Health inequalities briefing

Obesity and weight management: a briefing for NICE guideline developers and committee members

February 2023

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Executive summary

This briefing presents a targeted review of evidence exploring health inequalities in obesity and weight management. Its purpose is to support the full breadth of the guideline development process, from surveillance, through scoping and during the development stages to highlight the key areas of health inequalities.

It is designed to support both the NICE internal team and the committee to consider these inequalities when defining questions and making recommendations to target reducing inequalities and avoid exacerbation. The briefing also identifies key gaps, potential research questions and research recommendations.

Health inequalities exist between groups across different, often overlapping dimensions, including deprivation, geography, protected characteristics, and inclusion health groups (any population group that is socially excluded). These inequalities can be seen throughout the course of the condition, from health status and behavioural risk factors to the wider determinants of health and access to, experience of and quality of care.

Deprivation

Deprivation is the major underlying inequality underpinning differences in obesity levels, due to the dietary risk factors and wider determinants associated with deprivation. People in deprived areas often face significant barriers to accessing affordable, healthy food and to taking regular exercise These wider determinants hinder maintaining a healthy weight and can cause variation in people’s ability to follow weight management advice and recommendations.

Obesity has increased in the most deprived communities in England in recent years, leading to a widening gap between the most and least deprived areas. COVID-19 has increased inequalities for the groups most impacted by obesity.

Geography

There is geographical variation in levels of obesity with populations in the north and in coastal areas of particular concern. Much of the observed relationship correlates with deprivation and wider determinants.

Specific groups within the population

Rates of obesity are slightly higher in women than in men, but deprived women particularly face higher rates. People from certain ethnic family backgrounds, or inclusion health groups, have higher levels of obesity. There are overlaps here with deprivation, control over diet and physical activity and access to services tailored to the specific needs of these populations. Challenges for some groups have been highlighted, such as people with a learning disability and people in detention or secure units where opportunities to eat healthier or be active are limited by others and external factors.

Data and evidence on health inequalities is often lacking for people sharing certain protected characteristics and inclusion health groups and where this is the case the briefing has noted the gaps.

Life course

Childhood obesity is a strong predictor of adult obesity and associated ill health. Therefore, disparities in obesity in childhood is likely to worsen health outcomes and health inequalities for children from more deprived areas and other most affected groups later in their lives. Childhood obesity varies with ethnic background, is higher in boys and sharply increased in the 2020 to 2021 school year. Gaps in provision at all levels of weight management services for children have been noted.

Service access and uptake

Access to, and uptake, of services is variable across the country and population groups. This is not always matched to the expected burden. People in deprived areas may be less likely to complete weight management programmes, with socioeconomic factors influencing this. Men have lower referral rates for community and hospital services. Further analysis of these

relationships with lower uptake and completion, to address inequalities, would be beneficial. In the immediate term ensuring commissioners and providers monitor the uptake of interventions to be able to identify and target groups with lower uptake is vital.

Implications

In developing guidelines and recommendations, consideration should be given to the drivers of obesity, particularly deprivation, to ensure guidance do not inadvertently widen inequalities. For example, how recommendations can be tailored to the realities of food insecurity for the most deprived, who also face the highest level of obesity.

Services need to be designed in a way that is tailored to the populations who need to use services most and realistic for the underlying barriers they face. Working on design with people in these higher burden groups, to ensure this, is vital.

Lastly, continued advocacy is needed with partners across the system to tackle the inequalities that drive obesity.

For a more detailed discussion of implications and examples of how the findings of this report could be used, including some key sample review questions and recommendations, see the implications for NICE section.

1 Introduction

Health inequalities are systematic, unfair, and avoidable differences in health across the population and between different groups within society (see also the section on health inequalities in developing NICE guidelines: the manual). They arise because of the conditions in which we are born, grow, live, work and age. These conditions influence our opportunities for good mental and physical health and wellbeing.

This health inequalities briefing describes the key inequalities faced by populations in England in relation to the burden of obesity they face, the risk factors and wider determinants that underpin obesity and access and experience of services to manage weight.

It is a pragmatic targeted review of evidence exploring health inequalities in obesity and related services. In general, data availability on measures of health inequalities can be poor or absent. The briefing largely uses routinely available data sources but has included quantitative and qualitative research findings, and published reports on inequalities where gaps in data exist.

A fuller description of methods is in the appendix.

The identification and classification of overweight and obesity is covered in NICE's guideline on obesity: identification, assessment and management. For conciseness this report has only included detailed data on obesity based on Body Mass Index (BMI) cut offs.

2 Burden of obesity

The 2019 NHS Health Survey for England shows that most adults in England, 68% of men and 60% of women, are living with overweight or obesity. The Office for Health Improvement and Disparities (OHID) obesity profile shows that in England 1 in 3 children leaving primary school is overweight or have with obesity. The UK compares poorly with other high-income countries and has one of the highest rates of obesity in Europe (Organisation for Economic Cooperation and Development's Health at a Glance: Europe 2020).

2.1 Socioeconomic factors and deprivation

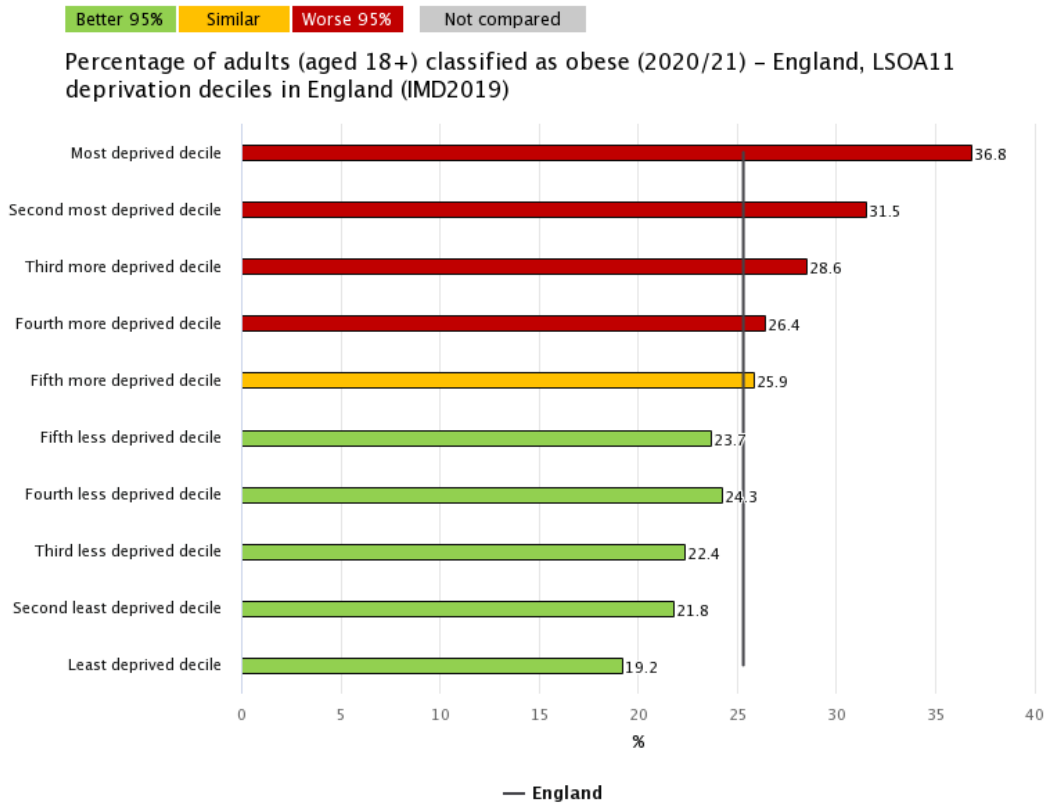
Some people are more likely to become overweight or obese than others. One of the strongest relationships is between deprivation and both adult and childhood obesity.

Adults

The greatest rates of adult obesity are seen in the most deprived parts of the country (Figure 1). The 2019 NHS Health Survey for England shows this difference is particularly pronounced for women, with 39% of women in the most deprived areas are obese, compared with 22% in the least deprived areas. In 2019 the obesity gap between the most and least deprived areas stood at 8% for men and 17% for women (Health Survey for England data tables). This gap appears have grown in recent years. The King's Fund's tackling obesity: the role of the NHS in a whole-system approach shows in 2014 the gap was 2% for men and 11% for women. This has been driven by increases in prevalence in the most deprived areas, while rates of obesity have remained constant in the least deprived areas.

