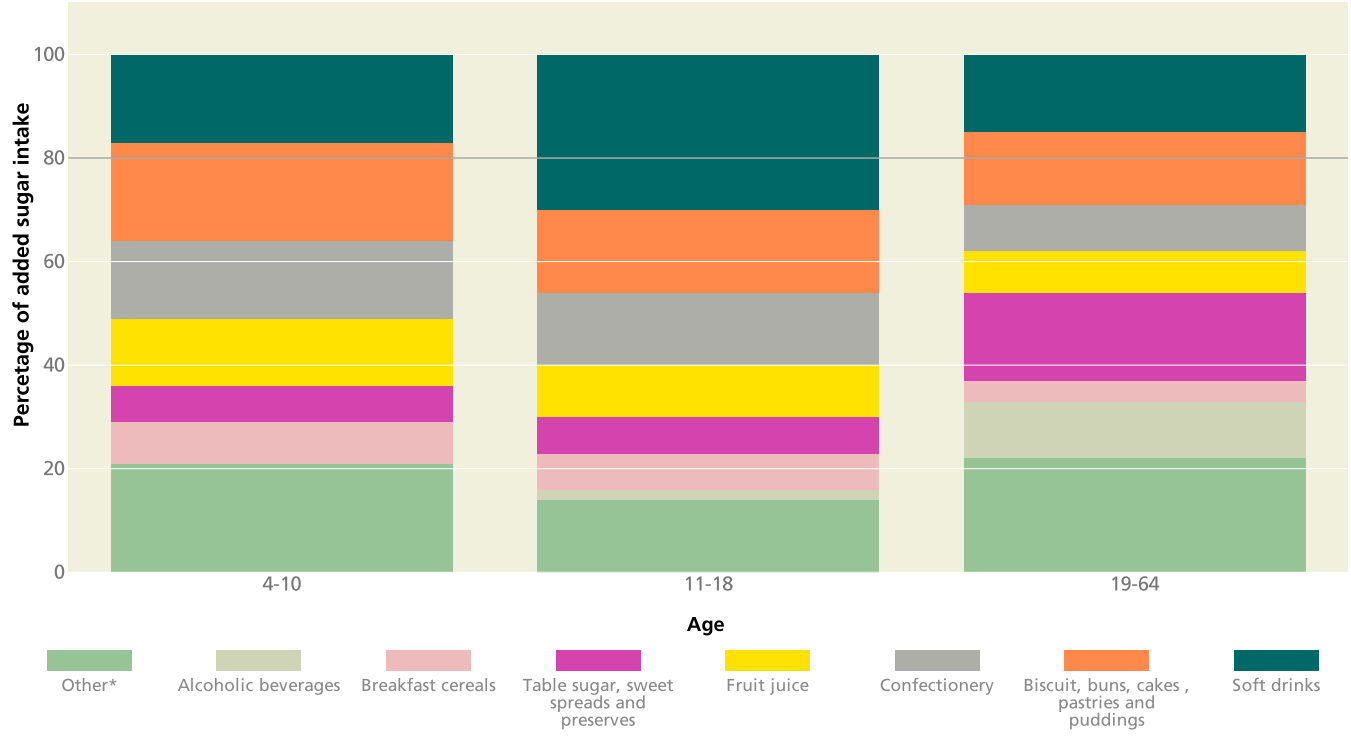
The Scientific Advisory Committee on Nutrition, which advises government on issues relating to nutrition, is currently undertaking a review of the evidence on carbohydrates and health, including sugars and sources of sugar. A report is due to be published in 2015.

Figure 5.5: Mean percentage of saturated fat intake derived from different food groups by age, UK, 2008/09 to 2010/11



Source: Bates, B., Lennox, A., Prentice, A., Bates, C., & Swan, G. (Eds.). (2012). National Diet and Nutrition Survey: Headline results from Years 1, 2 and 3 (combined) of the Rolling Programme (2008/09 – 2010/11).

Figure 5.6: Mean percentage of added sugar (non milk extrinsic sugar) intake derived from different food groups by age, UK, 2008/09 to 2010/11



Source: Bates, B., Lennox, A., Prentice, A., Bates, C., & Swan, G. (Eds.). (2012). National Diet and Nutrition Survey: Headline results from Years 1, 2 and 3 (combined) of the Rolling Programme (2008/09 – 2010/11).

Fast food and deprivation

In England, there is widespread access to cheap, palatable, energy-dense food lacking in nutritional value. The association between food availability and obesity is not yet fully understood.[23] Evidence from high-income countries has shown that the level of fast food consumption is an independent predictor of obesity.[24]

Figure 5.8 shows wide variation in the density of fast food outlets per 100,000 population at upper tier local authority level. Data on the location of fast food outlets in England were obtained from Ordnance Survey InterestMap™,[25] which provides location details of businesses, leisure sites and geographical features in the UK. Three sub-groups[26] have been combined to produce the map: fast food and takeaway outlets, fast food delivery services, and fish and chip shops. These national level data are updated regularly, and up-to-date local-level data are maintained by local authority environmental health departments.

Figure 5.7 shows a strong association between the density of fast food outlets and deprivation at lower tier local authority level. Obesity is closely associated with deprivation, so it is likely that the areas with the highest prevalence of obesity are also likely to have the highest density of fast food outlets, though these observational data give no evidence of causation.

The idea of attempting to influence the prevalence of obesity by reducing the rate of increase of fast food outlets has been examined in work by Public Health England[27] and others.[28] There are also some examples of innovative local practice involving fast food outlets.

In Gateshead, the environmental health service has worked with the local public health team to carry out a survey of takeaway food. Samples of two standard meals were taken from almost 200 independent takeaway restaurants and a full range of nutrients measured. The analysis identified large portion sizes and poor nutritional composition, with high levels of energy and fat. The businesses have been informed of the results of the study, and the council is using the findings to raise awareness of the poor nutritional quality of much of the fast food available locally.

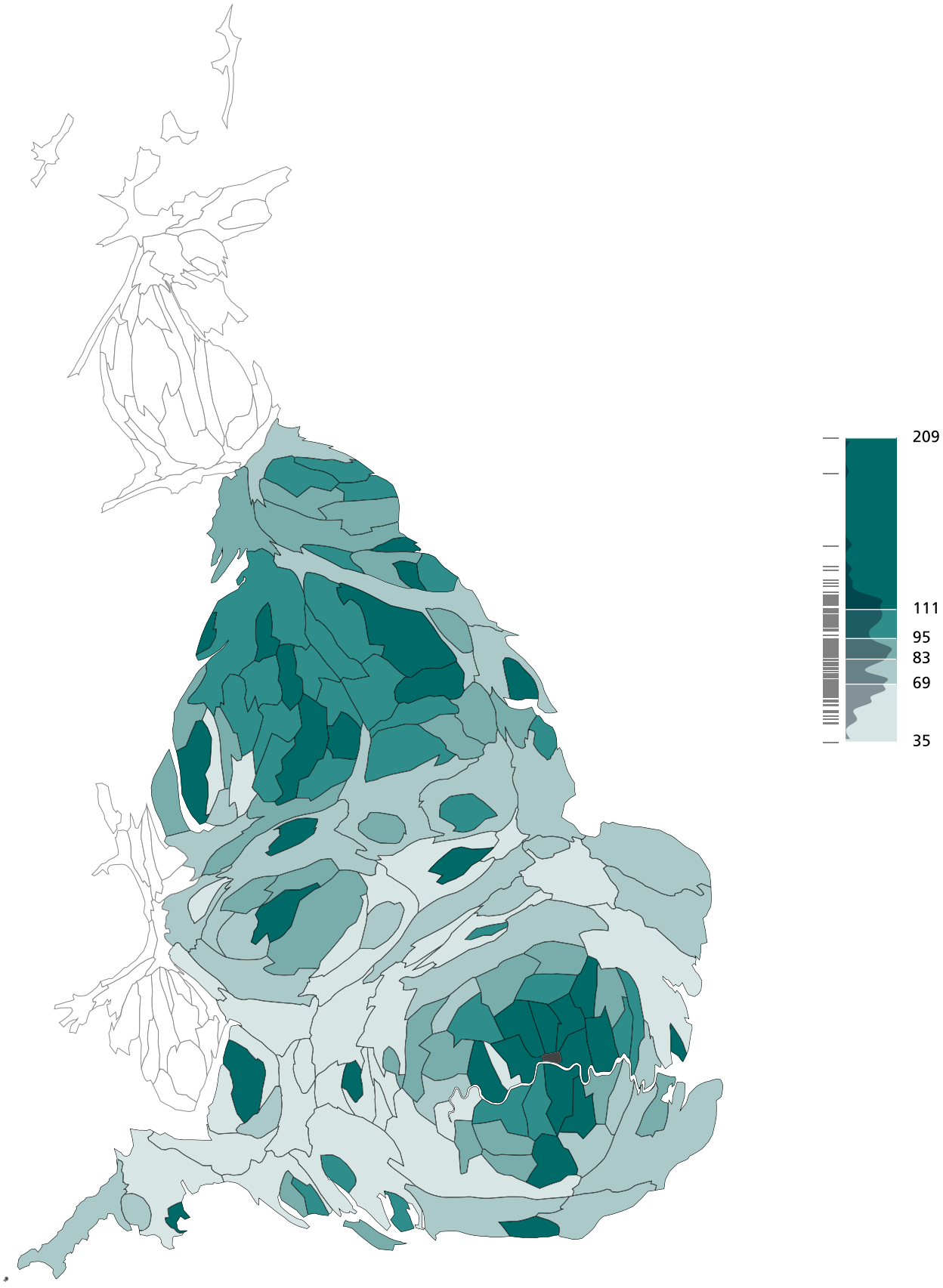
In South Tyneside, environmental health officers are beginning to use local data on fast food outlets to work with elected members and council officers to raise awareness of the association between deprivation and the availability of cheap, palatable, energy-dense food lacking in nutritional value.

These examples demonstrate the role that environmental health teams can play in helping to improve the local food environment and population health.

Figure 5.7: Association between fast food outlets per 100,000 population and deprivation by lower tier local authority, England, 2013

Source: OS InterestMap™ May 2013 (Provided by Public Health England); Indices of Deprivation 2010; DCLG / ONS mid-year population estimates 2010

Figure 5.8: Number of fast food outlets per 100,000 population by upper tier local authority, England, 2013



Source: OS InterestMap™ May 2013 (Provided by Public Health England)

Physical activity

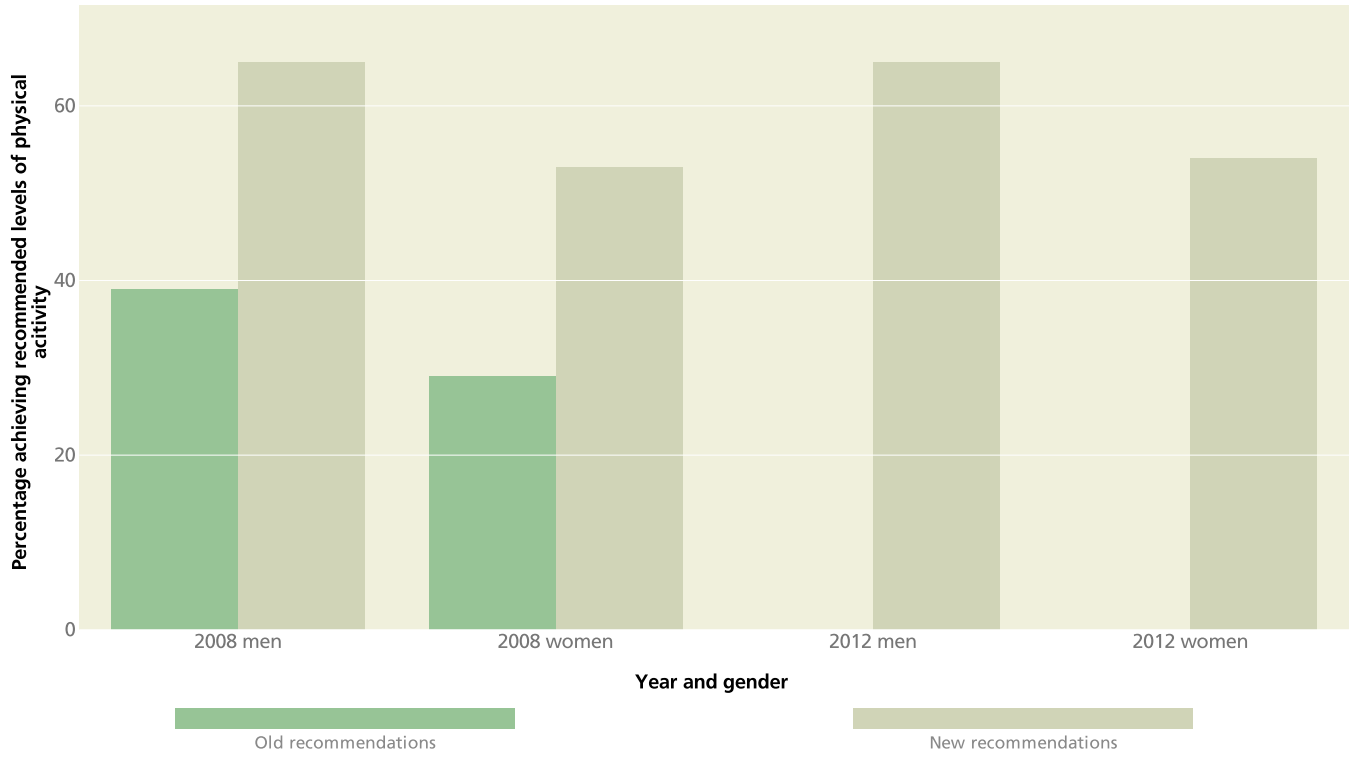
The Chief Medical Officers of England, Scotland, Northern Ireland and Wales published updated physical activity guidelines in 2011.[29] While the total duration of activity recommended remained the same as before (a minimum of 150 minutes of moderate intensity activity per week, in place of five sessions of 30 minutes per week), the new guidelines presented more ways for people to achieve recommended levels of physical activity, including accumulating 10-minute bouts, and counting time spent in vigorous activity as worth twice that spent on moderate activity.

This has led to changes in the interpretation and analysis of physical activity data that have resulted in a substantial increase in the reported prevalence of people assessed as sufficiently active. When the 2008 data from the Health Survey for England are re-analysed using the new recommended activity levels, the proportion of males reported as achieving recommended levels of physical activity increases from 39% to 65%, and the proportion of women achieving the recommended levels increases from 29% to 53% (see Figure 5.9). These increases merely reflect changes in analytical approach, not genuine changes in physical activity. When the survey data are re-analysed alongside those of previous years using the same analytical approach, it is clear that the level has remained unchanged between 2008 and 2012.

These re-analyses used the most comparable figures between 2008 and 2012, however some correction had to be applied. The Health Survey for England 2008 asked about occupational activity on a typical workday and on the number of days the participant had worked in the previous four weeks and assumed that each activity mentioned occurred on every day worked. These estimates are likely to overestimate the contribution of occupational activity, and so the methodology was changed for analysis of the 2012 data. In order to make the data comparable the 2008 data was re-analysed to include walking only for adults who reported walking at a fairly brisk or fast pace.

In conclusion, the 2011 revision to the CMO physical activity guidelines has led to changes in the approach for analysing national activity datasets. Although this has resulted in an apparent increase in reported activity, in fact the levels have not increased since the last time physical activity was measured in the same survey. Physical activity remains extremely important for life-long health, and the revised figures should not encourage complacency about the continued need to promote and support activity across the population.

Figure 5.9: Percentage of men and women achieving previous and new CMO-recommended levels of physical activity, England, 2008 and 2012



Source: Health Survey for England

Non-alcoholic fatty liver disease

Non-alcoholic fatty liver disease (NAFLD) is caused by accumulation of fat in cells inside the liver. It is one of the commonest forms of liver disease in the UK, and obesity is an important risk factor for the condition: over 66% of overweight people, and over 90% of obese people, have NAFLD.[30]

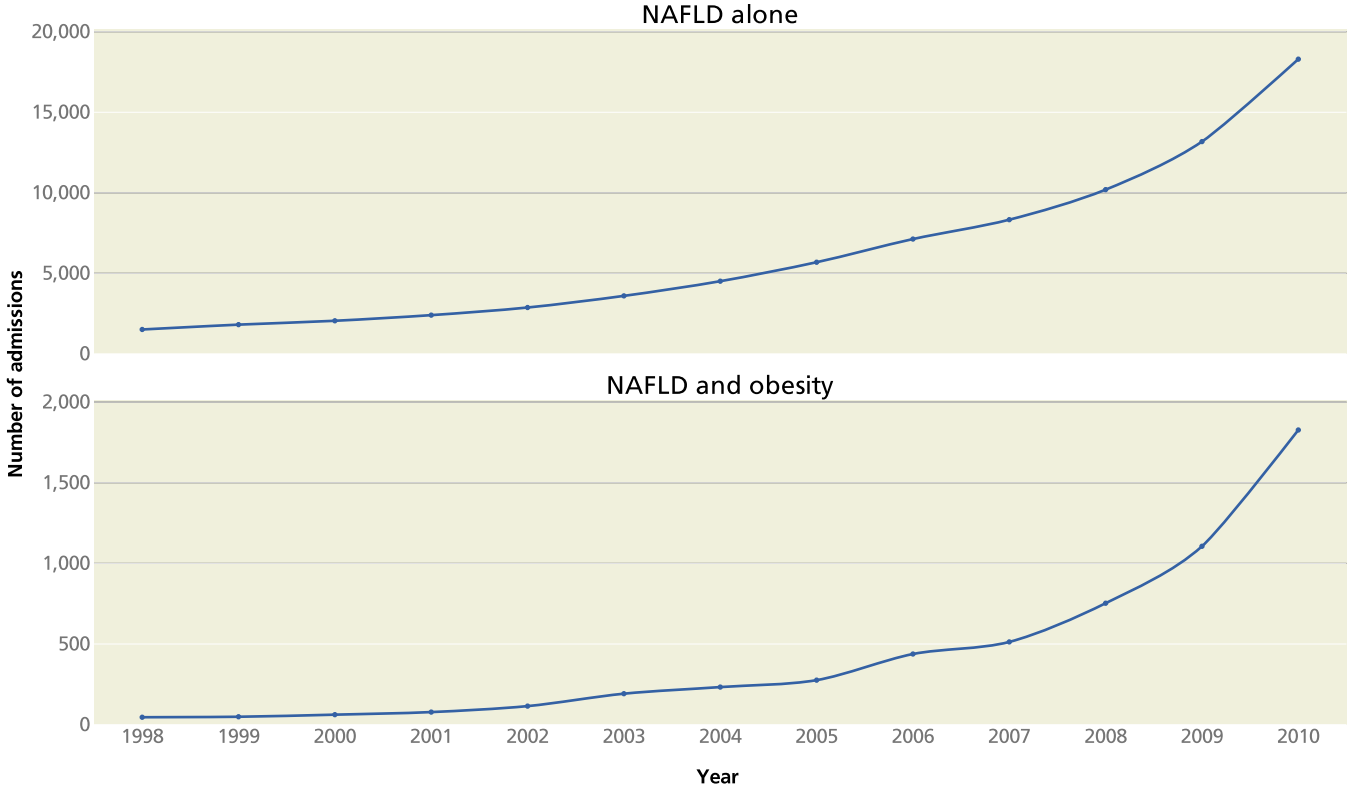
Most people with NAFLD have a benign form known as steatosis. However, in a small proportion of people, this will progress to a rarer, more serious form known as non-alcoholic steatohepatitis, in which the accumulation of fat within the liver cells is accompanied by liver inflammation and fibrosis. In some people this fibrosis may in turn lead to cirrhosis, which can cause severe liver damage and may, in some cases, lead to a form of primary liver cancer known as hepatocellular carcinoma.

