

Treating and preventing adolescent obesity

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This briefing paper examines adolescent obesity in Britain. It explores trends in obesity rates, their drivers and policy options for improving adolescent health outcomes and reducing the substantial societal costs of adolescent obesity and its frequent persistence into adulthood.

KEY POINTS

- **Obesity rates in England have increased significantly since the mid-1990s.** While in 1995 some 15% of 11–15-year-olds had obesity, this stood at just under a quarter (24%) in 2019.
- **Recently released statistics from the National Child Measurement Programme in England, for those in school Year 6 (aged 10-11) show a substantial increase in obesity.** For this age group, obesity rates increased from 21.0% in 2019/20 to 25.5% in 2020/21, presumably reflecting dietary changes and reduced physical activity in a year of school closures and lockdowns. It seems likely that older adolescents saw a similar rise in obesity rates over this time period.
- **Obesity in adolescence is a predictor of obesity in adulthood.** Among those with a BMI greater than 25 at age 16, close to two-fifths (39%) had obesity at age 42. This compared with a much lower rate of 12% among those that had a BMI of below 25 when they were aged 16.
- **Economic deprivation is a significant driver of adolescent obesity and the obesity rate gap between the most and least deprived parts of England has been widening.** Recently released data from the National Child Measurement Programme show an obesity rate of 33.8% among 10-11 year olds in the most deprived 10% of areas in 2020/21, compared with 14.3% in the least deprived 10% of areas.
- **Parental obesity is a significant driver of adolescent obesity.** 28% of children of a mother with obesity also had obesity, compared with 8% of children whose mother had neither overweight nor obesity.
- **Adolescent obesity can lead to immediate physical and mental health outcomes, including liver disease, sleep apnea, diabetes, asthma, skin conditions, and orthopaedic problems.** Due to the persistence of obesity into adulthood, it also leads to lifetime costs to individuals and wider society associated with coronary heart disease, stroke and cancer.
- **Conversely, reducing adolescent obesity could lead to a significant improvement in individual health and other societal outcomes.** A UK-based study found that a moderate intervention costing £400 per child with obesity could, in an upside scenario, increase life expectancy by as much

as one year. It could also save the NHS thousands of pounds, per child, from reduced lifetime costs of diabetes, coronary heart disease, stroke and cancer.

RECOMMENDATIONS

Adolescent obesity is a complex public health issue, with many contributing factors. There is no silver bullet intervention that will, in isolation, reduce obesity rates through treatment or prevention. Ultimately, a “whole systems” approach to reducing adolescent obesity is likely to be necessary – taking into account the wide range of drivers, from healthy food affordability to the built environment to weight management services.

Within this whole systems approach, policy needs to:

- Create new long-term, local-level partnerships and expand upon existing ones, drawing on examples of best practice from the UK and overseas. Metro mayors, local authorities and integrated care systems should deliver interventions targeted at the specific challenges of a given locality – such as economic deprivation and an urban landscape that discourages physical activity.
- Considering the deeply concerning statistics showing a sharp rise in childhood obesity during the COVID-19 pandemic, central government should commit to a sustained and sizeable cash injection to support the formation of new partnerships and the expansion of existing ones.
- Expand access to family-level interventions which encourage whole households to take steps to lead healthier lives. At present, efforts to manage a child or young person's weight are not always supported, and are sometimes undermined, by members of the wider family. Further, many young people with overweight and obesity may have, or come from a family with, a history of failed attempts to manage their weight. New interventions that address the family dynamics are necessary.
- School-based interventions should be explored by policymakers and schools. Such initiatives could include family “homework” assignments to promote healthier living, making school playing fields and playgrounds accessible after school hours and promoting non-competitive activities during physical education classes.
- At present, the exclusion of academy schools from national school food standards reduces the ability of government to introduce school-based interventions-related to diet. Given this, academy schools should be required to meet these national food standards.
- The National Child Measurement Programme should also be overhauled, with feedback letters for parents on their child’s weight being mandatory (rather than merely encouraged) and complemented with more constructive material supporting families to take steps to access support and lead healthier lives.