Links between obesity and other measures of socioeconomic background are also seen in the OHID obesity profile education data. For example education; the percentage of people with no qualifications who are obese is almost 16% higher than among people with level 4 qualifications or higher (a degree).

Figure 1: Relationship between adult obesity and level of deprivation in England



Source: OHID obesity profile

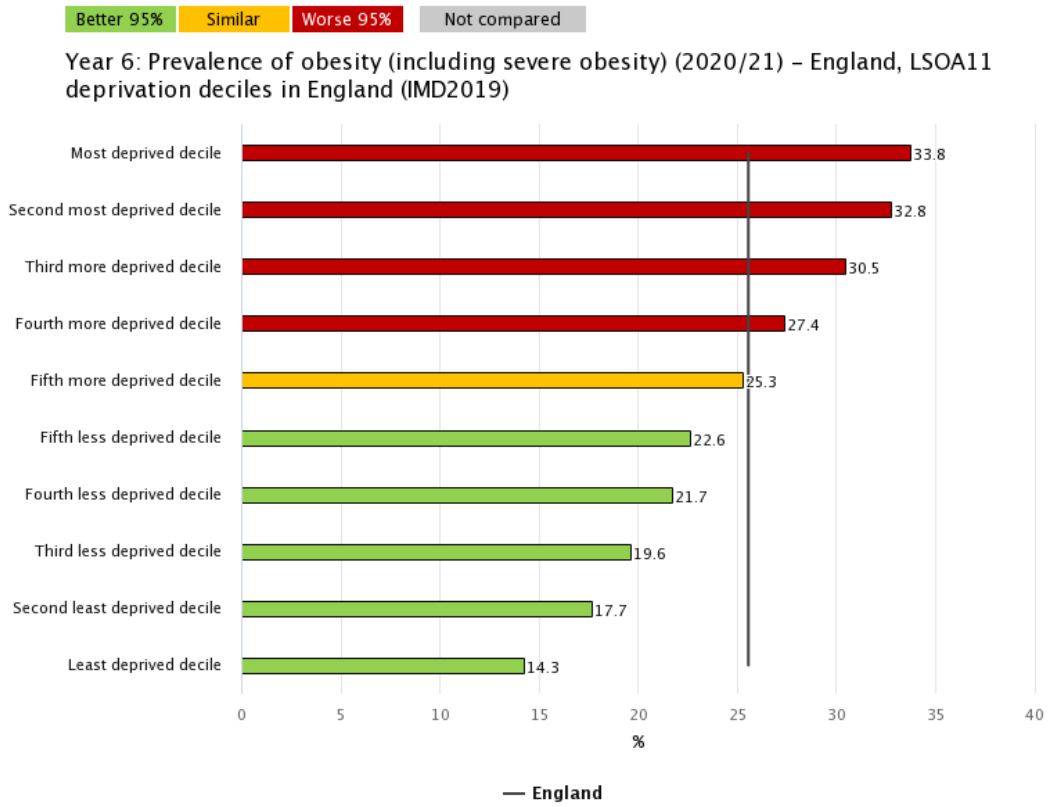
Being overweight or obese in pregnancy has short and longer-term risks for the pregnant woman and child. Obesity in early pregnancy, as measured by the percentage who are obese at the time of their initial (booking) appointment with a midwife, shows the same relationship with deprivation as obesity in adults overall (OHID obesity profile early pregnancy data). In England overall obesity in early pregnancy is 22%, in the most deprived decile it is 28.5% and in the least deprived decile 15%.

Children

The National Child Measurement Programme (NCMP) for England, 2020/21 school year found children living in the most deprived areas were more than twice as likely to be obese than those living in the least deprived areas. At the start of primary school (reception year, aged 4 to 5 years old) 20% of children living in the most deprived areas were obese compared with 8% of those living in the least deprived areas. By the end of primary school (year 6, aged

10 to 11 years old) 34% of children living in the most deprived areas were obese compared with 14% of those living in the least deprived areas (Figure 2).

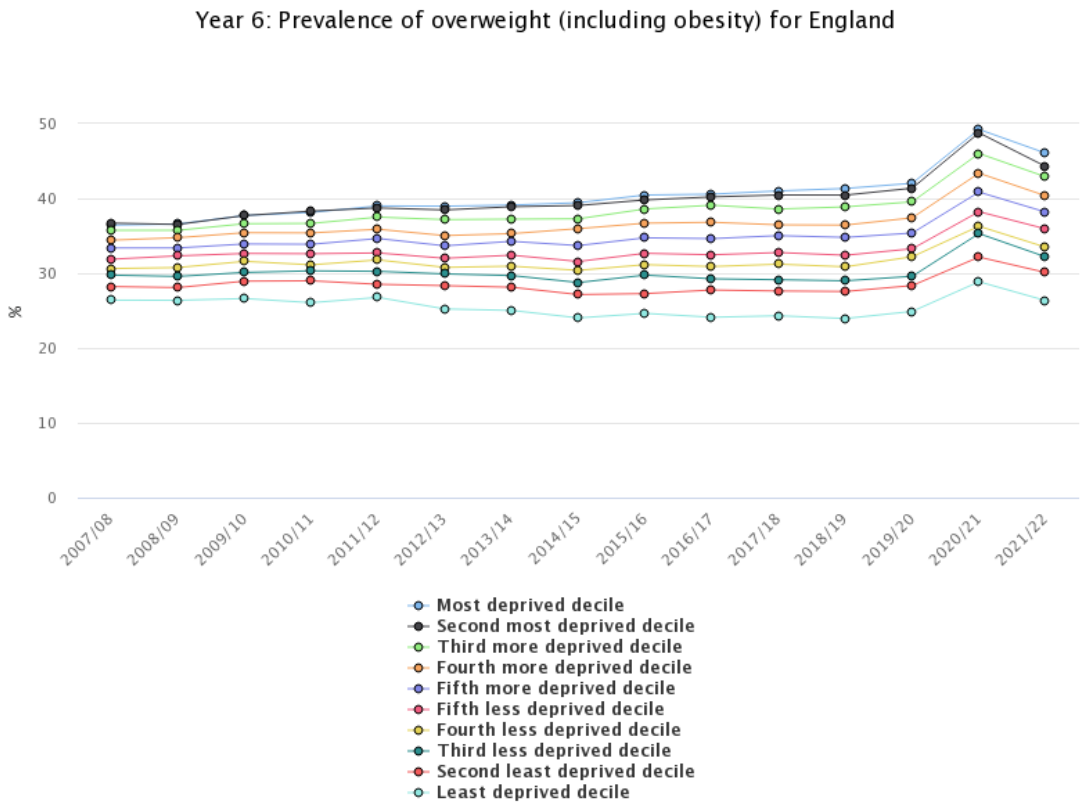
Figure 2: Relationship between childhood obesity and level of deprivation in England



Source: OHID obesity profile

For children leaving primary school the gap in obesity prevalence between those from the most and least deprived areas has grown between 2007/8 and 2021/22 (Figure 3 and OHID obesity profile Year 6 prevalence of obesity (including severe obesity)). As with adults, the gap has widened because of increases in obesity among the most deprived children, while rates among the least deprived have remained more steady.

Figure 3 Trend in range of child obesity prevalence across the social gradient from most to least deprived



Source: OHID obesity profile

Childhood obesity is a strong predictor of adult obesity and associated morbidities (Llewellyn et al. Childhood obesity as a predictor of morbidity in adulthood: a systematic review and meta-analysis). These disparities are likely to indicate worse health outcomes and entrenched health inequalities for children from more deprived areas later in their lives and as they become adults.

The disparities in childhood obesity with deprivation is more marked in the UK compared with other high-income countries. The OECD's Health at a Glance: Europe 2020, which uses the measure of family affluence rather than deprivation, reports the gap in overweight and obesity prevalence between children from the most and least affluent families in the UK was 26% in 2018. This was the largest gap recorded in any EU country and the EU average gap was 8%.