It is unclear why some people progress from steatosis to non-alcoholic steatohepatitis. Many people with NAFLD have no symptoms, and so may remain undiagnosed, or may be diagnosed only after non-alcoholic steatohepatitis has developed. Unlike steatosis, non-alcoholic steatohepatitis is associated with increased mortality.

Analysis of hospital admissions for obesity-related conditions and NAFLD in England shows a 10-fold increase in the number of admissions for obesity since 1998 but a 12-fold increase in the number of admissions for NAFLD. Figure 5.10 shows a year-on-year increase since 1998 in the number of admissions both for NAFLD alone, and for obesity and NAFLD combined. In 1998, there were 21,754 admissions that included a diagnosis of obesity, and 0.2% of these had both obesity and NAFLD as a diagnosis upon admission. In 2010, there were 219,407 admissions that included a diagnosis of obesity, 0.8% of which had both obesity and NAFLD as a diagnosis upon admission. It is not possible to demonstrate a causal link between the two factors described from these data, but it is likely that the rise in NAFLD has been largely driven by the increase in obesity since the late 1990s. Although there may be a degree of additional case finding in the light of increased awareness of NAFLD, Figure 5.10 gives an indication of the probable increase in the prevalence of NAFLD across the population in recent years.

The relationship between NAFLD and obesity could be better understood with an improved collection of NAFLD data in both primary and secondary care, and through death certification; this would allow for a more comprehensive understanding of its prevalence and the identification of individuals at risk of complications.

Figure 5.10: Number of NAFLD- and obesity-related hospital admissions by diagnosis, 1998-2010, England



Source: Hospital Episode Statistics, Health and Social Care Information Centre

Chapter author's commentary:

The challenges of dietary and physical activity surveillance

Surveillance of the physical activity, diet and nutritional status of populations is an important component of a public health approach to informing nutrition policy, promoting a healthy lifestyle and reducing obesity. Data on physical activity, dietary intake and nutritional status can help improve the targeting of interventions, while trend data can show the impact of policies over time.

The measurement of dietary intake and nutritional status is complex and presents significant challenges. A number of different methods can be employed depending on the objectives of the study, the characteristics of the study group and the resources available. In the context of public health nutrition, self-report methods are commonly used to collect dietary intake data, primarily because they are less resource-intensive than biochemical tests or observational methods and therefore facilitate studies with large sample sizes. Self-report methods rely on the accurate reporting of food intakes by a sample of individuals within a population and may be subject to sources of random and systematic error. Several approaches can be used to minimise errors, such as validating data collection instruments against laboratory tests, and adjusting findings by weighting them to correct for errors.

Until the development of motion sensors, such as accelerometers (which measure movement in three dimensions) and pedometers (which measure steps taken), the most frequently used assessment method for physical activity was self-report. As a consequence, there are many self-report approaches in use, including questionnaires, diaries and log books, with a great variation in reliability and validity. Their reliance on recalling activity from memory can be problematic, especially for children. However, they are extremely useful for providing information on the type and context of physical activity – information which is not available through more direct assessment methods. Despite these limitations, as with diet, self-report tools remain the most cost-effective option for population-level surveillance, and the most practical option for most public health evaluations of physical activity. As long as the same questions are used over time, this approach is likely to lead to useful trend data; even if the measure itself may be biased in some way, the bias is likely to be consistent over time.

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Chapter 6

Cancer trends

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Overview

Cancer is a major contributor to mortality in England. Around 25% of all deaths are attributable to cancer,[1] and it is the most common cause of death for people who die before the age of 75.[2] Between 1985 and 2010 the reported incidence of cancer increased by 15.1%, yet over a similar period (1985 to 2011) cancer mortality decreased by 26.3%. An understanding of the patterns and causes of these changing trends could enable improvements to be made in primary prevention and secondary interventions, thereby reducing mortality.

This chapter presents a novel analysis of changes in reported cancer incidence and mortality over time, based on data included in the Annual Report of the Chief Medical Officer 2011.[3] The techniques used have not been widely applied in this way to English cancer surveillance data before, and the analysis presented cannot be considered definitive, but may be useful to help describe and understand recent cancer trends.

Between 1985 and 2010, there was a continuous reduction in cancer mortality; the fall in incidence of cancers associated with high mortality (such as lung cancer in males) and improvements in diagnostic speed and treatment as a result of national initiatives are probably major factors contributing to this reduction.

There is long-standing variation in cancer mortality between populations living in areas with different levels of deprivation. An analysis of the most recent five years of data (2006 to 2011) shows a 0.7% per annum decrease in cancer mortality among those living in the most deprived areas, compared with a 1.6% per annum decrease among those living in the least deprived areas.

It has been estimated that 42.7% of cancers diagnosed in the UK in 2010 were attributable to potentially avoidable identified environmental risk factors. The five environmental risk factors to which the greatest proportion of cancers were attributed were: tobacco smoking (19.4%), overweight and obesity (5.5%), deficit in fruit and vegetable consumption (4.7%), excess consumption of alcohol (4.0%) and occupation (3.7%). It should be noted that there is a great degree of uncertainty in analysis of this type, and it is not necessarily true that all of these cancers could have been avoided. Exposure to many of these risk factors is more common among those living in more deprived areas than among those living in more affluent areas. For example, those living in deprived areas are more likely to be obese, and are more likely to use tobacco. This suggests that living in a more deprived area may be indirectly associated with a higher risk of cancer. However, it should be noted that some cancers, such as breast cancer, are more common in the more affluent population.

Smoking is the main risk factor for lung cancer. It is estimated[4] that 87.3% of lung cancers in males and 83.6% of lung cancers in females can be attributed to smoking. It is likely that lung cancer incidence will mirror the historical changes in smoking prevalence: lung cancer incidence in females will rise, followed by a much slower decrease than that seen in males, with incidence eventually becoming equal between the sexes.

For liver cancers diagnosed in the UK in 2010, it is estimated that 9.1% can be attributed to excess alcohol consumption and 15.9% to infections. Data from the General Lifestyle Survey[5] indicate that weekly alcohol consumption increased in the 1990s to reach a peak in the period 2000 to 2002; since that time it has fallen in both sexes. Therefore, depending on the latency period, the incidence of alcohol-related cancers may be reaching its maximum at present, and could fall in the future.[6] However, the growing prevalence of obesity (another risk factor for liver cancer) and changes in the prevalence of viral hepatitis may result in an increase in liver cancer in the future.

Of the new cases of melanoma seen in 2010, 89.8% of cases in males and 82.4% of cases in females can be attributed to excessive exposure to ultraviolet light, with recreational sun exposure having been shown to be the dominant pattern associated with melanoma risk. The change in holiday patterns and attitudes to recreational sun exposure since the mid-20th century may explain the increasing numbers.

There is now substantial evidence that persistent infection with some types of human papillomavirus (HPV) can lead to the development of several types of genital cancers (including cervical cancer) and oral cancers, equating to over 5,000 cancer cases per year.[7] While cervical cancer incidence reduced between 1985 and 2010 for most age groups, for females aged 0–24 it increased by an average of 1.5% per annum. Many other cancers associated with HPV infection also increased during this period.

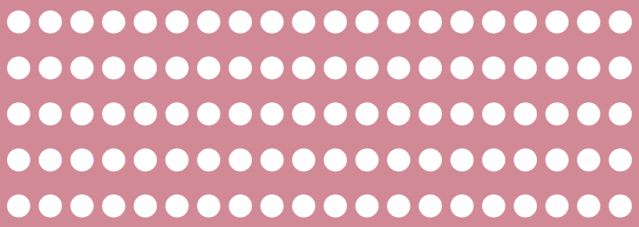
The line graphs in this chapter show only modelled data based on Joinpoint analysis.

The full statistical methods for this chapter and full results of the analysis are available online at the Department of Health webpages at https://www.gov.uk/government/organisations/department-of-health.

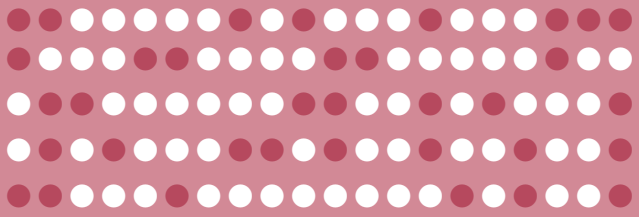
Based on statistics for all types of cancer…

1985

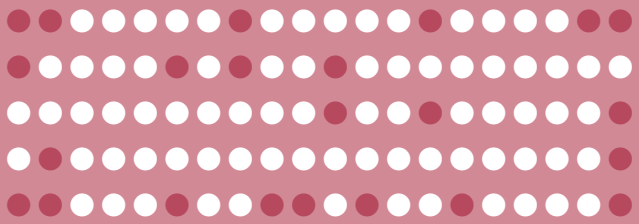
out of 100 average people…



35 were diagnosed with cancer

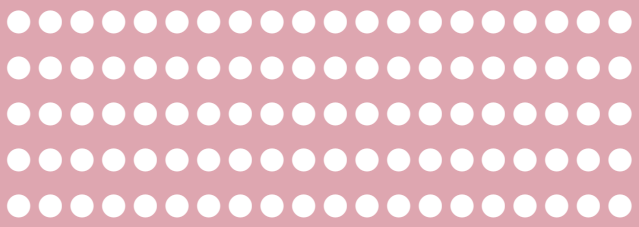


23 died of cancer

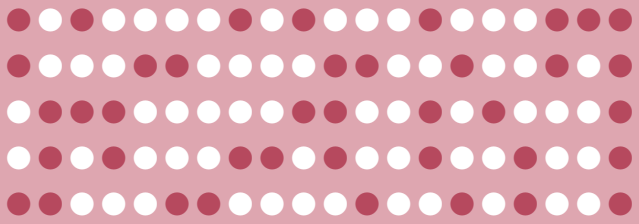


2010

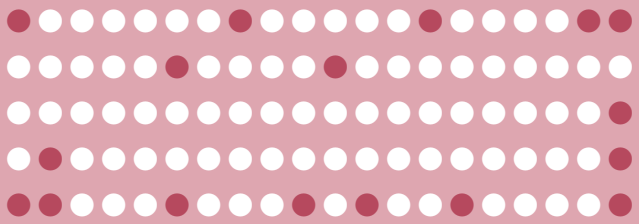
out of 100 average people…



40 were diagnosed with cancer



17 died of cancer



More people are being diagnosed with cancer, but fewer people are dying of it

Services for cancer diagnosis and treatment have improved

There are fewer cases of cancers which often kill quickly (e.g. lung cancer in men)

All cancers

From 1985 to 2010, the incidence of cancer in England increased by 0.6% each year. Decreases in the incidence of a number of cancer types (particularly smoking-related cancers in men) were masked within this overall figure by increases in the incidence of other cancer types. It has been estimated that 42.7% of cancers diagnosed in the UK in 2010 were attributable to 14 potentially modifiable lifestyle and environmental risk factors. The five to which the greatest proportion of cancers were attributable were: tobacco smoking (19.4%), overweight and obesity (5.5%), deficit in fruit and vegetable consumption (4.7%), excess consumption of alcohol (4.0%) and occupation (3.7%).[14] These figures probably underestimate the full impact of these risk factors, since attributions of cancer deaths to risk factors were made only where there was an extremely high level of confidence that they were causally implicated. However, there is a great degree of uncertainty in analysis of this type and this would not necessarily equate to 42.7% of cancers being avoidable.

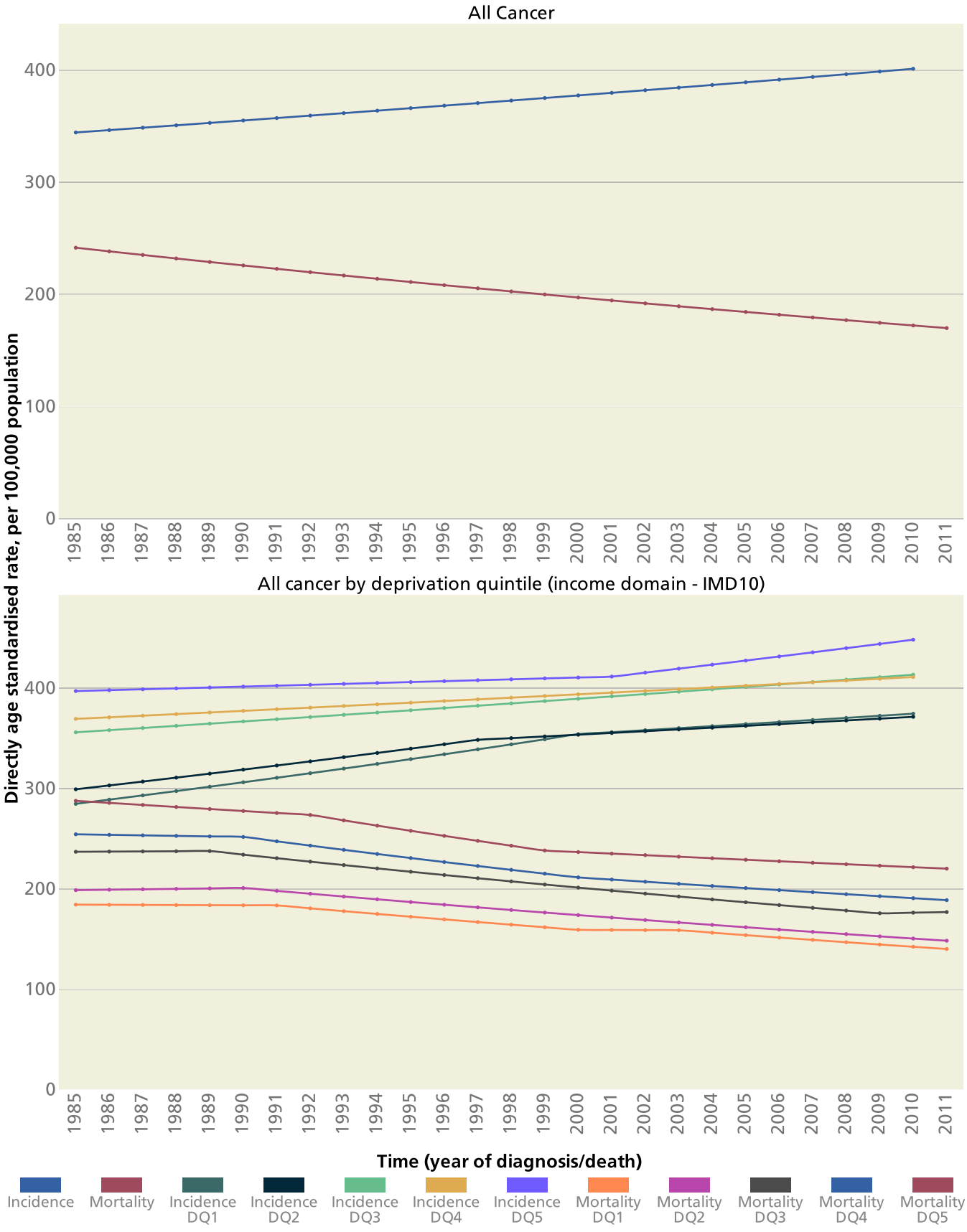
From 1985 to 2010, there were three distinct trends in cancer mortality in England. From 1985 to 1991, the annual reduction in cancer mortality was relatively small (0.4%). This was followed by a substantially greater annual reduction until 1999 (1.8%), which was followed by a slightly lesser annual reduction (1.2%) until 2011. The continuous reduction in cancer mortality throughout the period was probably due in part to a fall in the incidence of cancers associated with high mortality (such as lung cancer in males) and partly to improvements in diagnostic speed and treatment. The particularly rapid reduction seen in the 1990s may have been due to the impact of the Calman-Hine Report (1995),[15] which led to rapid improvement in previously sub-optimal care and also drove sustained, incremental improvement across cancer care in the NHS.[16] Subsequent initiatives, such as the Cancer Reform Strategy,[17] are also likely to have contributed to the continued reduction in mortality.

Despite the continuous reduction in cancer mortality since 1985, appropriate international comparisons[18] of data from 1995 to 2007 show that survival of lung and colorectal cancers in both sexes, and breast and ovarian cancers in females, remained below that in Australia, Canada and Sweden.

There is long-standing variation in cancer mortality between populations living in areas with different levels of deprivation (as defined by the IMD10 income domain).[19] An analysis of the most recent five years of data (2006 to 2011) shows a 0.7% per annum decrease in cancer mortality among those living in the most deprived areas, compared with a 1.6% per annum decrease among those living in the least deprived areas. The data presented here do not allow for an examination of why this is occurring. It may be that we are seeing the impact of a historical period where risk factors (e.g. tobacco use) for cancers with low survival rates reduced faster in the least deprived; it may be due to differences in access to care, particularly late presentation to services; or there may be multiple other factors.