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INTRODUCTION

Obesity in younger age has become a significant public health issue across the globe. According to the World Health Organisation (WHO), the number of children and adolescents (aged 5-19 years) with obesity has risen tenfold in the past four decades and by 2022, there will be more children with obesity than with moderate or severe underweight.¹

Britain is no exception and has seen a significant rise in childhood and adolescent obesity rates in recent decades. This in turn has serious implications for the physical and mental health of young people, which can continue into adulthood – especially given the correlation between obesity at a young age and adulthood obesity.

The government estimates that treatment of obesity-related conditions in England alone costs the NHS £6.1 billion each year. Wider costs to society – such as absence from work due to obesity – could also amount to as much as £27 billion per year.²

In this briefing paper, we argue that a focus on preventing and treating obesity in adolescence could go a long way towards reducing these substantial societal costs – improving public health outcomes, raising life expectancies, and reducing health inequalities. Because of the strong link between obesity at a young age and obesity in later life, taking steps to help younger people to manage their weight could generate significant long-term health benefits.

To realise these gains, policymakers need to consider the evidence around “what works” for reducing and preventing obesity in adolescence. In this paper, we explore such evidence and present a number of policy recommendations.

Before doing so, we first provide a snapshot of trends and drivers of adolescent obesity in Britain.

TRENDS AND DRIVERS OF ADOLESCENT OBESITY

Measuring weight in childhood

One of the challenges with understanding adolescent obesity relates to how it is measured.

For adults, the body mass index (BMI) is a widely-used metric for establishing whether an individual has underweight, a healthy weight, overweight, or obesity. A BMI of 25-30 is generally considered overweight while a BMI of more than 30 is considered obese.³

Assessing the BMI of children and adolescents is more complicated than for adults because a child’s BMI changes as they mature. Growth patterns differ between boys and girls, so both the age and sex of a child needs to be considered when estimating whether BMI is too high or too low.⁴

In England, the British 1990 growth reference (UK90) for BMI is commonly used to determine weight status according to a child’s age and sex. Each child’s BMI is calculated and compared with the BMI distribution for children of their age and sex in

UK90, which is based on the measurements of British children and young adults from nought to 23 years old collected between 1978 and 1994.⁵

Those falling above the 95th centile of this weight distribution are classified as having obesity. Unless stated otherwise, this UK90 definition of child and adolescent obesity is used throughout this section of the report.

The UK90 definition of adolescent obesity is not without its criticisms. For example, Christopher Snowdon from the Institute for Economic Affairs has argued that the measure significantly overstates the number of children and adolescents with obesity, due to the arbitrary nature of the 95th centile cut-off point. Snowdon has also pointed to the fact that data, using the UK90 measure for children and standard BMI cut-off points for adults, show an implausible decline in obesity rates between adolescence and early adulthood.⁶ It has also been argued that replacing UK90 with commonly-used international measures of childhood obesity – such as those used by the International Obesity Task Force – would result in lower reported rates of obesity.⁷

While we acknowledge these points of contention about UK90, it remains widely used in English and UK statistics, hence our focus on it here. Furthermore, while using an alternative reference to UK90 may change the overall number of children and adolescents with obesity, it is unlikely to change trends over time (whether obesity rates have increased or decreased), and the relative ranking of obesity rates across sexes, ethnicities, and different income groups – areas which we home in on below. Lastly, while the UK90 measure may be imperfect, it has been argued that it correlates well with negative health outcomes and therefore still serves as a useful tool.⁸

The rise of adolescent obesity and its implications for adult obesity

Data from the Health Survey for England show that adolescent obesity rates have increased since the mid-1990s; while in 1995 some 15% of 11-15 year olds had obesity, this stood at just under a quarter (24%) in 2019.

Obesity rates in England have increased particularly strongly for adolescent boys. While in 1995, boys aged 11-15 were slightly less likely to have obesity than girls (14% versus 16%), in 2019 they were more likely to have obesity (27% versus 20%).

While we do not have post-pandemic data on obesity rates among those aged 11-15, as in Figure 1, recently released statistics from the National Child Measurement Programme in England, for those in school Year 6 (aged 10-11) show a substantial increase in obesity. For this age group, obesity rates increased from 21.0% in 2019/20 to 25.5% in 2020/21, presumably reflecting dietary changes and reduced physical activity in a year of school closures and lockdowns. It seems likely that older adolescents saw a similar rise in obesity rates over this time.