Hospital admissions

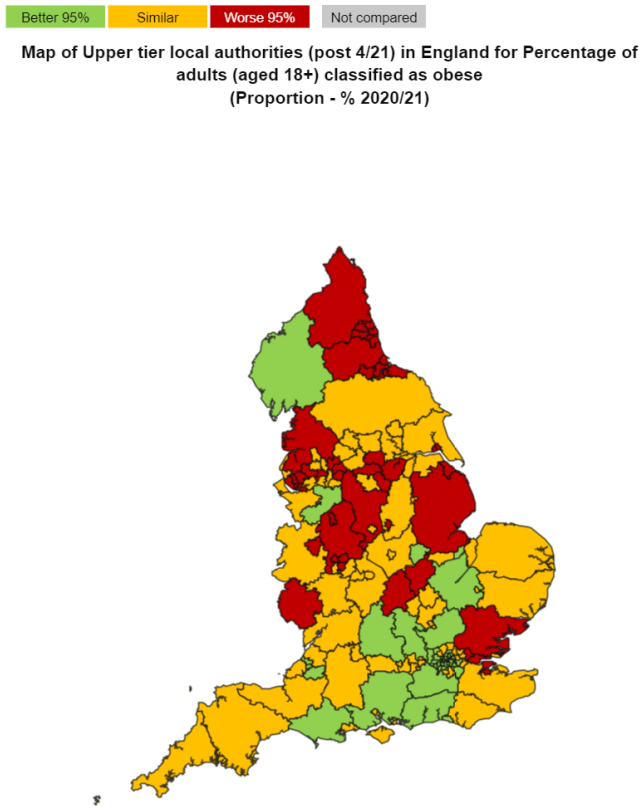
As with overall prevalence of obesity, the Office for National Statistics (ONS) statistics on obesity, physical activity and diet, England 2021 found rates of hospitalisation attributable to obesity increase in line with deprivation. Admissions directly attributable to obesity were over 3 times more likely in the most deprived areas, compared with the least deprived areas.

Women are almost twice as likely as men to have an obesity-related hospital admission. The rate of obesity-related hospital admissions for women from the most deprived areas is nearly twice as high as for women from the least deprived areas. There are also significant disparities between men from the most and least deprived communities (ONS statistics on obesity, physical activity and diet, England 2021), but deprivation is not such a strong of a predictor of obesity-related hospital admissions among men (King's Fund's tackling obesity: the role of the NHS in a whole-system approach).

Geographic areas of higher burden

Adult obesity is unevenly distributed geographically across England (Figure 4 and OHID obesity profile adult prevalence data). Some areas with the highest rates of obesity are clustered around urban areas in the North East and North West of England as well as parts of the East and West Midlands. The lowest rates, with some notable exceptions, are around London and the South of England. There is considerable overlap between these geographical areas and areas of higher deprivation.

Figure 4: Map of adult obesity levels compared with England average

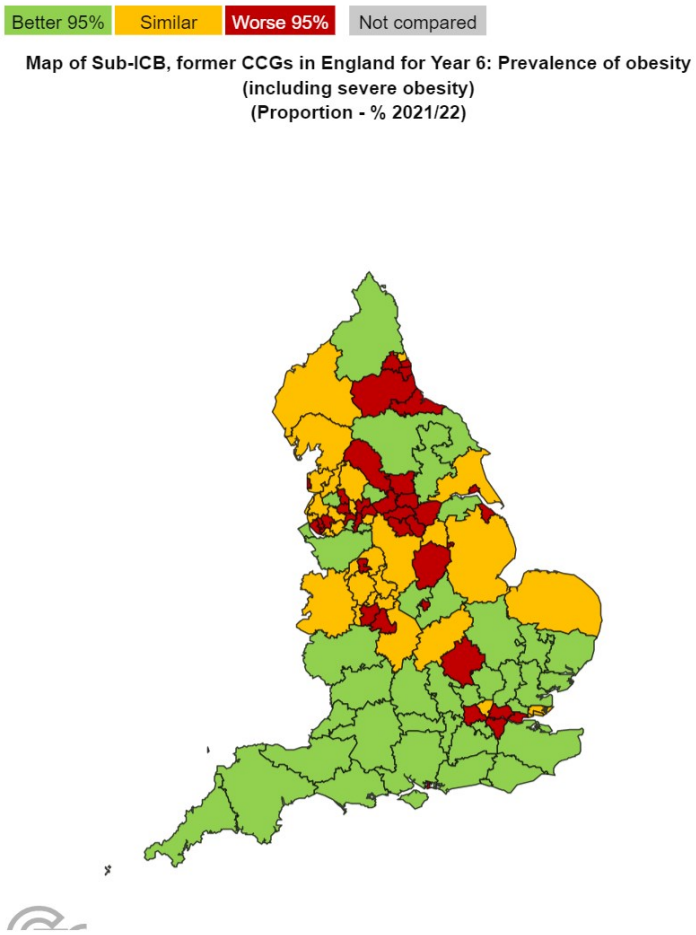


Source: OHID obesity profile

OHID obesity profile data on obesity in early pregnancy shows levels appear to follow adult obesity patterns, with levels highest in the North East and West Midlands.

OHID obesity profile data on geographical distribution of childhood obesity by the end of primary school shares some of the same patterns as adults (figure 5). High levels are seen in urban areas in the North East and North West of England and the West Midlands. However, some of the highest level of obesity in children are in London, such as the area covered by the NHS North East London Integrated Care Board. Again, there is considerable overlap between these geographical areas and areas of higher deprivation.

Figure 5: Map of childhood obesity at the end of primary school compared with England average



Source: OHID obesity profile

Deprived areas with a lack of social capital (see ONS 2021 census data on social capital), connections between people that result in a well-functioning and close-knit society, referred to as 'left-behind areas', have higher rates of long-term illness and mortality rates from some diseases than other deprived areas (Public Health England Health Profile for England: 2021). Coastal areas of England are one example of often left-behind areas. High levels of deprivation, driven in part by major and longstanding challenges with local economies and employment, are important reasons for the poor health outcomes in coastal communities. The Chief Medical Officer's annual report 2021: health in coastal communities estimated the 'coastal effect' on the number of patients on selected GP disease registers. Obesity showed a 2% coastal excess.

2.3 Protected characteristics and burden

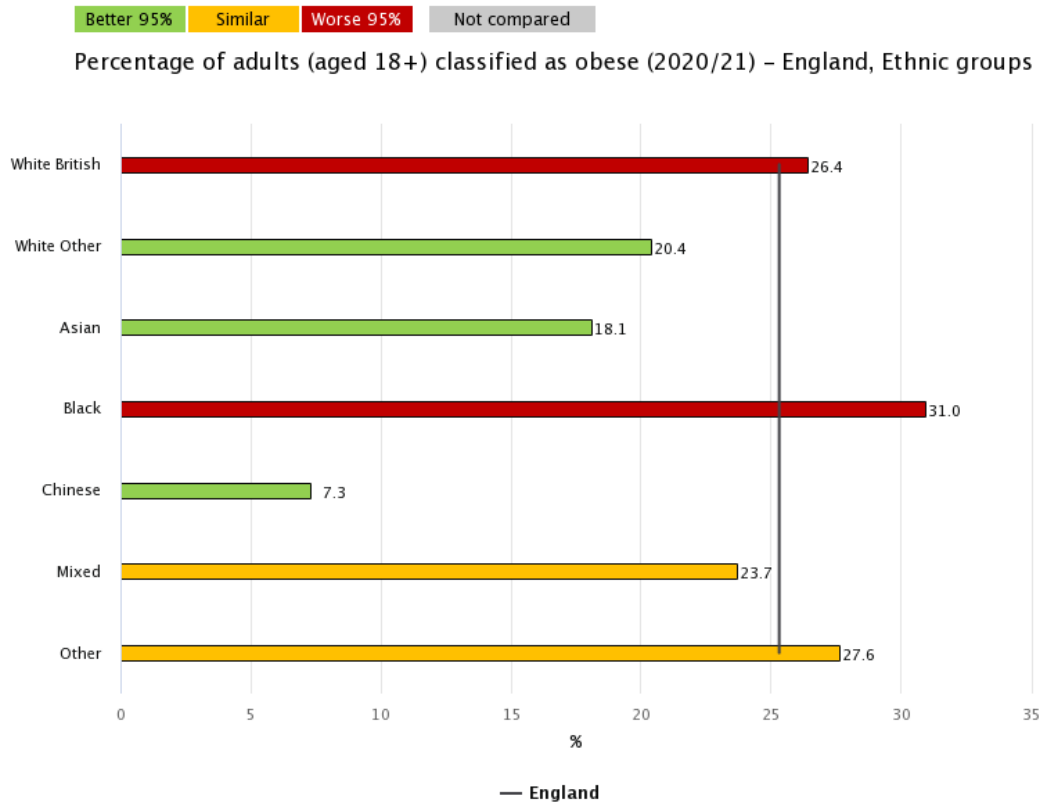
The following characteristics are protected characteristics, as they appear in the Equality Act 2010; age; disability; gender reassignment; marriage and civil partnership; pregnancy and maternity; race; religion or belief; sex; sexual orientation.