Successive governments have introduced strategies to reduce inequalities in cancer outcomes;[20,21] understanding the reasons for the widening of the variation in mortality between the least and most deprived areas despite these strategies would help to inform future policy.

Figure 6.1: Trends in incidence and mortality of all cancers, England, 1985 to 2011



Source: Best fitting modelled data based on Joinpoint analysis. Underlying data from NCDR, provided by PHE (WM KIT). Joinpoint analysis by Dr Eleanor Curtis and Dr Tom Fowler. Incidence excludes ICD-10 C44 (non melanoma skin cancer)

Smoking-related cancers

Lung cancer incidence and mortality are higher in males than in females, and higher in the 75 and over age group than in the under-75 age group. Between 1985 and 2010, the difference in lung cancer incidence between the under-75 age group and the 75 and over age group increased. Between 1985 and 2010, lung cancer incidence in females increased faster in the 75 and over age group (2.3% per annum) than in the under-75 age group (0.2% per annum). Over the same period, the incidence in males decreased faster in the under-75 age group (2.7% per annum) than in the 75 and over age group (1.8% per annum). As mortality is high and median survival times are short for those diagnosed with lung cancer, the patterns of mortality largely reflect those of incidence.

Smoking[a] is the main risk factor for lung cancer. It is estimated[22] that, in 2010, 87.3% of lung cancers in males and 83.6% of lung cancers in females could be attributed to smoking. The latency period between smoking uptake and lung cancer is at least 20 years.[23,24] Current patterns of lung cancer for both sexes in the under-75 and 75 and over age groups reflect historical patterns of smoking.

In 1948 the prevalence of cigarette use in males was 65%, with 82% using some form of tobacco. The prevalence of cigarette use decreased rapidly from around 1970 (55%) to the mid-1990s (27%). Thereafter the decrease slowed, and in some years of the latter half of the 2000s halted. In 2010, the prevalence of cigarette use in males was 21%.[25,26,27]

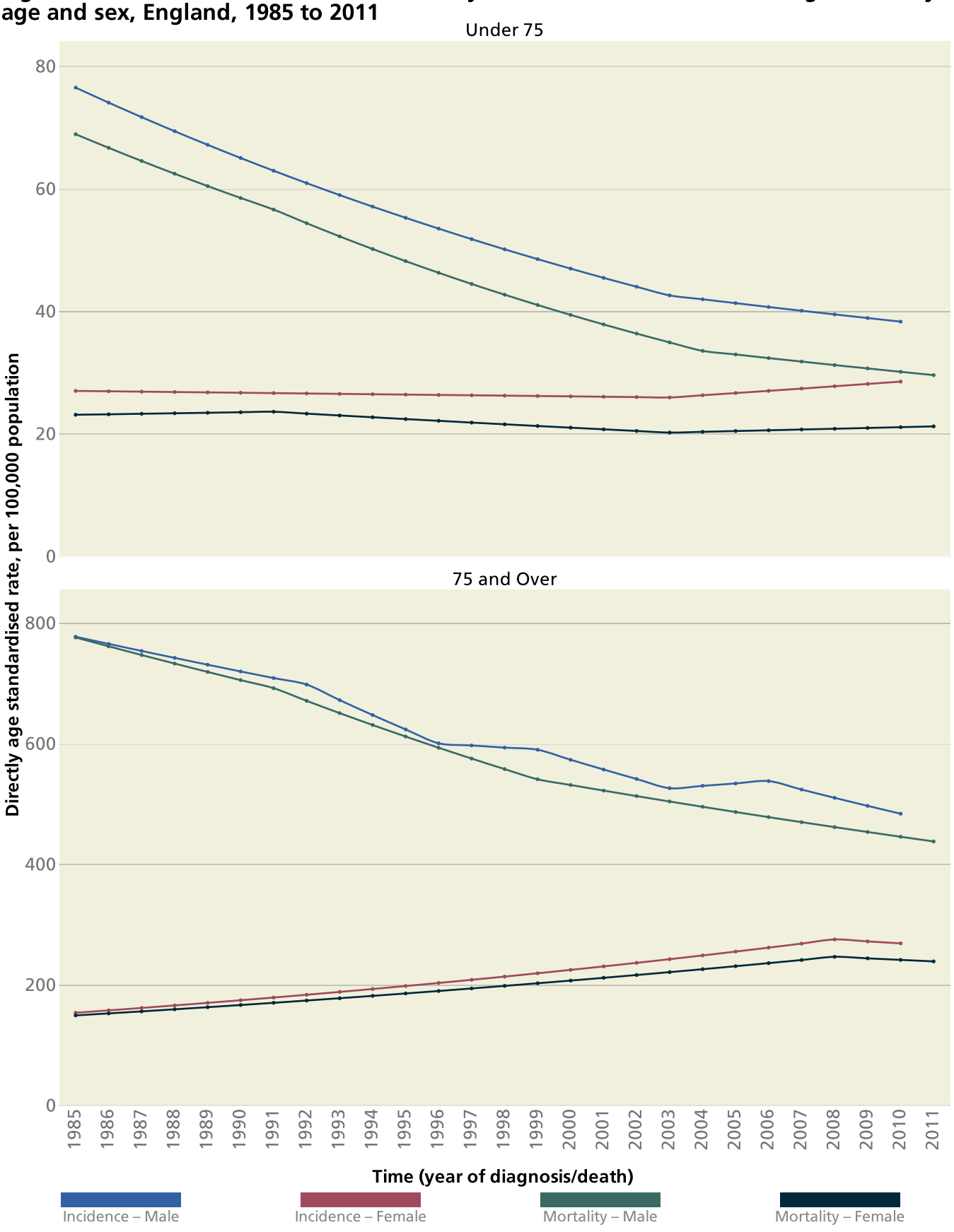
The prevalence of cigarette use in females has followed a different trend. Prevalence remained approximately constant from 1948 (41%) to 1970 (44%), then decreased, stabilising again at around 20%–21% in the latter half of the 2000s (20% in 2010).[28,29,30] The General Lifestyle Surveys carried out in 2008 and 2010 showed no significant difference between smoking prevalence in males and females.[31,32] It is likely that lung cancer incidence will mirror the historical changes in smoking prevalence: lung cancer incidence in females will rise, followed by a much slower decrease than that seen in males, with incidence eventually becoming equal between the sexes.

Analysis by Cancer Research UK suggests that since 1986 the prevalence of smoking has been higher among females aged 11–15 than males of the same age, though the degree of variation between sexes is not consistent. In 2011, 5% of females aged 11–15 reported smoking regularly, compared with 4% of males.[33] Given that the incidence of lung cancer is substantially greater in smokers who started smoking before the age of 15 than in those who started smoking at a later age,[34] lung cancer may disproportionately affect women in the future.

The Health Act 2006, which came into force on 1 July 2007, introduced a ban on smoking in most enclosed public premises and enclosed workplaces. As cancer incidence lags several years behind changes in smoking prevalence, any effect of this ban on cancer would not yet be expected to be seen.

[a] In this section, "smoking" refers to tobacco cigarette smoking.

Figure 6.2: Trends in incidence and mortality of trachea, bronchus, and lung cancers by age and sex, England, 1985 to 2011



Source: Best fitting modelled data based on Joinpoint analysis. Underlying data from NCDR, provided by PHE (WM KIT). Joinpoint analysis by Dr Eleanor Curtis and Dr Tom Fowler.

Melanoma

Between 1985 and 2010, melanoma incidence increased continuously and substantially across all age groups, with particularly large increases seen in the 60 and over age groups. The largest increases were seen in males in the 60–79 age group (an average 6.7% increase each year) and males in the 80 and over age group (an average 6.9% increase each year). Given that male sex and older age are associated with poorer five-year survival of melanoma, this trend is likely to be reflected in a continued increase in melanoma mortality.

The increase in incidence is mirrored internationally: recent analyses have reported increasing incidence in many countries populated predominantly by 'fair-skinned peoples'.[35,36] A retrospective registry-based analysis from 29 European cancer registries of data from 1990 to 2007 showed the incidence of melanoma to be rising rapidly, and predicted continued increases.[37] The highest incidence was seen for 'northern and north-western European countries like the UK, Ireland and the Netherlands'.[38] Despite low melanoma incidence among those aged over 70, this age group experienced the greatest increase in risk in Europe during the study period. Incidence remained stable in Norway, yet among males aged 25–49, rates significantly decreased; this provides some evidence that melanoma incidence trends can be reversed.

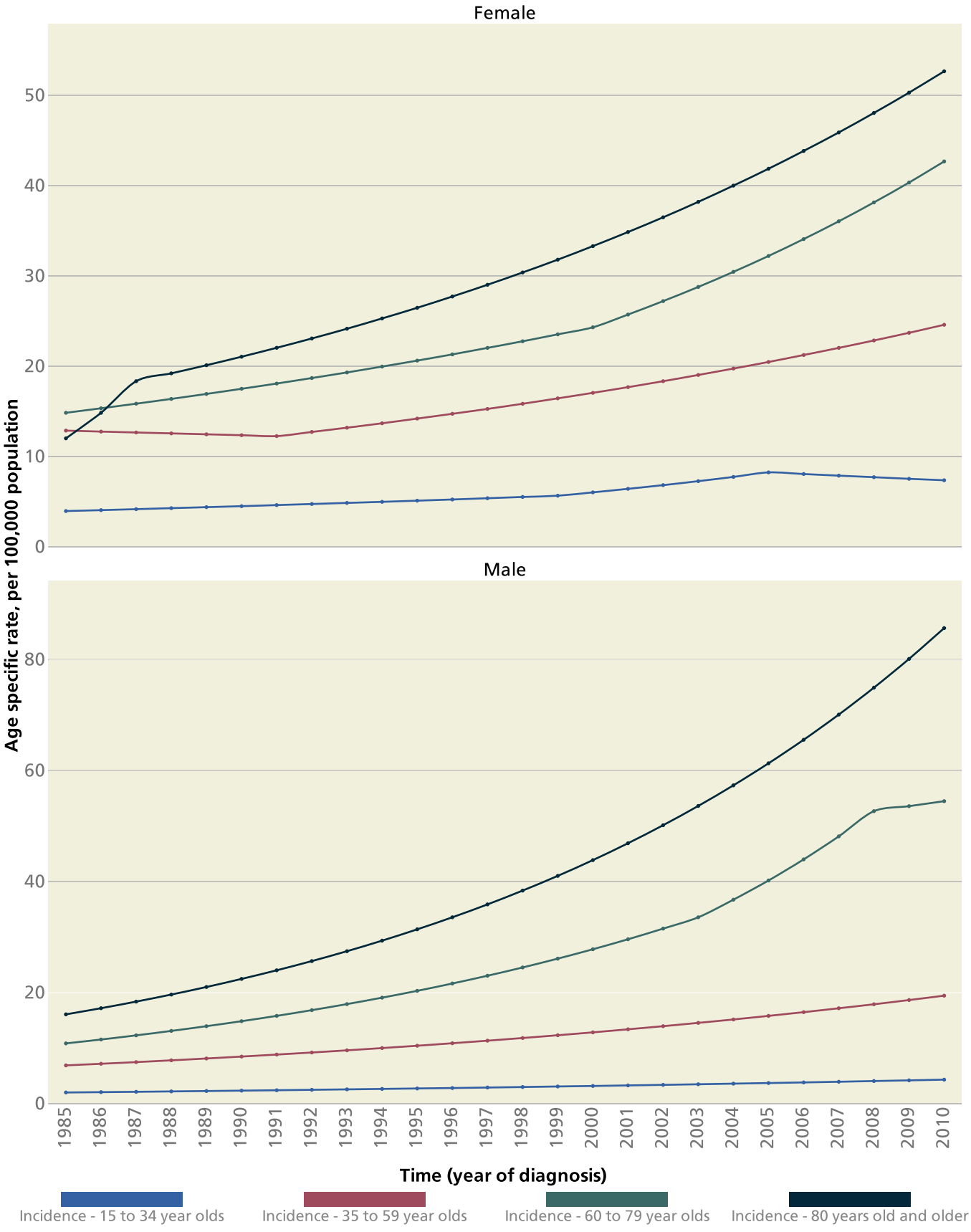
A study of data from 39 cancer registries, including data from Australasia and the USA as well as Europe, showed similar trends: incidence has been rising steadily in generations born up to the end of the 1940s, followed by a stabilisation or decline in incidence for more recently born generations in Australia, New Zealand, the USA, Canada and Norway.[39]

Of the new cases of melanoma seen in 2010, 89.8% of cases in males and 82.4% of cases in females can be attributed to excessive exposure to UV light.[14] Pooled data analysis of 15 case-control studies from around the world showed that recreational sun exposure was the dominant pattern associated with melanoma risk.[40]

It therefore seems likely that the increased incidence in older people in the UK reflects recreational exposure to the sun among people born before the 1950s. The change in holiday patterns and attitudes to recreational sun exposure since the mid-20th century may explain the increasing numbers, though the relative importance of sun exposure and sunburn in adulthood compared with childhood is unclear. Occupational sun exposure is more associated with non-melanoma skin cancers than with melanoma.[41]

UK residents over the age of 60 had significantly less access to sunny holidays abroad, when young, than young people do today. This implies that sunburn after adolescence is likely to have played a causal role. It is possible that there is an association between increasing melanoma incidence and the increasing number of European (non-UK) holidays taken by UK residents (approximately 3 million in 1960 and 43 million in 2010[42]), as these holidays are likely to increase exposure to the sun.

Figure 6.3: Trends in incidence of melanoma by age, England, 1985 to 2010



Source: Best fitting modelled data based on Joinpoint analysis. Underlying data from NCDR, provided by PHE (WM KIT). Joinpoint analysis by Dr Eleanor Curtis and Dr Tom Fowler.

HPV-associated cancers

There is now substantial evidence that persistent infection with some types of human papillomavirus (HPV) can lead to the development of several types of cancer. It has been estimated that, in the UK, in 2010, HPV infection was a causal factor for 100% of cervical cancers, 90.0% of anal cancers, 62.5% of vaginal cancers, 40.0% of vulval cancers, 40.0% of penile cancers, 14.1% of oropharyngeal cancers, 10.6% of laryngeal cancers and 8.0% of oral cavity cancers. This equated to 5,088 cancer cases.[43]

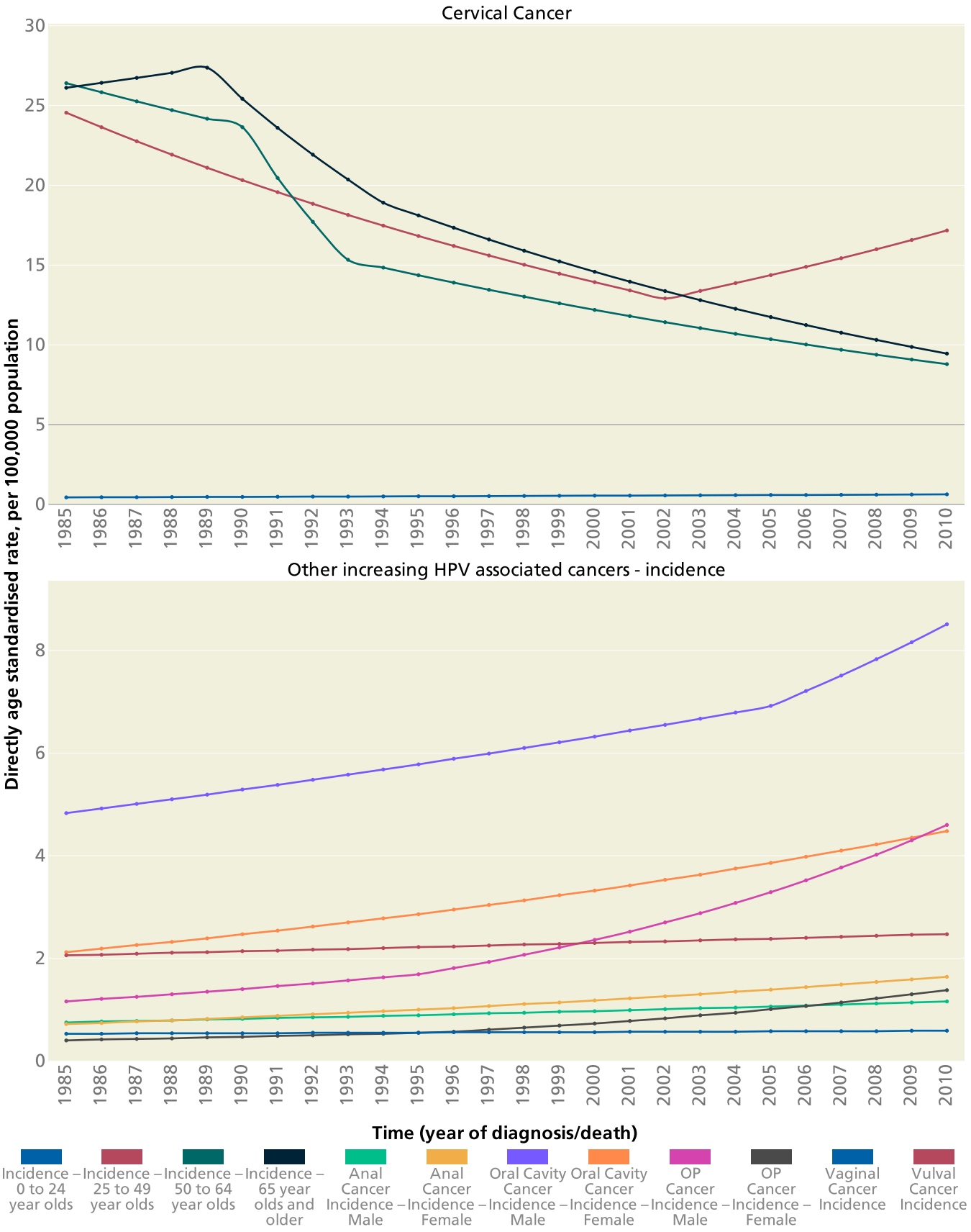
Of the HPV-associated cancers, cervical cancer is both the most closely related to HPV infection and the most common. In 2010, 2,300 new cases of cervical cancer were recorded, and in 2011 around 780 deaths from cervical cancer were recorded. Since the establishment of the Cervical Screening Programme in 1988 (which seeks to detect and treat early abnormalities that could lead to cervical cancer if untreated), incidence has decreased by a third, while mortality has decreased by more than half.