Ethnicity

People from certain ethnic groups, are more likely to be overweight and obese, and have a higher susceptibility to particular diseases linked to excess weight, such as type 2 diabetes. People from Black and Asian family backgrounds have adverse health outcomes at a lower BMI than people from a White family background, and in NICE's guideline on obesity: identification, assessment and management thresholds for intervention are set at a lower level accordingly.

OHID obesity profile adult prevalence data shows that compared with people from a White British family background, obesity prevalence is higher in adults from a Black family background and lower among groups of people from some other ethnic family backgrounds, being lowest in people from a Chinese family background (Figure 6).

Figure 6: Relationship between adult obesity and ethnic background in England



Source: OHID obesity profile

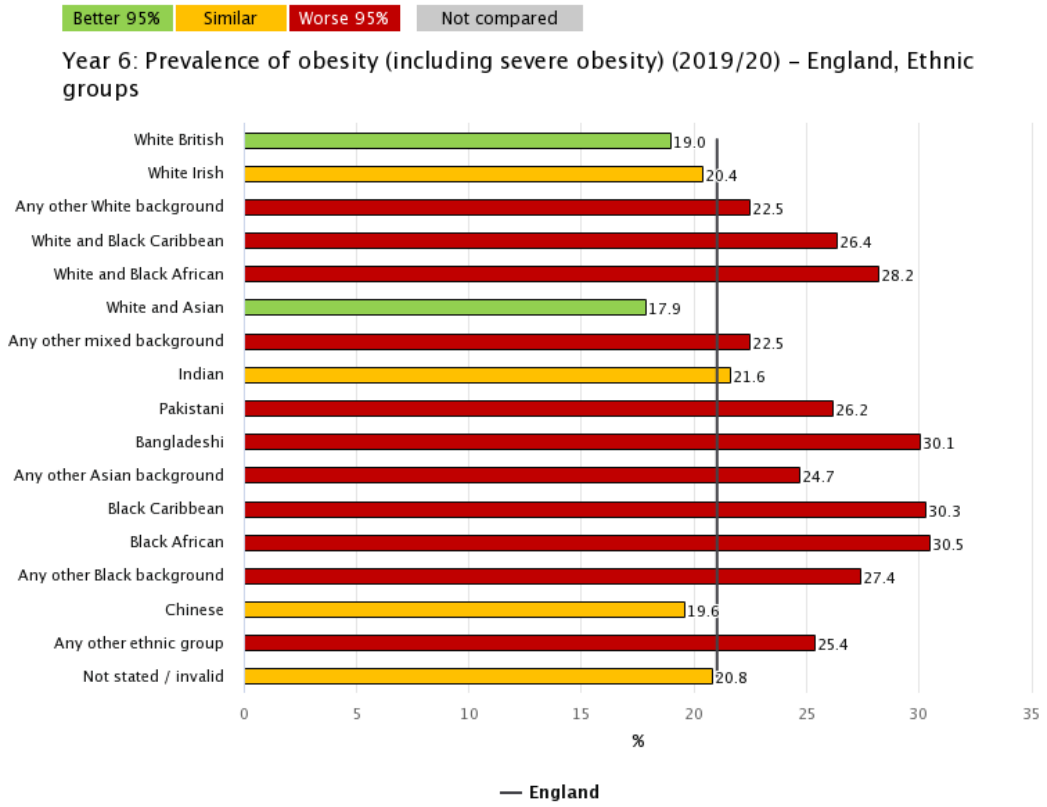
The health report of the Commission on Race and Ethnic Disparities highlighted the limitations of data on obesity and ethnic family background. Few studies explore, and statistically adjust for, potential predictors of obesity among people from different backgrounds, particularly the known risk factors for obesity such as socioeconomic status, maternal obesity, physical activity, and diet. This makes it difficult to know why differences arise. Use of aggregated ethnicity categories, such as South Asian, can mask important differences between smaller groups.

National Child Measurement Programme (NCMP) data on obesity prevalence at the start of primary school and end of primary school in England shows this varies by ethnic background (Figure 7). Obesity prevalence is highest in children from a Black African, Black Caribbean and Bangladeshi family background. Public Health England's 2019 analysis of differences in child obesity by ethnic group, adjusting for other explanatory variables, found ethnicity on its own influences obesity prevalence. This was in both Year 6

and Reception boys and girls and after a range of factors, including deprivation, are considered.

The NCMP data on changes in the prevalence of child obesity between 2019 to 2020 and 2020 to 2021 found disparities in obesity prevalence between children of different ethnic backgrounds had increased, with groups that previously had the highest obesity prevalence, in the most part, experiencing the largest increases.

Figure 7: Relationship between childhood (age 10/11) obesity and ethnic background in England



Source: OHID obesity profile

Age

The percentage of adults classified as overweight or obese tends to increase with increasing age, with the lowest prevalence in 16 to 24 year olds. This peak occurs for men at the 55 to 64 year age group (82%) and in the 65 to 74 year age group in women (70%), followed by a decline in the oldest age group for men and women.

NCMP data on changes in the prevalence of child obesity between 2019 to 2020 and 2020 to 2021 showed a very sharp increase in the prevalence of obesity at both the start and end of primary school. It is not known whether the recent increase is evident across children of all ages and whether trends will continue at this new higher rate or begin to return to pre-pandemic levels.

Sex

The ONS Health Survey for England 2019 shows a slightly higher proportion of women are obese compared with men, 27% of men and 29% of women in the latest data. As noted above, women in deprived areas are particularly affected. However, NCMP data on the England 2020/21 school year for children shows boys have a higher obesity prevalence than girls at both the start and by the end of primary school. At the end of primary school 29% of boys are obese compared with 22% of girls. In the NCMP data on changes in the prevalence of child obesity between 2019 to 2020 and 2020 to 2021 boys, particularly those in the last year of primary school, experienced the largest increases in obesity and severe obesity. This is after the COVID-19 pandemic which led to school closures and other public health measures and more data is needed to know whether this is a long-term increase.

Disability

OHID obesity profile adult prevalence data shows that the prevalence of obesity is 20% higher among disabled adults than among those not reporting disabilities. The Public Health England (PHE) severe mental illness and physical health inequalities briefing shows that the prevalence of obesity in adults with severe mental illness is almost double that for other adults aged 15-74 years. PHE's Obesity and weight management for people with learning disabilities: guidance shows that adults with a learning disability have high levels of obesity, at 31% and 45% for men and women respectively. It also shows that within people with learning disabilities, there are increased risks of obesity for people with Down's syndrome, people of higher ability, people living in less restrictive environments and women living in more deprived areas. Female sex is the most consistent risk factor for overweight and obesity in people with a learning disability. The UK's Millennium Cohort Study

shows children with a learning disability are also a high-risk group obesity (Emerson et al. Obesity in British children with and without intellectual disability). They are significantly more likely than other children to be obese at primary school.

Some of the risk factors that may explain these differences include medications that cause weight gain, and the amount of control people may have over their diet and activity, outlined later in this briefing.

Maternity

Differences in the prevalence of obesity in early pregnancy in the OHID obesity profile shows levels are highest in people from a Black family background, in those having a second or subsequent pregnancy and in those aged 20 to 30 and over 40 years. The 2021 Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK report highlighted the high proportion of women who die during or after pregnancy who are overweight or obese. The risk factors for obesity in pregnancy and maternal mortality cluster, as there is a more than fourfold difference in maternal mortality rates among women from Black family backgrounds compared with women from White family backgrounds. In addition, there is a fourfold higher maternal mortality rate among women aged 40 or over.

Sexual orientation

The Health Survey England additional analyses - health and health-related behaviours of lesbian, gay and bisexual adults shows a lower proportion of lesbian, gay or bisexual adults are overweight or obese (51%) than heterosexual adults (63%). The prevalence of overweight and obesity was similar across people from White and other ethnic family backgrounds.

Protected characteristics lacking data

No data or evidence was found in relation to obesity and the protected characteristics of gender reassignment, marriage / civil partnership, or religion.