While cervical cancer incidence has reduced for most age groups, for those aged 0–24 it increased by an average of 1.5% per annum between 1985 and 2010. Incidence decreased fastest in the 50–64 age group (4.4% per annum) and the 65 and over age group (4.0% per annum). Incidence for the 25–49 age group also decreased overall between 1985 and 2010 by 1.4% per annum, although this average decrease masks an increase between 2002 and 2010. This increase is thought to be due to changes in patterns of HPV infection. The specific spike in cervical cancer incidence seen in 2008–2009 has been attributed to an increase in diagnosis, as more women presented for screening and with symptoms in this period. This increase in presentation has been linked to publicity surrounding the celebrity Jade Goody's diagnosis of cervical cancer in 2008 and subsequent death from the disease in 2009.[44,45]

The reduction in the incidence of cervical cancer can largely be attributed to the Cervical Screening Programme. For the other HPV-associated cancers – with the exception of laryngeal cancer, which is more often related to smoking – incidence rose between 1985 and 2010. Incidence varies between the different HPV-related cancers and between males and females. Like many of the risk factors that impact on cancer, the latency period between exposure and increased risk is unknown, and may vary between exposures and types of cancer. There is also little data on historical trends in HPV infection in England. Nevertheless, it has been suggested[46] that the increased incidence of HPV-associated cancers at some sites reflects changes in sexual behaviour (e.g. a considerable increase in orogenital contact through the latter half of the 20th century);[47] these changes may have increased the spread of HPV to sites where increases in cancer incidence have been seen.

Since 2008, HPV vaccination has been offered to females aged 12–13 as part of the NHS routine childhood vaccination schedule. It is restricted to females because with high (~80%) coverage in females most cervical cancers caused by HPV types 16 and 18 (and many other HPV-related cancers) will be prevented either directly or by the expected indirect protection brought about by 'herd immunity'. HPV has a role in causing a range of cancers with increasing incidence in males. Immunisation of women creates some herd immunity, yet this provides little protection to some males, such as men who have sex with men. In recognition of this, the Joint Committee on Vaccination and Immunisation has instigated work to review the potential benefit of offering HPV vaccination to certain groups of males.

Figure 6.4: Trends in incidence of HPV related cancers, England, 1985 to 2010



Source: Best fitting modelled data based on Joinpoint analysis. Underlying data from NCDR, provided by PHE (WM KIT). Joinpoint analysis by Dr Eleanor Curtis and Dr Tom Fowler.

Note: 'OP cancer' refers to oropharyngeal cancer

Liver cancer

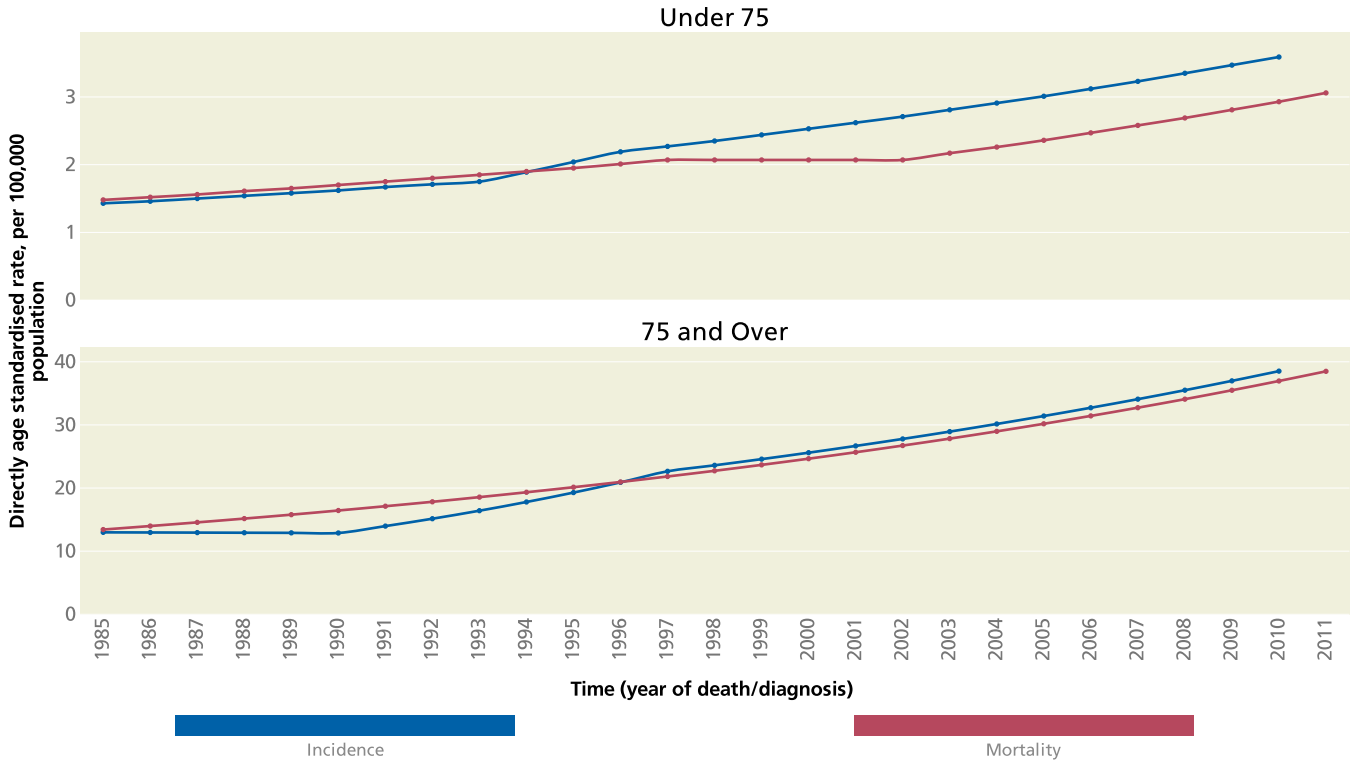
As discussed in Chapter 7 of this report, liver disease (including cirrhosis) is the only major disease category in which incidence is increasing in England while average incidence across the EU15 countries is decreasing.[48] Hepatocellular carcinoma, which accounts for most primary liver cancers, is a consequence of liver cirrhosis. Of liver cancers diagnosed in the UK in 2010, an estimated 9.1% can be attributed to excess alcohol consumption and 15.9% to infections. An equivalent estimate was not calculated for obesity, which is another risk factor for liver cancer.[49]

Incidence and mortality have risen by an average of 4% per year since 1985. This overall figure masks larger annual increases in incidence seen in the mid-1990s.

The latency period between exposure to risk factors and increased risk of liver cancer is not known. However, given the increase over recent decades in the population prevalence of known risk factors such as obesity, and excess alcohol consumption,[50] it is likely that there is some association with the substantial increase in the prevalence of liver cancer since 1985. Data from the General Lifestyle Survey[51] indicate that weekly alcohol consumption increased in the 1990s to reach a peak in the period 2000–2002; it has fallen since that time in both sexes. Therefore, depending on the latency period, the incidence of alcohol-related cancers may be reaching its maximum at present, and could fall in the future.[52] However, the growing prevalence of childhood obesity (and changes in the prevalence of viral hepatitis) may result in an increase in liver cancer in the future.

Despite the increased incidence of liver cancer, many cases are preventable. The evidence suggests that, if measures are taken to reduce the incidence of liver cirrhosis, then the incidence of liver cancer will also fall. In Italy, for instance, improved treatment of viral hepatitis and a reduction in alcohol intake have led to a reduced incidence of liver cancer.[53,54] Action to tackle the three most common causes of liver cirrhosis in England (alcohol, viral hepatitis and obesity) is likely to have similar results.

Figure 6.5: Trends in incidence and mortality of liver cancers by age and sex, England, 1985 to 2011



Source: Best fitting modelled data based on Joinpoint analysis. Underlying data from NCDR, provided by PHE (WM KIT). Joinpoint analysis by Dr Eleanor Curtis and Dr Tom Fowler.

Chapter author's commentary: Statistical methods used in this chapter

The Annual Report of the Chief Medical Officer 2011[8] presented a variety of data for 15 different cancers, including trends in incidence, mortality and risk factors. All the data included in the report were made publicly available to allow for further analysis and re-use. This chapter presents further analysis of age-standardised incidence and mortality data for a number of cancers. This work was undertaken by a Foundation Year 2 (F2) doctor and a public health consultant, exploring changes in cancer trends over time. While they have been supported by the cancer registries, and some of the leading cancer experts in England have provided input into the commentary, at heart this chapter remains their work.

The scope for different types of trend analysis is large; this chapter presents analysis that has used Joinpoint, a statistical software program[9] developed by the US National Cancer Institute. Joinpoint is a tool which can be used to analyse data statistically in order to suggest whether there has been more than one distinct trend in those data over a time period.

Where analysis suggests that more than one trend is present, Joinpoint can be used to estimate the most likely year during which the change from one trend to the next occurs; that is, the 'Joinpoint' between the trends. For each trend observed, the annual percentage change can be calculated. For example, the annual percentage change is 0.6% for all-cause cancer incidence between 1985 and 2010. This indicates that overall cancer incidence increased by 0.6% from the previous year's incidence, every year from 1985. Joinpoint can also be used to calculate an average annual percentage change, describing the average change per year over the whole period.[10] While this approach has been used with data from England in a research setting,[11,12] it is not part of current standard English cancer surveillance analysis.

In applying the statistical models underpinning the Joinpoint software, we make a number of assumptions. These include that change follows a log-linear model and that the simplest model best explains the data. These assumptions may not be accurate, and this can make interpretation of the analysis difficult; over-interpretation must be avoided.

Even policy initiatives or advancements in treatment which have substantial effects on incidence or mortality take time to take full effect, and the time from introduction of the change to observation of effects will vary widely. Therefore care must be taken not to attach too much weight to the specific years identified in this chapter as 'Joinpoints' between trends. However, findings such as identifying distinct phases in trends provide interesting observations to explore.

Tables with complete results of the statistical analysis and a full description of methods are available at the Department of Health webpages at https://www.gov.uk/government/organisations/department-of-health.[13]

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Chapter 7

Liver disease

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Overview

Liver disease was highlighted in the *Annual Report of the Chief Medical Officer 2011* as the only major cause of mortality for which premature mortality was increasing in England while the average for the EU15 countries (the 15 European Union member-states between 1 January 1995 and 30 April 2004) was decreasing. From 2001 to 2012, the majority of premature mortality from liver disease in England and Wales was due to alcoholic liver disease (67%), though non-alcoholic fibrosis and cirrhosis of the liver (20%) and non-alcoholic fatty liver disease (4%) also made substantial contributions.

In 2010, liver disease accounted for an estimated 360,000 hospital bed days and 141,600 potential years of life lost[1]. It accounts for more hospital admissions and deaths in males than in females; analysis[2] indicates that most of the gender variation is related to excess alcohol consumption or chronic hepatitis C infection.

There is considerable geographical variation in liver disease incidence and mortality: both are generally higher in the north than in the south of England. Part of this variation may be explained by underlying deprivation-related variation in liver disease incidence and mortality.[3]

Even this increasing trend may mask the true incidence of liver disease: liver disease is typically asymptomatic, or 'silent', until complications develop at a relatively late stage in the progression of the disease. As a result, patients often present 10–30 years after the first onset of disease.[4] This is problematic: interventional studies have shown that modest changes in exposure to risk factors at an early stage of the disease can result in substantial improvement or complete reversal of liver damage, whereas late presentation has a relatively poor prognosis.

Most risk factors for liver disease are also risk factors for other diseases. For example, excess alcohol consumption is associated with an increased risk of alcoholic liver disease, oral cancers and breast cancers[5,6]; obesity is associated with an increased risk of both non-alcoholic fatty liver disease and coronary heart disease; and unsafe sex is associated with an increased risk of both viral hepatitis and HIV. Reducing these risk factors in the general population is likely to impact positively on the development of these other diseases, as well as reducing the risk of further liver damage in those with undiagnosed early-stage liver disease.

Alcohol consumption per person across the UK population has more than doubled in the last half-century,[7] though this overall figure masks a still more concerning underlying pattern. As the proportion of the population which abstains from alcohol has increased, the increase in consumption per non-abstainer is higher.

The proportion of liver disease mortality related to viral hepatitis remains low. The prevalence of chronic hepatitis B in the UK is also thought to be relatively low,[8] though as the disease is 'silent' until complications occur, it is difficult to quantify with certainty. It is likely that there is considerable geographical variation in prevalence because of the varying patterns of immigration from countries where hepatitis B is endemic. The prevalence of hepatitis C also remains relatively low, though there is a clear increasing trend despite the advent of much more effective treatments over the last two decades. This is probably attributable in part to the reservoir of hepatitis C among those who are unaware that they have a chronic hepatitis C infection until complications develop; conservative estimates suggest that this may include 80,000 people, or half of those infected with chronic hepatitis C.

The risk factors for liver cancer are largely the same as for other liver diseases, and the incidence of liver cancer has increased in tandem with the increase in other liver diseases. However, the geographical variations in liver cancer mortality differ from those in other liver diseases, with the areas of highest mortality found in London.[9] The reasons for this pattern are not fully understood. Since patterns of liver disease differ between ethnic groups, differences in the makeup of populations in different areas may play a part. Alternatively, the underlying causes of liver cancer may vary by area.

This chapter presents data on liver disease mortality, alcohol consumption, hepatitis B, hepatitis C and liver cancer. There is further discussion of hepatitis B and C in prisons in Chapter 3, and discussion of non-alcoholic fatty liver disease in Chapter 5. Data on trends in liver cancer incidence and mortality are analysed in Chapter 6.

Typical result of asking 100 average men and women:

'What is the most you drank in one night last week?'

33%
Drank more than recommended limit

27%
Drank within recommended limit

40%
Did not drink alcohol last week

Typical unit content of drinks

Bottle of wine
9 units

Double measure of spirits
2 units

Pint of lager
2 units

Men should not regularly exceed 3-4 units of alcohol per day

Women should not regularly exceed 2-3 units of alcohol per day

Liver disease mortality

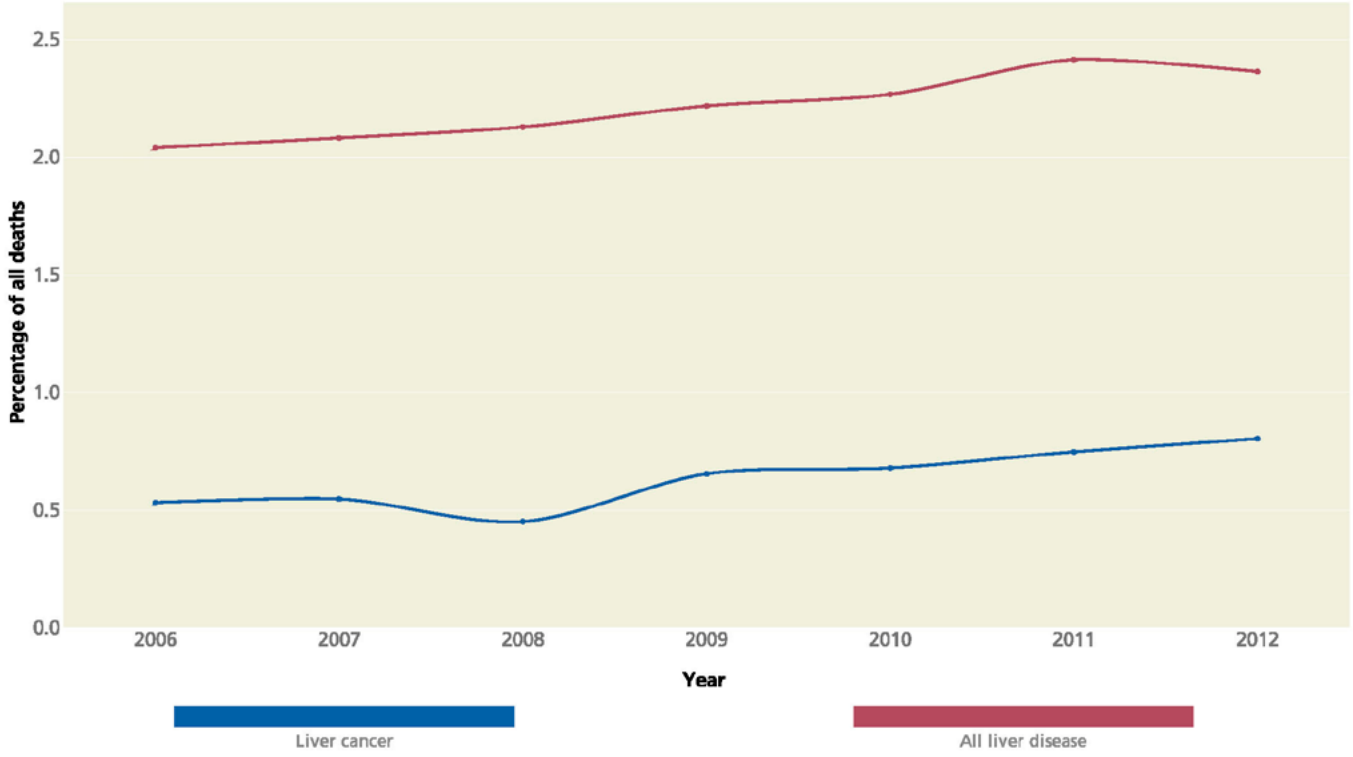
When measuring years of premature loss of life (a combination of the numbers dying and the age at which they die), whether under 65 years (traditional working age) or under 75 years (definition used for amenable healthcare intervention), liver disease is third only to cancer and cardio-respiratory disease as a cause of early death.[10] Deaths from liver disease appear to occur at a younger age on average than from any other cause. Yet severe liver disease and mortality represent the late stage of liver disease, often presenting 10–30 years after the first onset of disease.[11]

Liver disease is typically silent until a late stage.[12] This means that individuals are unlikely to be aware of liver disease that they may already have; it also means that the true prevalence of liver disease is difficult to quantify. Understanding of the prevalence of liver disease, and hence being able to plan for future service provision, can be partly aided by assessing the exposure of the population to common and quantified risk factors for liver disease, such as excess alcohol consumption, chronic viral disease and excess fat. However, understanding of these factors is also important at an individual level, since interventional studies have demonstrated significant and early improvement in liver disease, even including complete reversibility in the damaging effects on the liver, with even a modest change in risk exposure.

There is considerable geographical variation in liver disease incidence and mortality.[13] Across measures including premature mortality related to liver disease, proportion of the population dying before the age of 75 due to liver disease, and years of life lost, all of the top five PCT areas were in the North West region of England (Blackpool, Manchester, Liverpool, Salford and Wirral). All bar one of the 44 PCT areas which made up the top quintile for these measures is in the north of England. Fewer than 20 PCTs from the south of England featured in the top half of PCTs when ranked by these measures.

Deprivation (as measured by the Indices of Multiple Deprivation ranking) appears to correlate with overall mortality from liver disease and may account for up to half of the north–south variation seen.[14]

Figure 7.1: Proportion of deaths attributable to liver cancer and all liver disease, England and Wales, 2006-2012



Source: Office for National Statistics

Alcohol consumption and liver disease

The total number of units of alcohol consumed per person per year in the UK increased substantially between the 1950s (around 400 units) and 2009 (around 900 units). A rapid increase in consumption during the 1960s and 1970s was followed by a slower increase during the 1980s and 1990s. There was a further rapid increase from 2000 to 2005, followed by a slight fall to 2009.[15]

Trends in overall per capita alcohol consumption should be viewed in the context of changing patterns of drinking behaviour. The proportion of people who abstained from alcohol increased from 10% in 1998 to 15% in 2009.[a] Of those who did not abstain, two-thirds consumed no more than the recommended maximum number of units of alcohol each week (21 for males and 14 for females). Overall, therefore, more than 75% of the population did not consume excessive levels of alcohol.[16]

There are substantial geographical variations in both rates of abstinence and drinking behaviours which impact on the proportions and numbers of individuals who may be at risk of liver disease. In 2011, the proportion of people who abstained from alcohol ranged from 11.7% in the South West region and 24.5% in London. The variation at local authority level was greater, though there was a substantial level of alcohol-related disease in all areas.[17]

Examining only the variation in proportion of the population consuming excessive levels of alcohol can be somewhat misleading. For example, while the proportion of the population consuming excessive levels of alcohol is greatest in the North East, this region has the smallest absolute number of people who consume excessive levels of alcohol due to the relatively small size of the population.

Some geographical variation in the proportion of people abstaining from alcohol consumption may be explained by underlying variations in the population, such as the proportion of people who abstain from alcohol because of religious beliefs. Similarly, some geographical variation in excessive drinking may be explained by underlying variations in population age, or the density of licensed retail outlets.

Socio-economic differences may also play a part in the geographical variation in alcohol consumption. The reason for the recent reduction in consumption is not known. It has been suggested that this may have resulted from changes in income rather than health or policy intervention.[18]

It is well documented that the overall level of consumption in a population correlates with health harms. It is also well recognised that there is a time lag between excessive consumption and some directly attributable harms, notably alcohol-related liver disease.[19] This relationship can be appreciated by a graphical alignment of liver disease mortality against population consumption of alcohol. This lag suggests that, despite the recent reduction in overall alcohol consumption, a continuing rise in the burden of liver disease can be anticipated for some years to come.

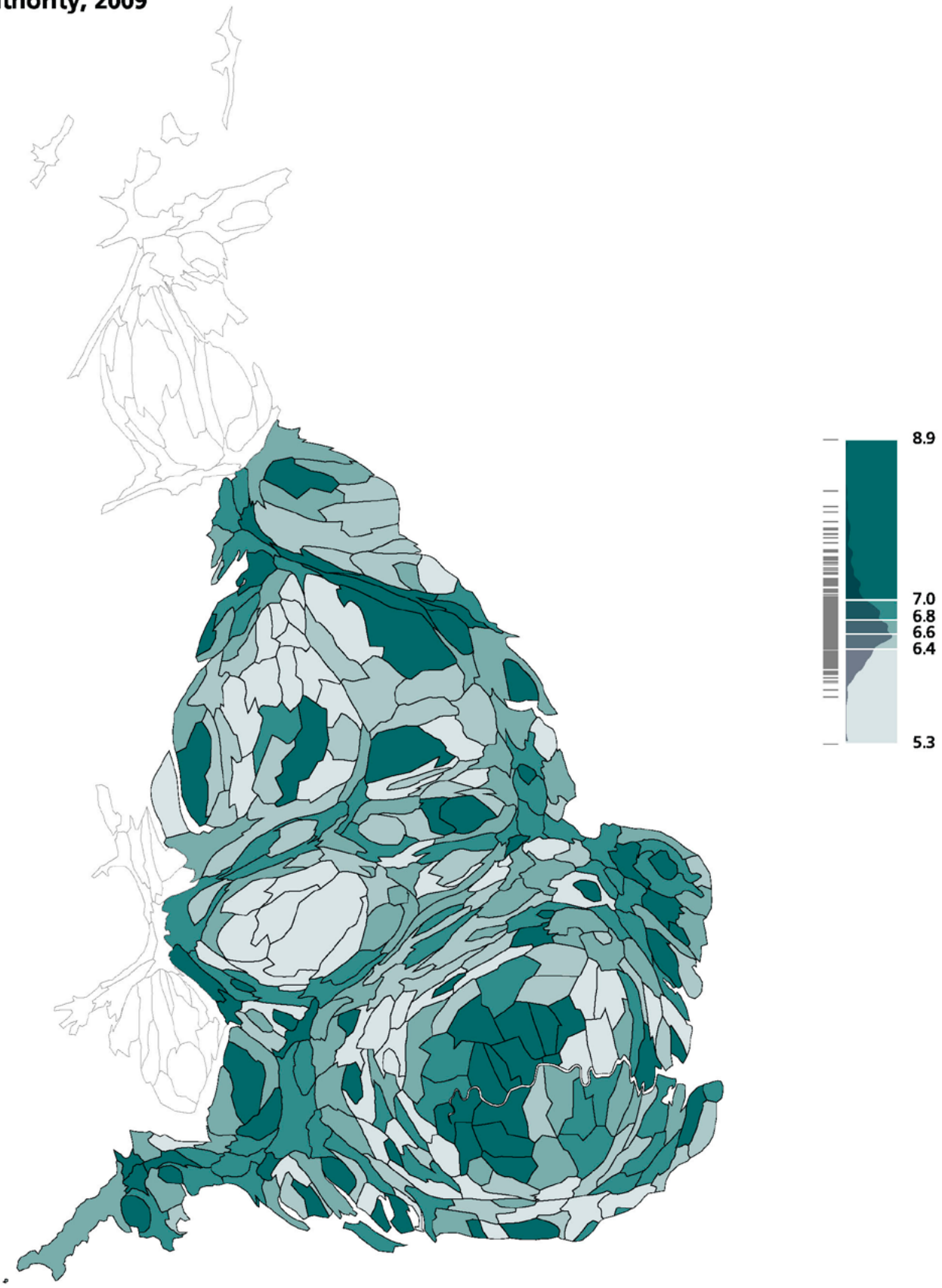
However, addressing liver disease in isolation is unlikely to be effective, since alcohol excess also contributes to cardiovascular disease, cancers of the digestive organs and breast cancer, and may also be associated with suicide, trauma and violence.[20]

There is evidence that obesity and alcohol can have a multiplier effect when it comes to liver damage. In women, for each 5-point increase in Body Mass Index (BMI) beyond 22.5, the Oxford Million Women Study reported that adjusted relative risk for cirrhosis increased by an additional 28%; a study of almost 10,000 men in Glasgow found a relative excess risk of 5.6 for obesity and drinking even moderate amounts of alcohol.

The links between obesity and liver disease are discussed in Chapter 5. Despite a relatively high energy content of 7.1 kcal/g, it is still unclear from epidemiological data how alcohol contributes to rising levels of obesity.

[a] General Household Survey/General Lifestyle Survey

Figure 7.2: Proportion of drinking population (aged over 16) who report engaging in higher risk drinking, by local authority, 2009



Source: Local Alcohol Profiles for England

Figure 7.3: Proportion of population (aged over 16) who report abstaining from alcohol, by local authority, 2009

Source: Local Alcohol Profiles for England

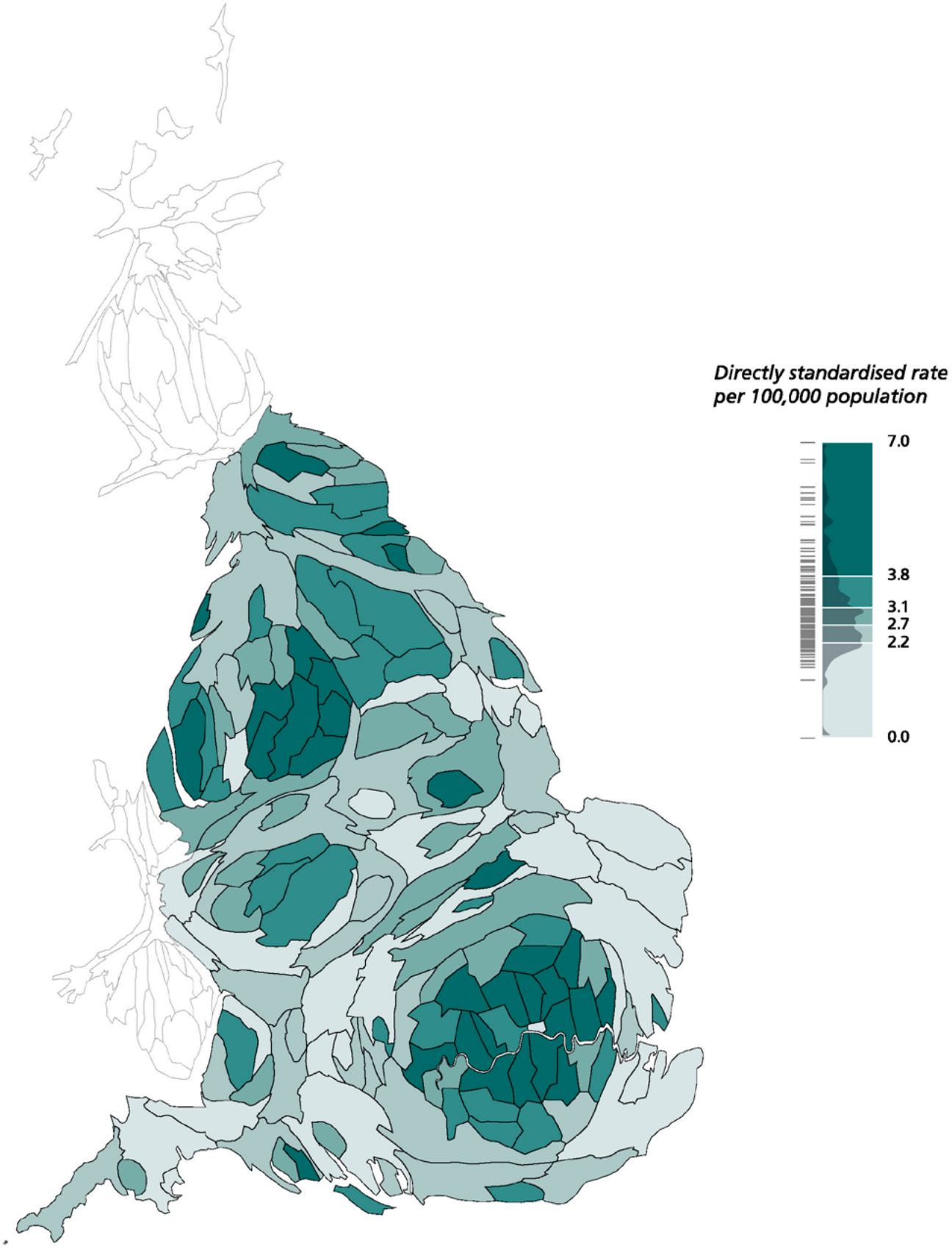
Liver cancer

The presence of cirrhosis is the single most important predictive factor for the development of hepatocellular carcinoma (primary liver cancer) and 95% of hepatocellular carcinoma occurs in people with cirrhosis from any cause. It has been estimated that approximately 2–3% per annum of people with cirrhosis may develop hepatocellular carcinoma; as admissions and mortality from liver disease have risen in the last 15 years, so has the incidence of hepatocellular carcinoma.[21] The trends in incidence and mortality of hepatocellular carcinoma are discussed further in Chapter 6.

The outcomes for treatment of hepatocellular carcinoma are poor. This is mainly due to late presentation because the underlying liver disease is 'silent'. Interventions for this cancer are limited to a very large extent by the functional state of the liver at the time of diagnosis: less than 20% of hepatocellular carcinoma is detected at a stage where treatment is potentially curative and 50% of patients with hepatocellular carcinoma currently present as 'emergencies'. European and American guidelines for liver disease suggest that surveillance of people with cirrhosis for hepatocellular carcinoma may improve outcomes; however, evidence for any individual intervention is lacking.

The hepatocellular carcinoma mortality varies geographically, and follows a different pattern to general liver disease. Thirteen of the 20 areas with highest hepatocellular carcinoma mortality are in London.[22] Looking at the demographic make-up of those areas, the likely explanation is the higher risk of hepatocellular carcinoma in some ethnic groups related to chronic viral hepatitis. Thus, the aetiology of the liver disease predisposing to hepatocellular carcinoma may differ geographically, with alcohol and hepatitis C causing most cases in the north, and hepatitis B and C causing most in the south, although there is insufficient linked detail in the data to ascertain this. The National Cancer Intelligence Network has also suggested that risk of hepatocellular carcinoma is particularly increased in some ethnic minoritiy populations.

Directly standardised rates for liver cancer mortality by local authority, England, 2007-2011



Source: Office for National Statistics

Hepatitis B

Hepatitis B is a blood-borne virus which can be transmitted by contact with infected persons or products. A distinction must be made between acute hepatitis B and chronic hepatitis B.

Acute hepatitis B usually occurs in adults who acquire the virus by exposure to infected blood or sexual contact, but this is usually a self-limiting infection. The development of immunity is the usual outcome and adverse consequences to health are rare, although some cases do progress to chronic hepatitis B.

Most cases of sexual transmission of hepatitis B occur between heterosexual partners. However, the risk of transmission is considerably greater for males who have anal sex with other males, and males who have receptive oral sex with other males. Most other cases are due to people who inject drugs using contaminated equipment.[23]

In 2011, 589 acute or probable acute cases of hepatitis B were reported for England, according to the Health Protection Agency's (HPA's) network of units and Sentinel reporting laboratories.[24] This gives a reported incidence of 1.13 per 100,000 population, compared with a reported incidence of 0.99 per 100,000 for 2010. In 2011, incidence varied by region from 0.54 per 100,000 in the North East to 2.06 per 100,000 in the London region. The majority of cases were in males (71%): the incidence among males was 1.63 per 100,000 in 2011, compared with 0.64 per 100,000 among females. Males aged 25–34 years had the highest incidence of acute hepatitis B at 3.11 per 100,000, compared with 2.07 per 100,000 in 2010. The incidence in children remains very low.

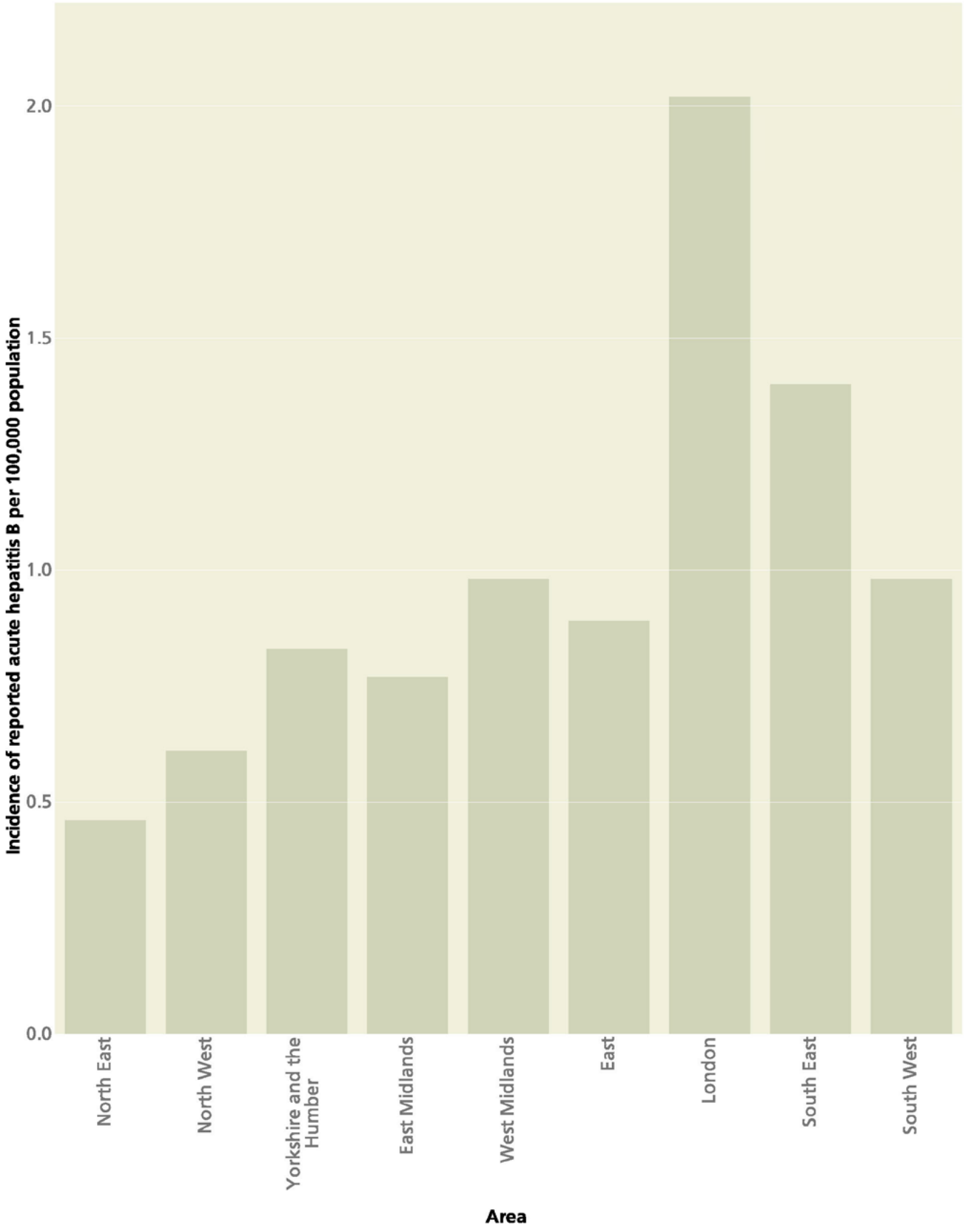
Chronic hepatitis B is a much more prevalent health problem than acute hepatitis B, which can cause chronic liver disease and liver cancer. It has been estimated that up to one-third of the entire global population has been in contact with the hepatitis B virus and about 350 million people have chronic hepatitis B as a result. Hepatitis B is most commonly passed from mother to child at the time of birth, and causes liver disease in adult life. Strategies aimed at preventing propagation of hepatitis B infection include limiting exposure by screening blood donors and plasma-derived products and viral inactivation procedures, promotion and adoption of safe sex practices especially for higher-risk groups, availability of needle exchange programmes for people who inject drugs, screening and vaccination practices for healthcare and other workers considered at risk, antenatal screening and vaccination of susceptible neonates, and screening and vaccination in prisons (see Chapter 3).[25]

These measures have been effective in keeping the UK in a state of low prevalence to date. Most people with chronic hepatitis B in the UK were born in countries with a higher prevalence, and it has been suggested that immigration of people from areas of higher prevalence may therefore contribute to the burden of liver disease in the future. In the past 10 years, more effective treatments have become available to prevent the progression of chronic hepatitis B to chronic liver disease. However, hepatitis B is a silent disease until complications ensue, and so identification of patients at an early stage is difficult.