2.4 Inclusion health groups

Inclusion health refers to any population group that is socially excluded (see the NHS Inclusion Health: applying All Our Health). This can include people who experience homelessness, drug and alcohol dependence, vulnerable migrants, Gypsy, Roma and Traveller communities, sex workers, people in contact with the justice system and victims of modern slavery. These groups are not routinely captured in public health or NHS datasets. A targeted search of published research and other governmental and non-governmental literature was undertaken to gather data and evidence, if it exists.

Various forms of detention are linked to higher levels of obesity. Research highlights the risk of weight gain while in prison and an increase in prevalence of being overweight and obese during or after incarceration (Bondolfi et al. Impact of incarceration on cardiovascular disease risk factors: a systematic review and meta-regression on weight and BMI change). Some risk factors identified for weight gain during incarceration include being a man from a Black family background, being a woman, especially women who quit smoking during incarceration and taking antidepressant or antipsychotic medication.

NHS England's managing a healthy weight in adult secure services – practice guidance shows the prevalence of obesity in adult secure settings, for those with mental health conditions, is 2 to 3 times greater than in the general population. There appears to be an increased risk of weight gain when detained and weight gain with certain medication, such as antipsychotics, is highlighted as an underlying factor.

Looked after children, that is children who have been in the care of their local authority, are a vulnerable group, with increased health needs compared with other children and young people from comparable backgrounds. A small-scale study conducted in England, found that looked after children are more likely to be overweight and obese and many have weight gain while in care (Bailey et al. audit of looked after children in residential care and BMI increase in one UK local authority).

People from Gypsy, Roma and Traveller communities (see the government's Gypsy, Roma and Irish Traveller ethnicity summary) have very poor self-reported health overall and an excess of conditions such as type 2 diabetes, which may suggest a high level of obesity (Friends, Families and Travellers' how to tackle health inequalities in Gypsy, Roma and Traveller communities). However, reliable estimates for the level of obesity in these communities was not found.

Evidence on the levels of obesity in migrant groups is mixed, partly because of the wide variation in who may fall under this term. Studies from the US and UK show migrants have a higher prevalence of obesity, compared with their compatriots who had not migrated, the levels of obesity increasing over time since migration and in some groups overtaking the population averages for the country they have migrated to (Murphy et al. obesity in international migrant populations; Ismail et al socioeconomic determinants of cardiovascular diseases, obesity, and diabetes among migrants in the united kingdom: a systematic review).

Not all inclusion health groups have a higher prevalence of obesity than the general population. For example, people who experience homelessness in Europe and Canada, have lower rates of obesity (Fazel et al. The health of homeless people in high-income countries: descriptive epidemiology, health consequences, and clinical and policy recommendations).

No relevant literature was found for some inclusion health groups, such as sex workers.

3 Underlying risk factors - diet and physical activity

3.1 Deprivation and diet

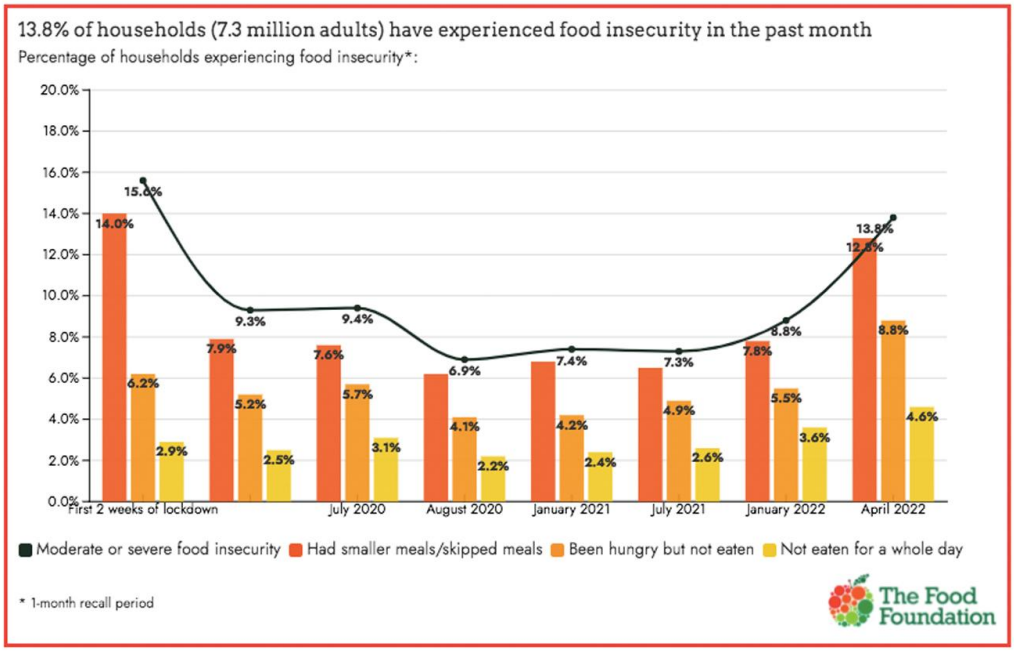
Poor diet is the principal risk causing obesity. The Food Foundation's dietary health disparities across socio-economic groups: a data story shows people on lower incomes have less healthy diets in general, are more likely to experience food insecurity and have less disposable income for food.

The OHID obesity profile fruit and vegetable data shows proportion of the population meeting the recommended 5 portions of fruit and vegetables on a usual day was around 55% in 2019 to 2020. The OHID consumption by deprivation decile data shows there were inequalities within this, for example this proportion was lower for people who were unemployed (45.2%), working in routine and manual occupations (45.8%), or living in the most deprived areas (45.7%).

The price and affordability of food is a key component in the inequalities seen. The Food Foundation's data story shows food prices in the UK are rising. Healthier food is more expensive per calorie. Healthy diets are often beyond the financial means of low income households and analysis by Banks et al. (Is healthy eating for obese children necessarily more costly for families?) suggest a poor diet at a budget supermarket is the cheapest of all food purchasing options. The relative affordability of food can be measured by the share of the household budget going on food. In the UK, the Department for Environment, Food and Rural affairs' Family Food 2019/20 found that an average 11% of household spend went on food in 2019/20, while for the 20% lowest income households it was higher at almost 15%.

Food insecurity, sometimes referred to as food poverty, means being without reliable access to enough affordable, nutritious food. The Food Foundation food insecurity tracking is a series of nationally representative surveys in the UK since the outbreak of the COVID-19 pandemic (Figure 8). In April 2022 7.3 million adults, almost 14% of households, had experienced food insecurity in the past month. Almost 50% of households on Universal Credit experienced food insecurity in the 6 months October 2021 to April 2022. The Food Standards Agency's consumer insights tracker report for December 2021 to March 2022 reports a similar trend and in March 2022 over one in 5 participants skipped or cut down the size of meals for financial reasons, significantly higher than when tracking first began in April 2020.

Figure 8: Trends in food insecurity in the UK March 2020 to April 2022



Source: [The Food Foundation, Millions of adults missing meals as cost of living crisis bites]

The Food Standards Agency's insights tracker report found groups significantly more likely to report skipping meals, or cutting down the size of meals, because they could not afford food were younger participants (16 to 34-year-olds), those from larger households, households with at least one child, participants from lower socioeconomic backgrounds, on lower incomes and urban compared with a rural setting. [The Trussell Trust and Heriot Watt University's State of Hunger project year 2 report] found that the risk of being food insecure is higher among younger people, single parents, people from an ethnic minority family background, social renters, and people in poor health.

Food bank use in the UK has increased in line with rising food costs and food insecurity. The largest food banks network in the UK, the Trussell Trust, distributed 61,000 emergency food parcels in 2010/11, rising to 2.5 million in 2020/21, this is an increase of 128%. The Food Standards Agency's insights tracker in March 2022, reported 15% of participants using a food bank or food charity to access food. This is the highest proportion, and a statistically significant increase, since tracking began in April 2020.

The Food Standards Agency's insights tracker and the State of Hunger project outline that the people most often helped by food banks are unemployed, unable to work or having benefit problems, disabled people or people with ill health, and single parent families. One in 5 users of food banks are homeless. The socio-demographic profiles of people who report food insecurity and people who were referred to food banks in the Trussell Trust network are similar, but people aged 16-24 report high levels of food insecurity but low levels of referrals to food banks.

Research literature raises concerns about the quality of food bank parcels. Fallaize et al. and Oldroyd et al. found they may not align with UK government dietary recommendations, have excess energy, carbohydrate and sugar and struggle to meet individual health, social, and cultural dietary needs. (Fallaize et al. Nutritional adequacy and content of food bank parcels in Oxfordshire, UK: a comparative analysis of independent and organisational provision; Oldroyd et al The nutritional quality of food parcels provided by food banks and the effectiveness of food banks at reducing food insecurity in developed countries: a mixed-method systematic review)

The government's Select Committee on Food, Poverty, Health and the Environment session on fixing the failures in food found the barriers to eating healthily are not just about income and choice; there are other psychosocial factors associated with deprivation and poverty that make eating healthily harder. Living in poverty, or ongoing food insecurity, is associated with high levels of stress, meaning that people may not have the mental energy to make choices or dedicate time and effort to cooking and preparing food that is nutritionally balanced.

The Food Foundation's data story shows dietary differences seen between the North and South of England are driven by socioeconomic differences and wider determinants. Incomes are lower in the north and a higher proportion of people are on Universal Credit or living in poverty. Regional patterns in OHID obesity profile fruit and vegetable consumption data show in the North of England diets are typically less healthy, in terms of fruit and vegetable or fast-food consumption.

3.2 Deprivation and physical activity

While physical activity is secondary to diet in terms of causes of obesity, it can support weight loss and improve health. Sport England's Active Lives surveys show adults and children from lower socioeconomic groups report lower levels of physical activity than higher income groups. OHID obesity profile adult physical activity data show around a half of adults in the most deprived areas of England meet the recommended level of physical activity compared with almost three quarters of adults in the least deprived areas. For children, 39% from the least affluent families are active for the recommended time compared with 50% in the most affluent families.

The King's Fund's tackling obesity: the role of the NHS in a whole-system approach found the reasons for lower levels of physical activity in more deprived areas are multifactorial, cutting across economic, social, geographic, and cultural factors. For example, levels of income will affect the relative affordability of accessing sports facilities or exercise classes, while a lack of access to green space or safe green space, can be a significant deterrent to physical exercise. As is the case with diet, some of the psychosocial factors associated with living in poverty will make finding time to exercise or prioritising physical activity difficult. For adults the OHID obesity profile adult physical activity data shows the regional variation in physical activity meeting recommendations broadly follows deprivation levels, with the north and London lowest. OHID obesity profile child physical activity data shows the West Midlands region has the lowest level of children meeting recommendations.

The OCSI left-behind areas report found people living in 'Left-behind' areas are less likely to be physically active than those living in other deprived areas, or England as a whole.

3.3 Diet, physical activity, and other populations

The PHE National Diet and Nutrition Survey follow up during COVID-19 found that across the British population the proportion of people meeting nutritional recommendations is poor. Consumption of fruit and vegetables is below the

NHS 5 A Day recommendation and mean intakes of saturated fat and free sugars exceeded maximum recommendations in all age groups. Within this some groups are even less likely to meet recommendations than others. Variation between groups and physical activity levels is also seen. Official data reports do not attempt to explain the reasons behind the differences seen in diet and physical activity between groups sharing protected characteristics.

The NHS Health Survey England Additional Analyses, Ethnicity and Health, 2011-2019 Experimental statistics shows average fruit and vegetable consumption varies with ethnicity from 3.3 to 4.6 portions a day among men and from 3.6 to 5.3 portions a day among women. Average consumption was lowest among men from Black Caribbean, White British, and White Irish family backgrounds. Considering age, no family background for women stood out as having particularly low consumption. The OHID obesity profile fruit and vegetable data shows that in general 5 a day consumption varies by sex, with almost 60% of adult females reporting meeting the target compared with 51% of adult males. Research literature found differences in food availability in households from different ethnic family backgrounds, for example Pakistani homes had more fresh fruit and sugar-sweetened beverages than White British homes (Bryant et al. An exploration and comparison of food and drink availability in homes in a sample of families of White and Pakistani origin within the UK).

Older adults have diets closer to recommendations than children or younger adults on several measures. The PHE National Diet and Nutrition Survey follow up during COVID-19 found that consumption of fruit and vegetables rises by age, the mean being 2.8, 3.7 and 4.5 portion per day for children aged 11 to 18 years, adults aged 19 to 64 years and adults aged 65 years over respectively. Mean intake of free sugars is highest in children aged 11 to 18 years.

Sport England's active lives adults survey for 2020-2021 found that just over 60% of adults met national activity recommendations, but this was lower in people from some groups. NHS statistics on obesity, physical activity and diet,

England, 2020 found hysical activity levels differ between ethnic family backgrounds and sexes. Adults from Asian and Black family backgrounds, and women, are most likely to report being physically inactive and least likely to report being active. The Commission on Race and Ethnic disparities independent report on health reviewed possible reasons for the differences described above. They highlight a range of factors including underestimation of recommended activity levels, perceptions of health and higher body weights, fear of racial harassment when exercising and lack of culturally appropriate opportunities for group-based activities.

Sport England's Active Lives adults survey found the number of adults meeting recommended activity levels generally decreases with age, with the sharpest decrease coming at age 75 and over to 39%, compared with over 60% meeting recommendations in all other adult age groups.

OHID obesity profile 5-a-day data show disabled adults report a lower 5 a day consumption than the overall population and the Sport England's Active Lives adults survey shows they have a lower likelihood to meet activity recommendations. Research into factors underpinning lower activity levels in people with a learning disability highlights the role of carers in terms of an acceptance of an inactive lifestyle and restrictions on activity due carer preferences and resource limitations (Cartwright et al. Barriers to increasing the physical activity of people with intellectual disabilities).

Sport England's Active Lives Children and Young People Survey Academic year 2020-21 found only 45% of children meet national activity recommendations. Boys and girls are equally as likely to be active. Activity levels among disabled children and young people or children and young people with long-term health condition are the same as for those without one. Activity levels are lowest for school Years 3-4 (ages 7-9) and higher in children younger and older than this. For activity by ethnic family background a similar pattern to adults is seen, with Black children and young people the least likely to be active (36%).

Activity by sexual orientation is not reported in the main activity surveys of adults and children conducted in England. The What About YOUth (WAY) survey 2014/15, found that at age 15 young people who stated they were gay, lesbian or bisexual were more likely to be sedentary for long periods each day than young people who stated they were heterosexual, straight or other. Research literature, however, found that sexual identity changes in men and women toward a more homosexual identity are associated with increases in physical activity and lower obesity prevalence (Fricke and Sironi Sexual fluidity and BMI, obesity, and physical activity).

People in prison face environmental challenges with maintaining a healthy diet and physical activity. House of Commons Health and Social Care Committee prison health 12th report comments that prison establishments frequently struggle to provide meals of a reasonable quantity and quality within the daily food budget, prisoners have little choice over what they eat, and healthy eating is difficult to promote. In addition, only 16% of prisoners were found to be unlocked for the recommended minimum of 10 hours per day. A third of people detained in local prisons, and almost 40% of people held in young adult prisons, were spending less than 2 hours out of their cell a day.

Active engagement in diet, exercise and other lifestyle interventions to reduce weight is also difficult to achieve in secure services, due to the severe, chronic nature of mental disorder, the treatments received, and the restrictions on freedom of movement (PHE's Managing a healthy weight in adult secure services – practice guidance).

3.4 Groups lacking data

No data or evidence was found in relation to dietary and physical activity risk and the protected characteristics of gender reassignment, marriage / civil partnership, or religion. No relevant literature was found for some inclusion health groups, such as sex workers.

4 Wider determinants of health and contribution to inequalities in obesity and risk factors

4.1 Food environment

The term 'obesogenic environment' refers to the role environmental factors may play in determining both nutrition and physical activity. Exposure to obesogenic environments is not equally felt by all (Public Health England: Obesity and the environment: increasing physical activity and active travel and Public Health England: Health matters: obesity and the food environment). There are significant inequalities in both the food and physical-activity environments, which drive the increased prevalence of obesity in deprived areas.

The density of fast-food outlets in local authorities varies greatly across England and outlets range from 26 to 232 per 100,000 population (PHE's Fast food outlets: density by local authority in England). This geographic variation is linked with deprivation as the availability of fast-food outlets increases with the level of deprivation, meaning on average, there are more fast-food outlets in deprived areas than in more affluent areas (PHE Obesity and the environment Density of fast food outlets 2017 map). Fast-food outlets tend to cluster in deprived areas due to cheaper rents and greater social desirability. Neighbourhood deprivation may therefore confound the association between the fast-food environment and obesity-related outcomes. (Green et al. The association between fast food outlets and overweight in adolescents is confounded by neighbourhood deprivation: a longitudinal analysis of the millennium cohort study).