Previous estimates of the numbers of people in England affected by chronic hepatitis B have ranged from 180,000[26] to 350,000;[27] the latter methodology in particular took into account the contribution from immigrant sub-populations. This methodology has recently been adopted in the USA where up-to-date literature-based prevalence of chronic hepatitis B infection was applied to the birth origin of US residents.[28]

Applying the same methodology to country of origin as reported in the UK census 2011 allows us to estimate an updated figure for chronic hepatitis B in England to local authority level. Using this method, whole population prevalence for England in 2011 is estimated at 1.07% (95% confidence interval: 0.73–1.25%), and for London 2.04% (1.5–2.5%). These estimates are higher than previously reported, but are consistent with recent immigration patterns from areas of higher endemicity. By this method, in London, 84% of chronic hepatitis B occurs in people born outside the UK whereas outside London this figure is 47%.

Figure 7.5: Incidence of reported acute hepatitis B per 100,000 population by region, England, 2012



Source: Immunisation, Hepatitis and Blood Safety Department, Public Health England

Hepatitis C

An illustration of our current understanding of the incidence of hepatitis C is shown in Figures 7.5 and 7.6 but the numbers of people found already with hepatitis C infection, or treated, or still to be found can only be estimates and there are many confounding variables and assumptions built into this summary. It is clear, however, that there are many people who would benefit from treatment.

The HPA's annual reports on hepatitis C provided valuable data for understanding the contribution of hepatitis C to the rising burden of liver disease, and indicated that the number of identified and treated cases increased substantially between 1996 and 2012. More than 10,000 people were identified with hepatitis C in 2012. Some of the recent apparent increase may be due to improved reporting, especially since statutory notification of hepatitis C cases by diagnostic laboratories was first introduced in 2010.

Between 1996 and 2012, approximately 105,000 hepatitis C antibody-positive results were reported to the HPA, though it is thought that there was significant under-reporting until statutory notification was introduced. It has been shown that approximately 74% of those with reported hepatitis C antibody-positive results were chronically infected with the virus: around 78,000 people on the basis of the known reported numbers. It is not known how many of these were seen or assessed for either liver disease or treatment.

In 2005, the HPA derived a model based on evidence synthesis to estimate that there were 160,000 people overall chronically infected with the hepatitis C virus in England.[29] This suggests that approximately 50% of people with chronic hepatitis C do not know they have the virus and are still to be identified; however, it is probable that more infected people have by now been identified than not.

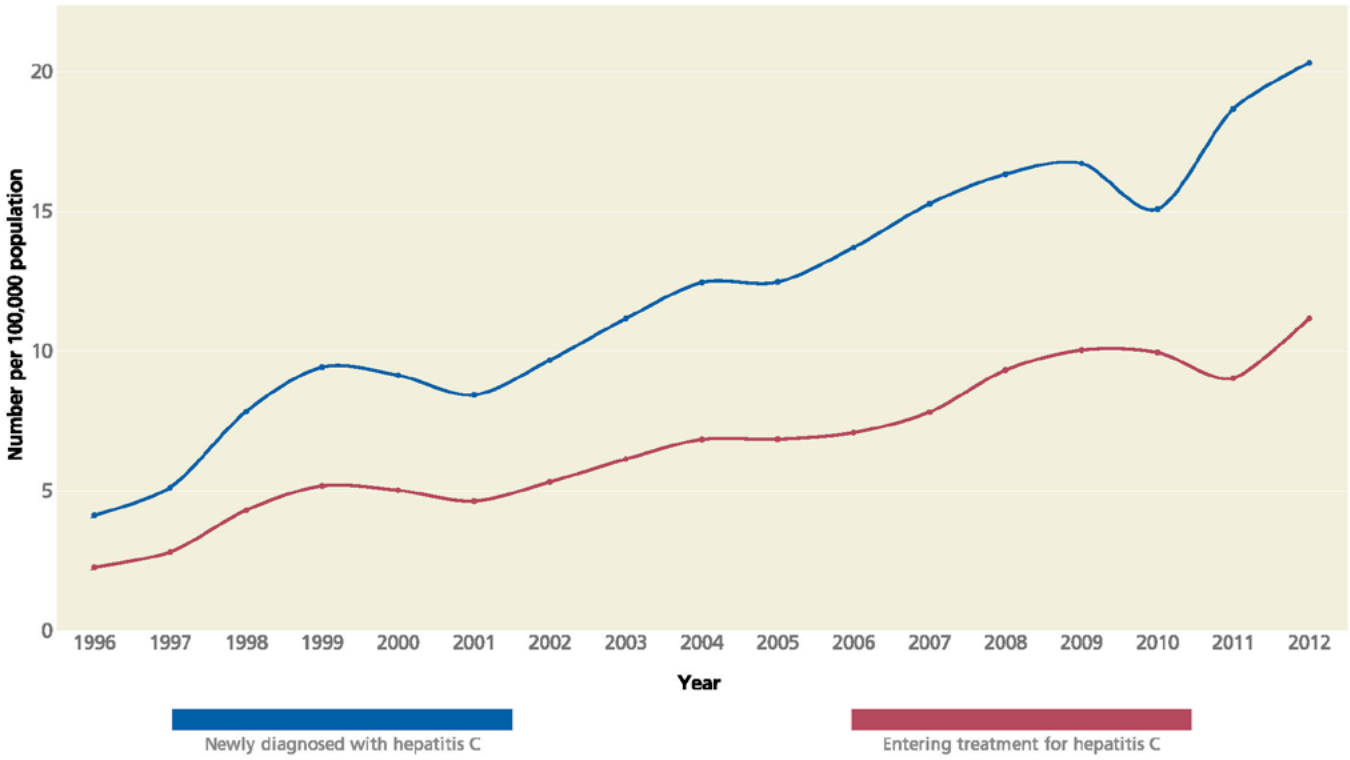
Some progress has been made over the years in preventative measures, especially among people who inject drugs, including substantial efforts to target testing on those people who have injected drugs and who attend clinics or who are in prison (see Chapter 3). Despite this, the number of people admitted to hospital with end-stage liver disease, or related liver cancer, or who die or require transplantation has risen between 1996 and 2012. For example, an overall increase in registrations for liver transplants with a primary code of post-hepatitis C cirrhosis has been observed – from 45 in 1996 to 124 in 2012 – although figures have been relatively stable over the last five years.[30]

Using a variety of data sources, the HPA estimated that 27,500 people were treated for hepatitis C each year between 2006 and 2011. This figure includes approximately 7,700 people for whom treatment was not successful. It is difficult to estimate how many people may have been treated between 1996 and 2005 when the natural history of the condition was still being documented and treatment programmes evolved using less effective forms of treatment. Sustained viral response rates (SVR, or 'cure' rates) for those receiving hepatitis C treatment have improved from 16% prior to the mid-1990s to >70% in the late 2000s because of improvements in treatments.[31]

Approximately 33,000 chronically infected people were identified between 1996 and 2005. Applying the lowest treatment rates as observed in later years (range 0.48–0.66), (HPA 2012, and cross-referencing with methodology in Deuffic et al 2012) at most 16,000 may have been treated; however, with much lower 'cure' rates from the treatments then available, it is unlikely that more than 50% of people treated overall during this period had their virus cleared. While it is important to emphasise that these are empiric estimates, and many patients may have received more than one course of treatment, at best in the period 1996–2012 we have eradicated this virus in only one-third of patients actually identified with chronic hepatitis C infection, which in turn is probably only 50% of people with chronic infection.

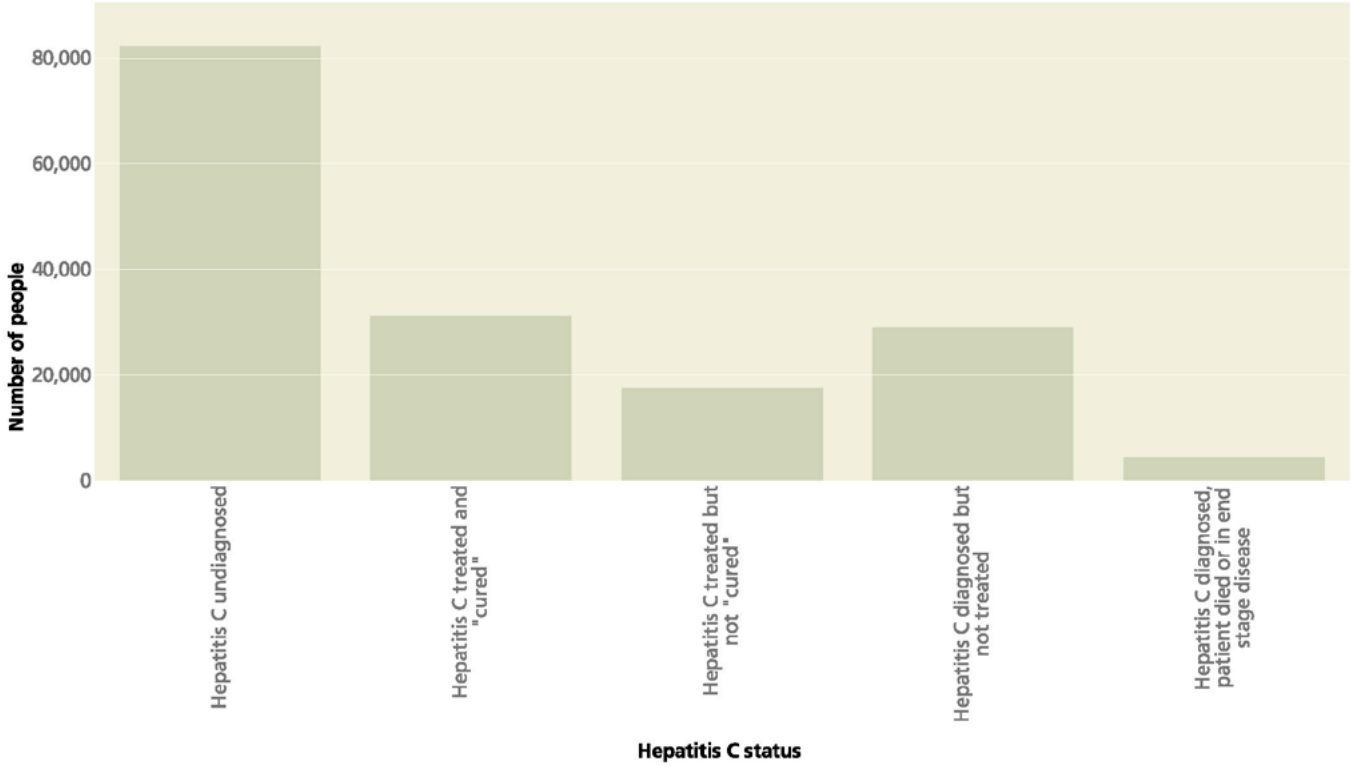
Hence, the remaining two-thirds of patients with chronic infection represent a significant reservoir of infection for people at risk. Reducing this risk requires an improved understanding of the barriers to treatment, in 2013 the efficacy of which continues to improve all the time. Using published estimates for efficacy of treatment, the HPA modelled how doubling current levels of treatment in the next 10 years could reduce end-stage liver disease or death in those treated by at least one-third. Treating more people would also reduce the risk of onward transmission, producing a further (external) reduction in morbidity and mortality.[32]

Figure 7.6: Number of people newly diagnosed with, and entering treatment for, hepatitis C per 100,000 population, England, 1996-2012



Source: HPA annual reports

Figure 7.7: Estimated number of people with chronic hepatitis C by treatment status, England, 2012



Source: Original estimates based on data from HPA annual reports

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Chapter 8

Public health miscellany 2012

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3 Chief Medical Officer's Events and Project Manager, Department of Health

Overview

Sir John Simon, the first Chief Medical Officer appointed in 1855, started the tradition of a Chief Medical Officer's annual report, providing an independent assessment of the state of the public's health to the government of the day. The format of his report, which persisted for over a century, included an opening letter from the Chief Medical Officer in which he set out a miscellany of events which had influenced the public's health over the preceding year. Collectively, these letters form a fascinating historical record.

The early editions of these reports date from a time before wide acceptance of germ theory. This is reflected in frequent discussions about improving hospital design to reduce the flow of miasma, or "bad air", which was thought at that time to be the cause of disease. There is also frequent discussion of the prevailing weather: as late as the 1940s, Sir William Jameson remarked that "the year, alike at its beginning and its end, was remarkably free of fog".

Alongside the revealing insights into the scientific understanding of the time, the Chief Medical Officers set out lessons which could be learned from events which had occurred during the year. Some of these remain remarkably apt many years later. In his 1912 report, Sir Arthur Newsholme discusses the difficulty of identifying the animal constituents of imported meat. Exactly a century later, the "horse meat issue" has caused us to revisit many of the same issues.

Similarly, in 1931, my predecessor Sir George Newman warned that some people were "over-fed – giving their poor bodies little rest, clogging them with yet more food". More than 80 years later, a chapter of this annual report is dedicated to diet, physical activity and obesity.

Inspired by my predecessors, I have chosen a collection of interesting discussion topics and examples of excellent public health practice which have occurred during 2012 (though like my predecessors, I have not stuck rigidly to the boundaries of the calendar year). I hope that these will provide inspiration to my colleagues in the public health community today, and contribute to the historical record of our time for the future.

Active travel (walking and cycling)

In 2012, there were a number of high profile media reports about the safety of cycling. Cycling is one form of "active travel", which is a term used to describe any physically active mode of transport (also known as "active transport").[1] The commonest forms of active travel are walking and cycling, though there are many other forms such as rollerblading, skateboarding, or using manually-propelled scooters. The public's health would benefit from an increased uptake of active travel.

Fear of death or serious injury when walking and cycling presents a substantial barrier to improving uptake.[2] Data on casualty rates for different modes of transport in Great Britain were published by the Department for Transport in 2013.[3] These figures are not directly comparable between modes of transport: the average length of a car journey is longer than either pedestrian or cycle journeys; a large amount of cycling and walking is done off-road, and so not included in these statistics; cars more often carry passengers than pedal bicycles, and there is no equivalent to a passenger for a pedestrian. However, these figures provide some limited insight into the relative safety of these modes of transport.

In Great Britain, the number of deaths per billion kilometres for all modes of transport has declined since 2003. However, per-kilometre risk of death from some forms of active travel remains considerably higher than risk of death from car travel. In 2012, per billion kilometres travelled by each mode of transport, there were 24 deaths among cyclists (compared with 26 in 2003), 23 deaths among pedestrians (41 in 2003), and 1 death among those in cars (3 in 2003). The number of serious injuries per billion kilometres has decreased for those travelling by car (24 in 2003; 18 in 2012) and pedestrians (382 in 2003; 328 in 2012), but increased among cyclists (518 in 2003; 558 in 2012).

Despite the substantially greater per-kilometre death and serious injury rates for cycling compared to travelling by car, as well as other effects such as increased exposure to pollution, research strongly suggests that the health benefits associated with switching from travelling by car to cycling outweigh the risks. Indeed, research suggests that the overall health benefits of cycling are 7 times greater than the risks.[4]

The average number of miles travelled per person per year on foot has declined from 201 in 2003 to 181 in 2012.[5] While the number of miles cycled per person has increased over the same period (from 37 to 53),[6] cycling still accounts for only 2% of all journeys in Great Britain.[7] Walking accounts for 22% of journeys.[8] Since walking accounts for a greater distance travelled per person and a greater proportion of all journeys, the absolute number of pedestrian deaths and injuries is far higher than the number of deaths and injuries for cyclists.

It is important that all forms of active travel are considered when infrastructure is modified. For example, research suggests that some pedestrians fear collisions with cyclists, and some report feeling "terrorised" by cyclists.[9] This fear may be an unintended consequence of frequently co-locating cyclist traffic and much slower pedestrian traffic. The reported number of injuries from pedestrian-cyclist collisions is very low, but since injuries are likely to be minor, they may be under-reported.

Continuing to improve the safety of all forms of active travel will reduce the incidence of injury, and may also help to improve uptake through reducing safety concerns. The direct and indirect public health benefit which could be derived from increasing uptake of active travel has been well documented.[10] However, the effectiveness and cost-effectiveness of different interventions to improve the uptake, safety, and perceived safety of different forms of

active travel are less well documented. The many proposals for improved active travel safety, from a national register of cyclists[11] to elevated cycling routes,[12] would benefit from further research evidence. Innovative tools such as the World Health Organisation's Health Economic Assessment Tools for walking and cycling[13] may prove useful in helping to assess the likely effectiveness of proposed interventions in specific populations.

While there is work to be done to improve the safety of some road users, it should be recognised that overall road safety in Great Britain has shown great improvement in recent decades. In 1970, the number of road injuries per 100,000 population was 14.0; by 2011, this had decreased to 3.1. This figure compares very favourably with those of other countries: in 2011, the comparable figure for the United States was 10.4, for Australia was 5.6, for France was 6.1, and for the Netherlands was 4.0.[14] The success of road transport safety improvements to date should not be overlooked.

Street Spice Festival (Outbreak of gastro-intestinal illness associated with a food festival)

Investigation of outbreaks of disease is a core skill offered by the Public Health specialty, and historical CMO Annual Reports frequently discussed interesting examples. Discussion of the handling of outbreaks provides an opportunity for lessons to be learned, and for good practice to be shared. In this case, the commendable close working relationship between the parties involved in the investigation helped to ensure a thorough, high-quality result which identified a gap of growing importance in food preparation guidelines.

The outbreak of gastro-intestinal illness affected around 926 people who attended the Street Spice Festival held in Newcastle upon Tyne between 28 February and 2 March 2013. The outbreak was investigated by the North East Health Protection Unit and Newcastle City Council, with support from laboratory services of the Health Protection Agency and specialist epidemiology teams from the North East Regional Epidemiology Unit and HPA Colindale.

Investigation of human cases of illness was carried out by the Environmental Health team of Newcastle City Council, working closely with the Health Protection Unit.

The investigation of food preparation and source of ingredients was led by the Environmental Health team and involved liaison with environmental health teams in other local authorities involved in the food chain and with the Food Standards Agency.

29 cases of Salmonella were confirmed from people reporting illness; 25 of these cases were a newly identified strain of Salmonella, Salmonella Agona phage type 40. Further investigations using a Polymerase Chain Reaction assay suggested that a number of other faecal organisms, including enteroaggregative Escherichia coli (in 70% of samples tested) and Shigella (in 39% of samples tested), may have contributed to the burden of illness.

Salmonella Agona phage type 40 was isolated from samples of the same batch of curry leaves used at the event. Pulsed-field gel electrophoresis confirmed that the S.Agona isolates from human and food specimens were indistinguishable.

The epidemiological findings from a cohort study supported the environmental and microbiological findings. The Outbreak Control Team concluded that the use of uncooked curry leaves, which were contaminated with Salmonella Agona PT40, was the mechanism of transmission of infection.

After consideration of the findings of the investigation, Newcastle City Council decided not to take formal action in this case. This decision, based on the council's enforcement policy, took into account the lack of clear, official advice about the use of curry leaves and the overall good standards of food hygiene at the festival.

Recommendations were made regarding the further investigation of contamination of curry leaves, and an FSA-led sampling study is currently being undertaken.

Study of folic acid supplementation before pregnancy

Neural tube defects complicate around 1.5 per 1,000 pregnancies in the UK.[15] At around the third week of pregnancy, a tube begins to form which will ultimately develop into the spinal cord and brain of the foetus. If the two edges of the neural tube do not completely fuse, there is effectively a hole in the tube, which is referred to as a neural tube defect. Neural tube defects cause a variety of conditions. Some, such as ancephaly, are rarely compatible with life; others, such as spina bifida, can cause severe disability.

The Medical Research Council Vitamin Study, published in 1991, was a randomised controlled trial which showed that taking folic acid before conception reduced the risk of a neural tube defect pregnancy by an estimated 72%.[16] Partly as a result of this study, the Department of Health has recommended since 1992 that women should take a daily supplement of 400 micrograms of folic acid while they are trying to conceive, and should continue taking this dose for the first 12 weeks of pregnancy.[17] In 1998, a survey of 1,238 women attending antenatal screening at the Wolfson Institute of Preventive Medicine in London found that only 42% had taken folic acid supplements before pregnancy.

A study of almost half a million women[18] attending the Wolfson Institute of Preventive Medicine in London between 1999 and 2012 found that the proportion had reduced further from an adjusted percentage of 40% in those attending the clinic between 1999 and 2001, to 28% among those attending between 2011 and 2012. Only 6% of women aged under 20 took folic acid supplements before pregnancy, compared with 38% in those aged 35 to 39, and 31% in those aged over 45. Uptake was lower in black and minority ethnic groups than in the white British group. Among all women with a previous pregnancy affected by a neural tube defect pregnancy, uptake was 51%.

The low uptake is partly explained by the fact that not all pregnancies are planned. In some other countries, such as the United States, folic acid is added to breads, cereals, flour and other grain products[19] in an attempt to ensure that folic acid intake in women with undiagnosed pregnancies is great enough to reduce the incidence of neural tube defects. This is not currently done in England or any EU country. The Department of Health is currently considering the case for mandatory fortification of flour.

Novel coronavirus

On 3 September 2012, a previously well 49-year old male Qatari national developed a mild respiratory illness while in Qatar.[20] This developed into a bilateral pneumonia, and he was hospitalised six days later. His condition continued to deteriorate. He required intubation and ventilation. Nine days after the onset of symptoms, he was transferred by air ambulance to an intensive care unit in London, where his condition continued to worsen, and he was diagnosed with acute renal impairment.

After international reports were received of a 60-year old Saudi Arabian patient who had died in similar circumstances after detection of a novel coronavirus, the patient was investigated for novel coronavirus infection. On 21 September 2012, a coronavirus was detected in the patient's respiratory tract samples. The following day, genetic testing of the virus revealed it to be closely related to the novel coronavirus detected in the Saudi Arabian patient.

A public health response was mounted. The patient was isolated in a negative-pressure room, and full personal protective equipment was worn by staff and other contacts. The Health Protection Agency reported the case to the World Health Organisation and rapidly developed and published advice to health professionals, the public and travellers. 64 close contacts of the patient were identified, none of whom developed severe respiratory disease. 13 reported mild respiratory symptoms, of whom 10 were tested; the novel coronavirus was not detected in any of these. The patient later died.

The swift and professional public health response to this case helped to protect the public's health. The response to three additional cases in February 2013 was similarly comprehensive. Public Health England published a review of the public health response in July 2013.[21] It concluded that closer engagement between public health professionals and the media would be beneficial in similar circumstances in the future.

Horse meat

On 15 January 2013, the Food Safety Authority of Ireland published the results of a targeted authenticity survey in which 10 of 27 beef burger products tested, tested positive for horse DNA. Some of the product lines tested were sold in the UK, including one in which horse meat accounted for approximately 29% of the total meat content of the burger. Some of the products were produced by a company located in the UK.[22]

The UK response was led by the Food Standards Agency (FSA), in partnership with other organisations. Extensive testing was undertaken by the FSA, local authorities and industry, revealing 27 instances of comminuted beef products containing more than 1% horse meat. The 1% cut-off was intended to distinguish trace from deliberate adulteration.

The horse meat issue was very widely covered in the media over several months. Concern had been raised in the media about the possible presence of phenylbutazone ("bute"), a drug widely used in horses but banned for use on horses destined for the food chain. On 9 April 2013, a positive test for the presence of phenylbutazone in tins of corned beef sold by a major UK retailer was reported to the FSA. The product had already been withdrawn from sale due to horse meat adulteration, and the level of phenylbutazone contamination was very low (four parts per billion).

In response to this issue, the FSA's use of social media has been particularly praised.[23] The FSA's communications team monitored the prevalence of horse meat related tweets and engaged where appropriate. Their use of social media functioned both as a vehicle for messages to reach certain groups (particularly young people), and also allowed the FSA to check reception and understanding of its key messages. In order to communicate the risk level associated with phenylbutazone, the Chief Medical Officer pointed out that one would have to eat more than 500 burgers composed entirely of horsemeat to reach a human dose. This comment was widely reported in the media.

Lessons learned from the horse meat issue could be used in other situations where public health messages need to be rapidly and accurately communicated to the public. Opportunities afforded by social media to check reception of key messages should not be overlooked in these instances.

London 2012 Olympic and Paralympic Games

The London 2012 Olympic and Paralympic Games provided a substantial health protection challenge for those charged with protecting the UK population from infectious diseases. The Games brought together millions of people from hundreds of countries across the world, including over 14,000 athletes from 205 nations, and 11 million spectators.

The Health Protection Agency established intensive, international infectious disease surveillance, which monitored any international infectious disease threats which might have had the potential to impact human health in the UK. In particular, the Health Protection Agency monitored threats which could affect those involved with the Games. This monitoring involved close collaboration between the Health Protection Agency and the European Centre for Disease Prevention and Control.

Over the course of the monitoring period, over 400 international infectious disease reports were identified and

assessed. 49 incidents were deemed to need a closer risk assessment, though none was risk assessed as being a threat. International infectious disease surveillance formed only one part of a large health protection effort associated with the Games.

There is a substantial legacy resulting from the large amount of health protection work undertaken in preparation for the Games including enhanced public health systems and stakeholder relationships, as well as increased experience and expertise in planning and delivering high quality health protection services for mass gatherings. This can inform future health protection work in England.

The *Summary Report of the Health Protection Agency's Games Time Activities*[24] provides an overview of all of the activities undertaken by the Health Protection Agency in support of the London 2012 Olympic and Paralympic Games.

Poly Implant Prosthèse (PIP) breast implants

In March 2010, the Agence Française de Sécurité Sanitaire des Produits de Santé (AFSSAPS; the French regulator of medicine and medical devices) informed the UK Medicines and Healthcare products Regulatory Agency (MHRA) that it had suspended the marketing, distribution, export and use of silicone gel filled breast implants manufactured by Poly Implant Prosthèse (PIP), as it had been established that implants manufactured since 2001 had been filled with an unapproved silicone gel. Within two days, the MHRA issued a Medical Device Alert advising UK clinicians not to implant these products.[25]

Both the AFSSAPS and the MHRA independently commissioned testing of the implants, and both found no evidence of safety issues associated with the filler material. However, on 23 December 2011, the French government announced that it was recommending that all women who had been implanted with PIP breast implants should have them removed as a preventative measure, due to concerns about high rates of implant rupture. This recommendation generated extensive media coverage throughout Europe.[26]

On 31 December 2011, The UK's Secretary of State for Health, the Right Hon Andrew Lansley MP, asked the NHS Medical Director, Sir Bruce Keogh, to chair an Expert Group's review into PIP breast implants. One week later, this Expert Group published an interim report. It concluded that PIP breast implants were not associated with an increased risk of breast cancer (or other forms of cancer) compared to other breast implants. They also concluded that toxicological tests showed no evidence of cytotoxicity or genotoxicity. However, their report recommended that further testing should be carried out.[27]

All women who had received a PIP breast implant from the NHS were contacted with relevant information. Those women who wished to do so could seek clinical advice including (where necessary) imaging to check for rupture. Where there was a clinical need, the NHS would remove and replace the implant.[28]

Those who had received a PIP breast implant from a private provider were advised to contact their provider. The Department of Health encouraged private providers to provide a similar service to that offered to NHS patients. For those whose private provider refused to provide this service, or whose private provider was no longer in business, the NHS agreed to provide clinical assessments. If these assessments showed that it were clinically necessary to remove the implant, the NHS would provide this service. However, the NHS would not replace the implant unless it were deemed clinically necessary.[29]

As of 30 November 2012, a total of 7,917 women who had received PIP breast implants from private providers had consulted the NHS, with 633 deciding to have their implants removed.[30]

In January 2013, the MHRA published their final toxicology test results which confirmed previous testing, and concluded that there was no evidence of cytotoxicity or genotoxicity.[31]

A review into the Department of Health and MHRA's responses to the events, led by Lord Howe, was published in May 2012.[32] In April 2013, a wider-ranging independent review of the regulation of cosmetic interventions, led by Sir Bruce Keogh, was published.[33]

Global Burden of Disease Study 2010

In December 2012, The Lancet devoted an entire issue to publishing the Global Burden of Disease Study 2010.[34] This collaborative effort between hundreds of experts worldwide, funded by the Bill and Melinda Gates Foundation, quantified the burdens of 291 major causes of death and disability and 67 risk factors across 21 geographic regions. It provides a comprehensive assessment of the state of the world's health.

The Global Burden of Disease Study 2010 found that the global disease burden is shifting from communicable to non-communicable diseases, and from premature death to years lived with disability. The study suggested that the rising burden from mental and behavioural disorders, musculoskeletal disorders and diabetes would impose new challenges on health systems.

In March 2013, *The Lancet* published disaggregated data from the Global Burden of Disease Study 2010 focussing on the UK,[35] including comparisons of mortality and disability between the UK and 18 comparator nations. This landmark study contains much of interest to the public health community in England.

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Appendix

Data interpretation and sources

Appendix

Interpretation of figures

Where figures include error bars, these represent 95% confidence intervals unless otherwise stated.

The figures in Chapter 6 are based on innovative Joinpoint analysis. Please refer to the chapter overview for details of how they should be interpreted.

Interpretation of infographics

The infographics in this report display data in an ergonomic fashion. In some cases, there is a substantial degree of rounding (for example, when summarising statistics for sensory impairment and employment using "10 average men"). Statistics cannot, therefore, be derived from the images with a high degree of precision. Please refer to the data sources listed for each infographic for the full data.

Data sources for graphs and maps

All data used to generate figures within this report is available at the Department of Health webpages (https://www.gov.uk/government/organisations/department-of-health). Full details of each data source is contained within these files.

Data sources for infographics

Chapter 2 Health and employment

Office for National Statistics Annual Population Survey, July 2012 to June 2013

Black C and Frost D. 'Health at work – an independent review of sickness absence' Department for Work and Pensions 2011.

Chapter 3 Health and justice

Home Office (2011). Crime in England and Wales 2010 to 2011. Available from: http://www.gov.uk/government/publications/crime-in-england-and-wales-2010-to-2011

Chapter 4 Sensory impairment

GP Patient Survey http://www.gp-patient.co.uk/

(data shown in the infographic combines 2012 and 2013 rounds of the survey)

Chapter 5 Diet, physical activity and obesity

NHS Information Centre for Health and Social Care (2013) Health Survey for England 2012. Available from: http://data.gov.uk/dataset/health_survey_for_england

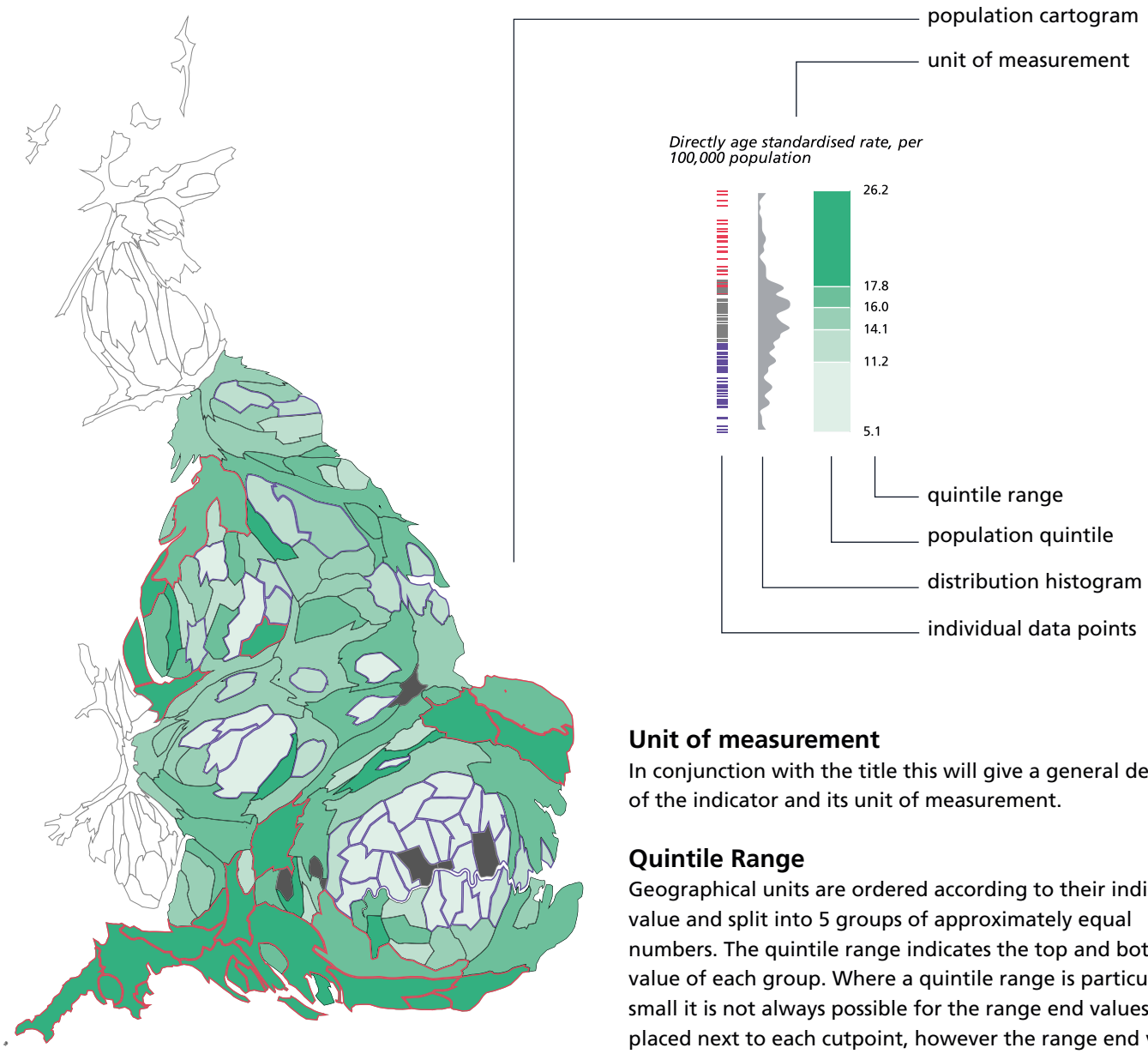
Chapter 6 Cancer trends

National Cancer Data Repository, provided by Public Health England (West Midlands Knowledge and Intelligence Team)
NB: Incidence excludes ICD-10 C44 (non melanoma skin cancer)

Chapter 7: Liver disease

NHS Information Centre for Health and Social Care (2013) Health Survey for England 2012. Available from: http://data.gov.uk/dataset/health_survey_for_england

How to read the maps



Population Cartograms

All maps in this report are population cartograms. A population cartogram, or *isodemographic map* is where each geographical unit has been scaled so that it is approximately proportional to the size of the resident population in that area, with minor size adjustments for areas with especially high or low population or density. Map keys for the different geographical units used are provided here.