Research evidence suggests food environments undermine efforts at weight management, consistently making purchasing and consumption of healthier food more difficult, particularly for those on a low income. For weight management to be more successful, concurrent actions to reshape food environments are necessary (Neve and Isaacs How does the food environment influence people engaged in weight management? A systematic review and thematic synthesis of the qualitative literature).

4.2 Natural and built environment

There are inequalities in the distribution, quality, quantity, and use of green space (PHE Improving access to greenspace: a new review for 2020). People living in the most deprived areas are less likely to live near green spaces. Some of the groups that use green space less often are older people, those in poor health, with a physical disability, of lower socioeconomic status, ethnic minorities, and those who live in deprived areas.

Although the links between access to green space and levels of physical activity appear well-established (PHE Local action on health inequalities: Improving access to green space), it is less clear if this follows that green space is linked with obesity. The PHE 'Improving access to greenspace: a new review for 2020' found the strength of the association for people living in greener urban environments being more likely to meet physical activity recommendations and less likely to be overweight or obese varies across demographic groups and contexts.

4.3 Impact of the COVID-19 pandemic

The COVID-19 pandemic has impacted wider determinants of health in complex ways, through school and business closures, disruption of normal daily patterns, social networks and support, changes in employment patterns and financial impacts. COVID-19 had a disproportionate effect on populations also facing higher levels of obesity, including people from certain ethnic family backgrounds and those living in more deprived areas (PHE Excess weight and COVID-19: insights from new evidence).

The PHE 'Excess weight and COVID-19' report also found that food purchasing, dietary habits and physical activity changed during periods of lockdown. The shifts in where food was purchased, and the types of food being bought, suggests diets became unhealthier, such as a marked increase in snacking. The OHID Wider Impacts of COVID-19 on Health monitoring tool found changes in food use behaviours were most visible among the younger age groups, households with children and those who were self-isolating. The

habits of most of the older age groups remained more consistent with before the pandemic.

As data above indicates, more people became food insecure because of the pandemic and the number of food banks and the quantity of emergency food parcels they distribute increased.

Sport England's Active Lives found the pandemic effects on physical activity were more mixed, with some positive impacts reported for some groups, but overall, the pandemic exacerbated inequalities in physical activity for adults and children. Closure of schools, sporting and leisure facilities, park facilities and recreational areas, together with an increase in screen time over the pandemic period led to a reduction in physical activity in children and young people. Sport England's Active Lives children and young people survey for the academic year 2020-21 found the reduction in physical activity in children had a greater impact on boys than girls and on those from Black and Mixed family backgrounds. Research showed that for children the differences in physical activity between ethnic family backgrounds was due to the large differences in whether children left the home and for how long between groups (Bingham et al. Covid-19 lockdown: Ethnic differences in children's self-reported physical activity and the importance of leaving the home environment; a longitudinal and cross-sectional study from the Born in Bradford birth cohort study).

Sport England's Active Lives adults survey for 2020-2021 found that women saw a more sustained drop in physical activity due to the pandemic and the overall impact was greater in lower socioeconomic groups, people from Black and Asian family backgrounds, those with a disability, long standing conditions, or illness. These are groups who were already more likely to be among the least active.

Some positive changes to the environment came as a response to COVID-19 that may help to promote physical activity, including infrastructure to support more walking and cycling. It is unclear if these changed may have benefited some groups more than others and increased inequalities.

During lockdown, local authority and NHS commissioned behavioural weight management services, (see PHE's Excess weight and COVID-19: insights from new evidence) which provide support to people wanting to change behaviour and achieve a healthier weight, were either paused or adapted. Many services continued to deliver using virtual and remote approaches. Some service users reported the virtual approach was convenient and saved having to find childcare or transport to attend a meeting. It is unclear however if the changes may have cause any inequalities in terms of ability to join virtual groups due to digital exclusion. (see NHS Digital's What we mean by digital inclusion)

5 Access and experience of services in relation to health inequalities

Different tiers of weight management services cover different interventions. Definitions vary locally but usually tier 1 covers universal services, such as health promotion or primary care; tier 2 covers lifestyle interventions; tier 3 covers specialist weight management services; and tier 4 covers bariatric surgery. No data sets on tier 1 services were found.

If data was available inequalities identified for certain groups in access and experience are outlined below.

5.1 Deprivation and impacts on access and completion

OHID's Adult tier 2 weight management services national data has been published but these are experimental statistics and are not complete. The available data does show referrals and enrolments to tier 2 programmes are highest in the most deprived groups, as would be expected in line with burden of obesity in these groups. However, completion of the programme does not follow the same pattern and suggests those in less deprived groups are more likely to complete. This is in keeping with data above on deprivation, dietary risk factors and food environment and with research literature that suggests food environments undermine efforts at weight management, consistently making purchasing and consumption of healthier food more difficult,

particularly for those on a low income (Neve and Isaacs How does the food environment influence people engaged in weight management? A systematic review and thematic synthesis of the qualitative literature). For weight management to be more successful, concurrent actions to reshape food environments are necessary, as well designing interventions tailored to people from more deprived backgrounds, bearing in mind their food environments, such as low-cost recipes.

In 2019/20 there were 6,740 hospital admissions with a primary diagnosis of obesity and a main or secondary procedure of bariatric surgery (NHS Digital: Statistics on Obesity, Physical Activity and Diet 2021: Data tables). Rates of referral are significantly higher in more deprived areas, although this appears proportional to actual rates of severe obesity. Between 2019/20 and 2021/22, 27% of all people with obesity who had bariatric surgery in England were from the most deprived socioeconomic quintile, compared to 12% from the least deprived quintile (The Health and Social Care Information Centre).

5.2 Sex and age differences in accessing services

The OHID adult tier 2 weight management data shows the most common age of referral for males and females is 45 to 59, and the pattern of referral by age largely fits the distribution of obesity by age. In 2021/22, 28% of people with obesity who had bariatric surgery were age 45-54 years, 24% were 35-44 years and 20% were 55-64 years. Just 1% of those with obesity who had surgery were age 75-120 years and 2% were 17-24 years (Health and Social Care Information Centre)

Over double the number of females compared with males are referred, which suggests a lack of access or uptake for men. This is also reflected by 76.2% of people with obesity who had bariatric surgery between 2019/20 and 2021/22 being female.

ONS statistics on obesity, physical activity and diet for England 2021 show that nationally, women are referred to weight-loss surgery at a rate 4 times that of men. King's Fund's tackling obesity: the role of the NHS in a whole-system approach found women from the most deprived communities have the

very highest referral rates at 5 times the rate at which men are referred. The 2020 National Bariatric Surgery Registry 3rd report highlights that men seek bariatric surgery later in the course of their disease, as the registry data shows they generally have a higher BMI and more obesity-related disease than female patients. The median age for male patients is consistently one to 2 years greater than for female patients according to registry data.

5.3 Geographic variation in services across England

In 2014/15 PHE (now OHID) conducted a PHE weight management services national mapping exercise to determine the provision of tier 2 and tier 3 weight management services provided by local authorities and clinical commissioning groups (CCGs). This suggested a reasonable geographical coverage across the country, with 73% of local authorities and 18% of CCGs confirming there was a weight management service for children and young people and/or adults,

Information on tier 3 services is limited. The 2014/2015 PHE mapping had a poor response rate so a conclusion on coverage of services available across England could not be made. This PHE mapping exercise referenced a Royal College of Physicians survey which resulted in around 21% of the CCGs in England describing a tier 3 adult service. Connected with limited data on tier 3 is a lack of guidance beyond members of the multi- disciplinary team in terms of interventions at this level. Tier 3 therefore varies across the country in terms of what is provided.

NHS statistics on obesity, physical activity and diet 2021: data tables show there is a regional variation in admissions for bariatric surgery, ranging from 7 to 22 admissions per 100,000 of population against the England average of 12 per 100,000 of population. Admissions are highest in the North East, which also has the highest regional level of obesity (OHID adult obesity profile data). However, other regions with high levels of obesity have some of the lowest bariatric admissions, such as North West and Yorkshire and Humber, suggesting there may be geographic variation in the match of burden and access or uptake of services. The 2020 National Bariatric Surgery Registry

report finds regional variation in England in NHS funding as well as the kinds of procedures performed.

Historically in the UK a mismatch between the burden of obesity and surgical volume expected to be seen has been observed which suggests that inequalities in uptake in areas of greatest need may occur (Bhanderi et al. Influence of social deprivation on provision of bariatric surgery: 10-year comparative ecological study between two UK specialist centres). A longstanding variation in access to surgery between regions in England has also been reported (Owen-Smith et al. A NICE example? Variation in provision of bariatric surgery in England).