Where analysis has been undertaken to determine which geographical units are significantly ($p<0.05$) greater or less than the national average, significantly different indicator values are identified by the boundary of the geographical unit being coloured red or blue.

Where no data is available, or data has been suppressed due to small numbers, geographical units are coloured dark grey.

Unit of measurement

In conjunction with the title this will give a general definition of the indicator and its unit of measurement.

Quintile Range

Geographical units are ordered according to their indicator value and split into 5 groups of approximately equal numbers. The quintile range indicates the top and bottom value of each group. Where a quintile range is particularly small it is not always possible for the range end values to be placed next to each cutpoint, however the range end values given and the order in which they appear is correct.

Population Quintile

This is the key to the map. It identifies which quintile a geographical unit is part of and illustrates the range of each quintile.

Distribution Histogram

This is a smoothed histogram displaying the distribution of the underlying indicator values for the different geographical units.

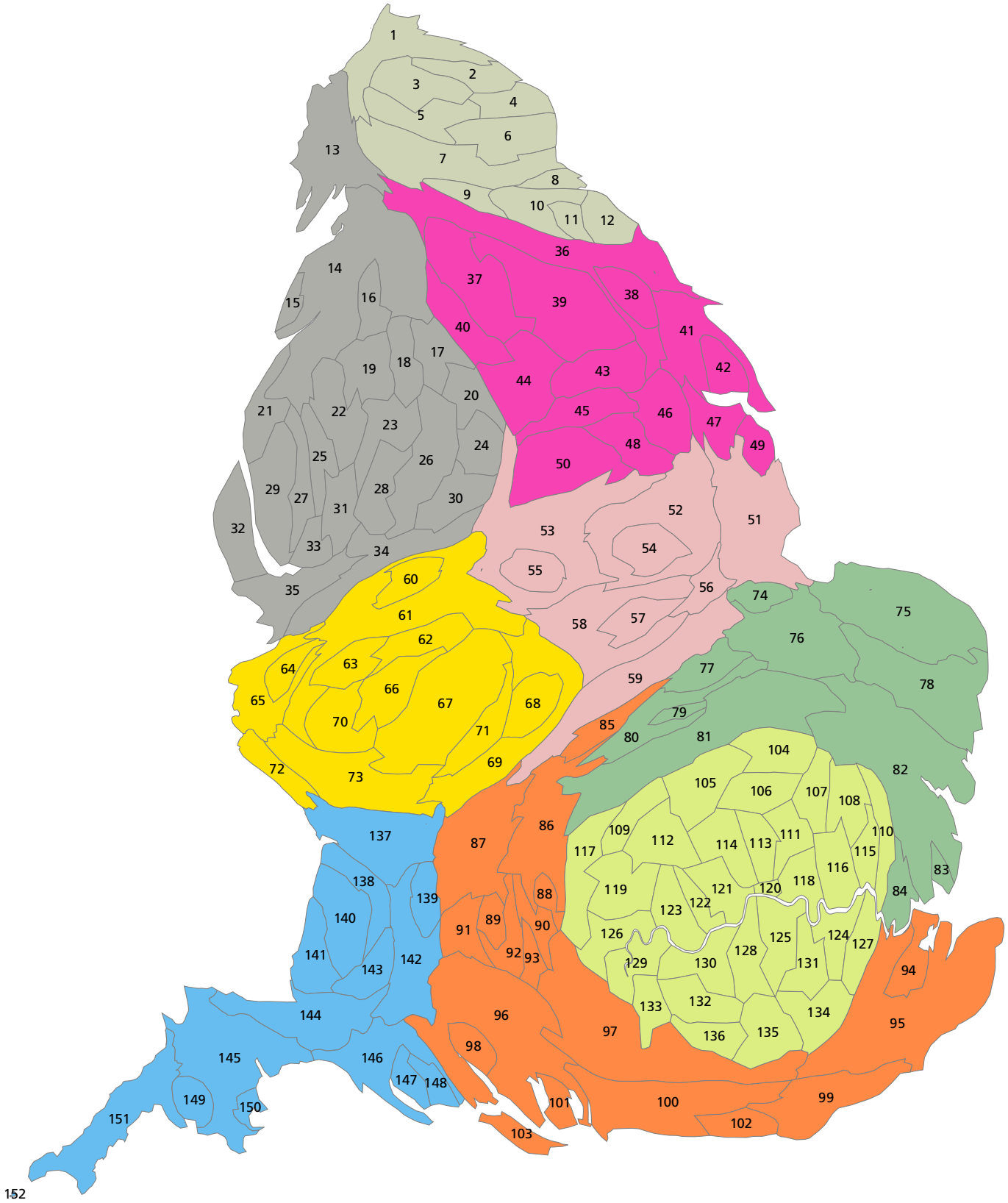
Individual data points

This is a plot of the indicator value for each of the geographical units. Where analysis has been undertaken to determine which geographical units are significantly ($p>0.05$) greater or less than the national average, significantly different indicator values are identified by being coloured red or blue.

Upper Tier Local Authorities

UA = Unitary Authority
MD = Metropolitan District
CC = County Council
LB = London Borough

This map shows each Upper Tier Local Authority, scaled to be proportional to the size of its resident population. This is the default geographical unit used in the report.



1. Northumberland UA
2. North Tyneside MD
3. Newcastle upon Tyne MD
4. South Tyneside MD
5. Gateshead MD
6. Sunderland MD
7. County Durham UA
8. Hartlepool UA
9. Darlington UA
10. Stockton-on-Tees UA
11. Middlesbrough UA
12. Redcar and Cleveland UA

13. Cumbria CC
14. Lancashire CC
15. Blackpool UA
16. Blackburn with Darwen UA
17. Rochdale MD
18. Bury MD
19. Bolton MD
20. Oldham MD
21. Sefton MD
22. Wigan MD
23. Salford MD
24. Tameside MD
25. St Helens MD
26. Manchester MD
27. Knowsley MD
28. Trafford MD
29. Liverpool MD
30. Stockport MD
31. Warrington UA
32. Wirral MD
33. Halton UA
34. Cheshire East UA
35. Cheshire West and Chester UA

36. North Yorkshire CC
37. Bradford MD
38. York UA
39. Leeds MD
40. Calderdale MD
41. East Riding of Yorkshire UA
42. Kingston upon Hull UA
43. Wakefield MD
44. Kirklees MD
45. Barnsley MD
46. Doncaster MD
47. North Lincolnshire UA
48. Rotherham MD
49. North East Lincolnshire UA
50. Sheffield MD

51. Lincolnshire CC
52. Nottinghamshire CC
53. Derbyshire CC
54. Nottingham UA
55. Derby UA
56. Rutland UA
57. Leicester UA
58. Leicestershire CC
59. Northamptonshire CC

60. Stoke-on-Trent UA
61. Staffordshire CC
62. Walsall MD
63. Wolverhampton MD
64. Telford and Wrekin UA
65. Shropshire UA
66. Sandwell MD
67. Birmingham MD
68. Coventry MD
69. Warwickshire CC
70. Dudley MD
71. Solihull MD
72. Herefordshire County UA
73. Worcestershire CC

74. Peterborough UA
75. Norfolk CC
76. Cambridgeshire CC
77. Bedford UA
78. Suffolk CC
79. Luton UA
80. Central Bedfordshire UA
81. Hertfordshire CC
82. Essex CC
83. Southend-on-Sea UA
84. Thurrock UA

85. Milton Keynes UA
86. Buckinghamshire CC
87. Oxfordshire CC
88. Slough UA
89. Reading UA
90. Windsor and Maidenhead UA
91. West Berkshire UA
92. Wokingham UA
93. Bracknell Forest UA
94. Medway UA
95. Kent CC
96. Hampshire CC
97. Surrey CC
98. Southampton UA
99. East Sussex CC
100. West Sussex CC

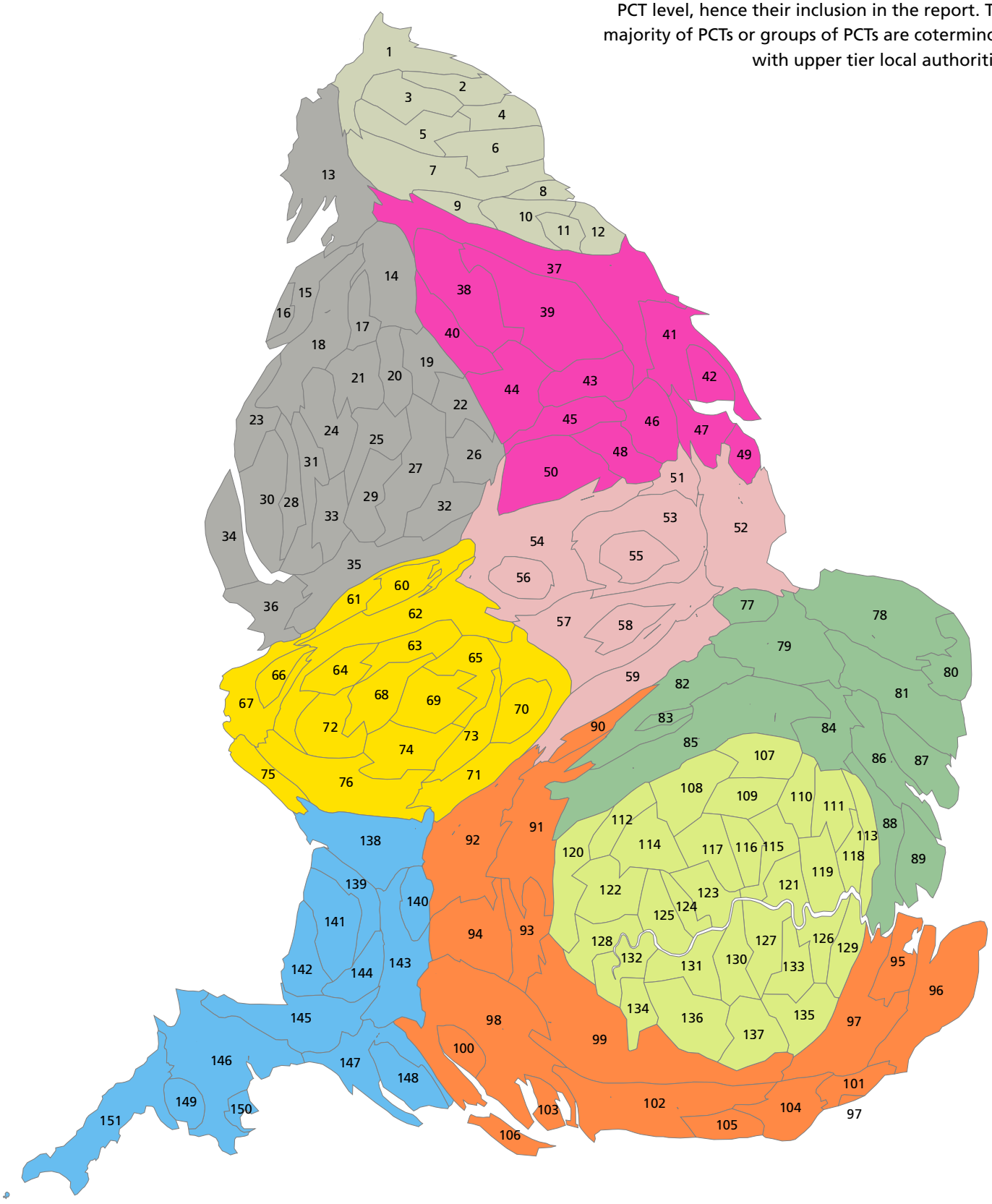
101. Portsmouth UA
102. Brighton and Hove UA
103. Isle of Wight UA

104. Enfield LB
105. Barnet LB
106. Haringey LB
107. Waltham Forest LB
108. Redbridge LB
109. Harrow LB
110. Havering LB
111. Hackney LB
112. Brent LB
113. Islington LB
114. Camden LB
115. Barking and Dagenham LB
116. Newham LB
117. Hillingdon LB
118. Tower Hamlets LB
119. Ealing LB
120. City of London LB
121. Westminster LB
122. Kensington and Chelsea LB
123. Hammersmith and Fulham LB
124. Greenwich LB
125. Southwark LB
126. Hounslow LB
127. Bexley LB
128. Lambeth LB
129. Richmond upon Thames LB
130. Wandsworth LB
131. Lewisham LB
132. Merton LB
133. Kingston upon Thames LB
134. Bromley LB
135. Croydon LB
136. Sutton LB

137. Gloucestershire CC
138. South Gloucestershire UA
139. Swindon UA
140. Bristol UA
141. North Somerset UA
142. Wiltshire UA
143. Bath and North East Somerset UA
144. Somerset CC
145. Devon CC
146. Dorset CC
147. Poole UA
148. Bournemouth UA
149. Plymouth UA
150. Torbay UA
151. Cornwall UA
152. Isles of Scilly UA

Primary Care Trusts

This map shows each Primary Care Trust (PCT), scaled to be proportional to the size of its resident population. PCTs are the unit of organisation of provision of primary care (GPs, Dentists, pharmacy services etc). These will be superseded by Clinical Commissioning Groups (CCGs). Currently a large proportion of health service data is collected at the PCT level, hence their inclusion in the report. The majority of PCTs or groups of PCTs are coterminous with upper tier local authorities.



1. Northumberland Care Trust
2. North Tyneside PCT
3. Newcastle PCT
4. South Tyneside PCT
5. Gateshead PCT
6. Sunderland Teaching PCT
7. County Durham PCT
8. Hartlepool PCT
9. Darlington PCT
10. Stockton-on-Tees Teaching PCT
11. Middlesbrough PCT
12. Redcar and Cleveland PCT

13. Cumbria Teaching PCT
14. East Lancashire Teaching PCT
15. North Lancashire Teaching PCT
16. Blackpool PCT
17. Blackburn with Darwen
18. Central Lancashire PCT
19. Heywood, Middleton and Rochdale PCT
20. Bury PCT
21. Bolton Teaching PCT
22. Oldham PCT
23. Sefton PCT
24. Ashton, Leigh and Wigan PCT
25. Salford PCT
26. Tameside and Glossop PCT
27. Manchester Teaching PCT
28. Knowsley PCT
29. Trafford PCT
30. Liverpool PCT
31. Halton and St Helens PCT
32. Stockport PCT
33. Warrington PCT
34. Wirral PCT
35. Central and Eastern Cheshire PCT
36. Western Cheshire PCT

37. North Yorkshire and York PCT
38. Bradford and Airedale Teaching PCT
39. Leeds PCT
40. Calderdale PCT
41. East Riding Of Yorkshire PCT
42. Hull Teaching PCT
43. Wakefield District PCT
44. Kirklees PCT
45. Barnsley PCT
46. Doncaster PCT
47. North Lincolnshire PCT
48. Rotherham PCT
49. North East Lincolnshire Care Trust Plus
50. Sheffield PCT

51. Bassetlaw PCT
52. Lincolnshire Teaching PCT
53. Nottinghamshire County Teaching PCT
54. Derbyshire County PCT
55. Nottingham City PCT
56. Derby City PCT
57. Leicestershire County and Rutland PCT
58. Leicester City PCT
59. Northamptonshire Teaching PCT

60. Stoke On Trent PCT
61. North Staffordshire PCT
62. South Staffordshire PCT
63. Walsall Teaching PCT
64. Wolverhampton City PCT
65. Birmingham East and North PCT
66. Telford and Wrekin PCT
67. Shropshire County PCT
68. Sandwell PCT
69. Heart Of Birmingham Teaching PCT
70. Coventry Teaching PCT
71. Warwickshire PCT
72. Dudley PCT
73. Solihull
74. South Birmingham PCT
75. Herefordshire PCT
76. Worcestershire PCT

77. Peterborough PCT
78. Norfolk PCT
79. Cambridgeshire PCT
80. Great Yarmouth and Waveney PCT
81. Suffolk PCT
82. Bedfordshire PCT
83. Luton PCT
84. West Essex PCT
85. Hertfordshire PCT
86. Mid Essex PCT
87. North East Essex PCT
88. South West Essex PCT
89. South East Essex PCT

90. Milton Keynes PCT
91. Buckinghamshire PCT
92. Oxfordshire PCT
93. Berkshire East PCT
94. Berkshire West PCT
95. Medway PCT
96. Eastern and Coastal Kent PCT
97. West Kent PCT
98. Hampshire PCT
99. Surrey PCT
100. Southampton City PCT

101. Hastings and Rother PCT
102. West Sussex PCT
103. Portsmouth City Teaching PCT
104. East Sussex Downs and Weald PCT
105. Brighton and Hove City PCT
106. Isle Of Wight NHS PCT

107. Enfield PCT
108. Barnet PCT
109. Haringey Teaching PCT
110. Waltham Forest PCT
111. Redbridge PCT
112. Harrow PCT
113. Havering PCT
114. Brent Teaching PCT
115. City and Hackney Teaching PCT
116. Islington PCT
117. Camden PCT
118. Barking and Dagenham PCT
119. Newham PCT
120. Hillingdon PCT
121. Tower Hamlets PCT
122. Ealing PCT
123. Westminster PCT
124. Kensington and Chelsea PCT
125. Hammersmith and Fulham PCT
126. Greenwich Teaching PCT
127. Southwark PCT
128. Hounslow PCT
129. Bexley Care Trust
130. Lambeth PCT
131. Wandsworth PCT
132. Richmond and Twickenham PCT
133. Lewisham PCT
134. Kingston PCT
135. Bromley PCT
136. Sutton and Merton PCT
137. Croydon PCT

138. Gloucestershire PCT
139. South Gloucestershire PCT
140. Swindon PCT
141. Bristol PCT
142. North Somerset PCT
143. Wiltshire PCT
144. Bath and North East Somerset PCT
145. Somerset PCT
146. Devon PCT
147. Dorset PCT
148. Bournemouth and Poole Teaching PCT
149. Plymouth Teaching PCT
150. Torbay Care Trust
151. Cornwall and Isles Of Scilly PCT

Postscript

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Postscript

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Department of Health

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