ONS statistics on obesity, physical activity and diet, England 2021 data on prescriptions of orlistat, the only drug available in the UK that is recommended specifically for the management of obesity, geographic variation at CCG level is seen across the country, with some CCGs recording almost zero rates. It is not possible with the available data to conclude if this variation at CCG level is in line with burden of obesity or underlying risk factors and determinants. At regional level in 2019/20, the North West followed by the North East and Yorkshire had the highest prescription rate with 8 - 9 items per 1,000 population, and South East had the lowest rate with 4. This pattern does fit with the known burden of obesity and underlying factors such as deprivation.

5.4 Other groups needing tailored services

Some groups of people face a higher burden of obesity and may have specific challenges benefiting from current interventions. Tailoring of services to address these challenges is needed for groups such as people from different ethnic family backgrounds, people in various forms of detention or care and disabled people. For example, people with a learning disability may find interventions based on a health education approach are ineffective, although the PHE report Health inequalities: overweight, obesity and underweight suggests that multi-component weight management programmes can be adapted and prove effective.

5.5 Gaps in provision for children

A gap in provision of all levels of weight management services for children has been identified. In 2019 the Time to solve childhood obesity: Chief Medical Officer special report reported 1.2 million children in England with clinical obesity needed weight management services, or additional specialist services, such as medication or surgical treatment and found under-provision at every level. For example, as many as 90,000 adolescents may have been eligible for bariatric surgery, but fewer than 10 operations were undertaken each year. Access to services based on where children live, and not on their need, was noted.

5.6 Gaps in evidence and data

5.6.1 Protected characteristics

Although the OHID's Adult tier 2 weight management services national data tables report ethnicity, disability, religion, and sexual orientation for participants there are data completeness issues, ranging from 24% of ethnicity unknown up to over 60% of sexual orientation and religion unknown. This data set is not yet able to inform any conclusions on access by these protected characteristics.

The OHID national programme for adult tier 2 behavioural weight management services: minimum data set technical guidance outcome measure captures individuals enrolled who are from high-risk groups, meaning lives in the nationally most deprived 20% of areas, person's ethnicity is Black, Asian or minority ethnic group, person has a mental illness and person has a disability (including learning disability). The 2021/22 data to date reports this at 44%.

Data and evidence for groups of people sharing protected characteristics such as ethnic background, are not available in the public reports of NHS and registry data relevant to tier 4 services. No information on inclusion groups was found.

5.6.2 Impact of services on inequalities

Very limited evidence, in the form of small-scale studies, policy reviews and grey literature reports, were found in a targeted search for quality and experience of care in relation to health inequalities.

Most trials of behavioural weight management interventions do not examine whether there are differences in uptake, adherence, attrition, or outcome in geographic, socioeconomic, ethnic, and other social or demographic groups (Birch et al. A systematic review of inequalities in the uptake of, adherence to, and effectiveness of behavioral weight management interventions in adults). Birch et al. also found that in studies of weight management interventions that did examine differences, most found no gradient, that is intervention uptake or trial attrition was not higher in either groups that would be considered more or less advantaged. Where a gradient was observed, it mostly favoured those who were more advantaged. This was not the case for weight outcomes, for which a similar number of trials favoured less advantaged groups as those favouring more advantaged.

6 Implications for NICE

Weight management services need to be universal, that is accessible by everyone, no matter who they are or where they live. But where there is greater burden of obesity, service provision should match this, and programmes tailored to the needs of specific groups. This may also need action that addresses a specific barrier in a specific population group. This briefing has highlighted groups facing a higher burden of obesity and the risk factors and wider determinants that can affect people's ability to follow weight management advice or access and benefit from services.

Guidance needs to consider the major drivers of obesity, deprivation and linked wider determinants and as far as feasible, NICE should ensure recommendations do not widen inequalities, especially in relation to deprivation, diet, and physical activity. Considerations include whether a recommendation could make it more difficult for a specific group to access, or engage, with the interventions or services compared with other groups and

whether a recommendation for patient self-directed action, which is more easily adhered to by higher socioeconomic groups, could worsen inequalities. If this is the case guidance should consider whether mitigation against these impacts is possible, for example a recommendation for commissioners and providers to monitor the uptake of an intervention so that plans could be made to target groups with lower uptake.

To ensure this design and delivery of programmes needs to be user-led, with those who are least able to meet recommendations, or access services. NICE guidance can help by encouraging those delivering services to use local expertise within systems to identify populations of greatest burden, and design services with these target populations so interventions are undertaken in a way that is most likely to help people meet recommendations and complete programmes. Cross cutting principle to facilitate this can be found in NICE's guidelines on community engagement to improve health and wellbeing and reduce health inequalities and general approaches to behaviour change.

Inequality starts at birth, and accumulates across the life course, so acting early in life can have greatest impact in reducing health inequalities. There are rising levels of obesity in children, disproportionately felt by some groups of children, such as boys from more deprived and some ethnic family backgrounds and evidence of a gap in provision of some weight management services for children. Ensuring guidance highlights these groups of children for tailored support, to try and reduce the widening gaps in inequality between children, that will last a lifetime, is vital.

Guidance should seek to ensure services monitor and evaluate in such a way as to measure if the health benefits are equitable and do not increase health inequalities.

Strong advocacy is needed in guidance for partners to work collaboratively across the system to tackle the inequalities that drive obesity.

7 Limitations of available data and further work

This is a pragmatic targeted review of the literature and not a systematic review that has comprehensively capture of all inequalities that exist for obesity and weight management services. As such, it is in part subjective, based on evidence available and retrieved by the lead authors, and can only provide examples of where inequalities have been measured. The briefing is limited by the lack of routine data captured on all the protected characteristics and inclusion health groups. Further work is ongoing within NICE to obtain, analyse and visualise NHS data sets to enable better understanding of groups impacted.

Deprivation is the major driver of health inequalities seen but the available data and evidence is unable to lead to conclusions on how far other inequalities seen, such as differences between people of different ethnic family backgrounds or geographic variation overlap with deprivation. Unpicking this further would enable more targeted approaches to reducing health inequalities.

More analysis and modelling, using tools such as the York Equity Impact tool, to support understanding of differential uptake and health gains of interventions is ongoing. This is likely to further support NICE's work in reducing inequalities.

8 Conclusions

Health inequalities in respect to obesity and relevant services exist across different, often overlapping dimensions, including deprivation, geography, protected characteristics, and inclusion health groups. Inequalities can be seen across health status, risk factors, wider determinants of health, and access to, and experience of, healthcare services. Although NICE guidance is limited in its remit to tackle many wider determinants, it can provide clear recommendations to help commissioners and providers consider populations of highest burden and design services for those groups we know are most impacted and the challenges they face.

Appendix: how we conducted this briefing

Aims and objectives

In this briefing we aim to identify and present evidence on:

- Health status in relation to overweight and obesity against the 4 dimensions of health inequalities (socioeconomic groups and deprivation; protected characteristics; geography; inclusion health groups).
- Weight management intervention and programme data across these 4 dimensions
- Relationships between overweight and obesity and the following domains of health inequalities: wider determinants, behavioural risk factors to health, the role of service access, quality, and experience of care
- The impact of weight management interventions on health inequalities, including the ability to address inequalities, and potential positive or negative effects on health inequalities
- Key gaps in data and information, with recommendations for how these may be addressed

This is to aid with consideration of health inequalities in current and future guideline updates.

Methods

This briefing is a pragmatic targeted review of evidence exploring health inequalities in respect to unhealthy weight and related services. In general, data availability on measures of health inequalities can be poor or absent. As a result, this briefing based on evidence available and can only provide examples of where inequalities have been measured, rather than a comprehensive picture. It has been undertaken as a pragmatic, targeted review of literature with support from an information specialist. It has used largely real-world evidence, including routinely available data sources, quantitative and qualitative research findings, and published reports on inequalities. Data for inclusion health groups is often not routinely collected

and so this briefing explores grey literature and small-scale studies for any findings relevant to health inequalities.

The briefing has been structured to include data and evidence across the 4 dimensions of inequality (socioeconomic groups and deprivation, protected characteristics, geographical and inclusion health), and across the 5 levels of outcomes (health status, behavioural risks to health, wider determinants of health and, access to care, and quality and experience of care).