Figure 1: Obesity rates among 11-15 year olds in England, by sex, %

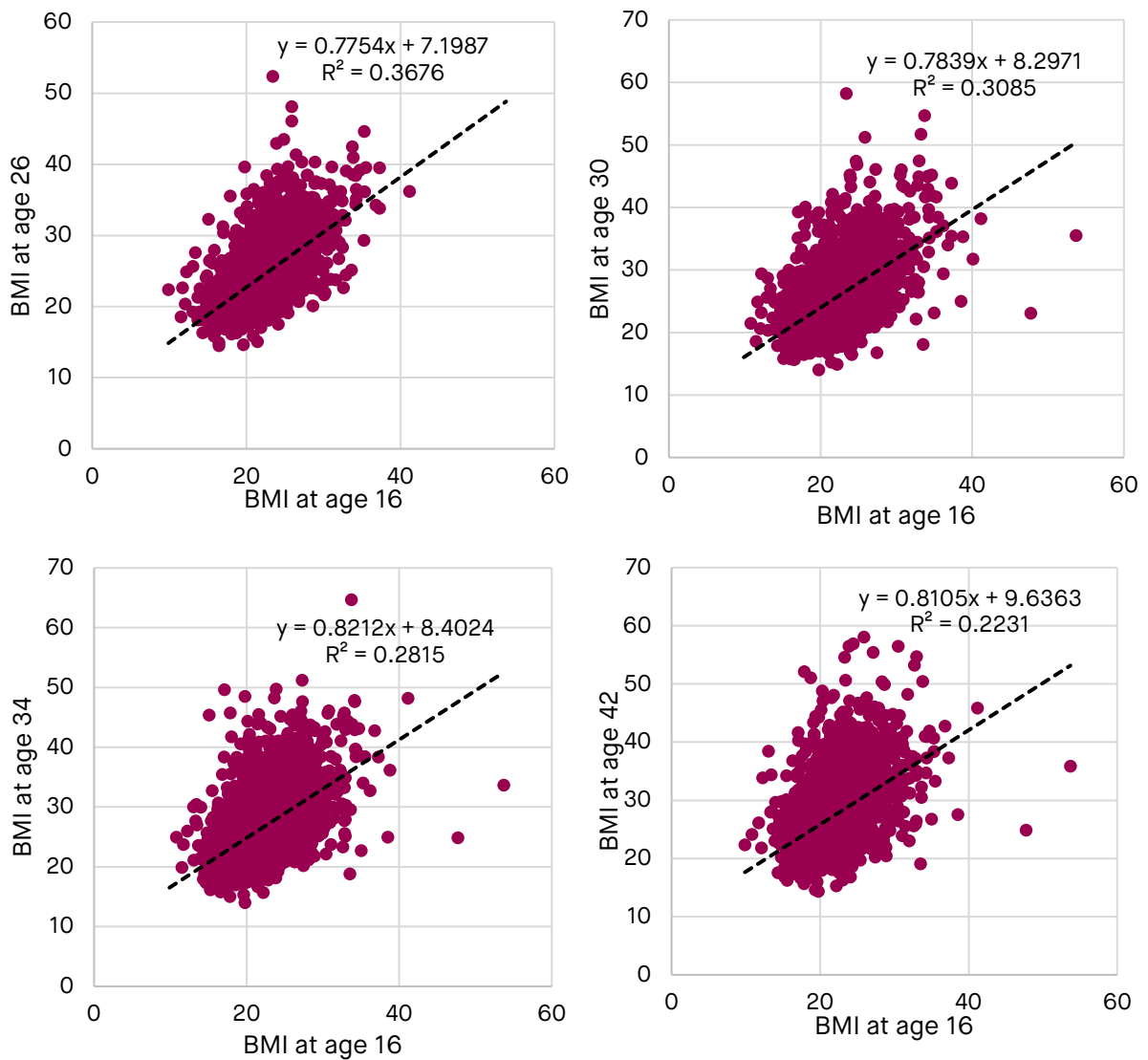


Source: Health Survey for England

This long-term rise in adolescent obesity rates is set to contribute to higher rates of *adult* obesity in the future, given the persistence of obesity apparent in longitudinal survey data.

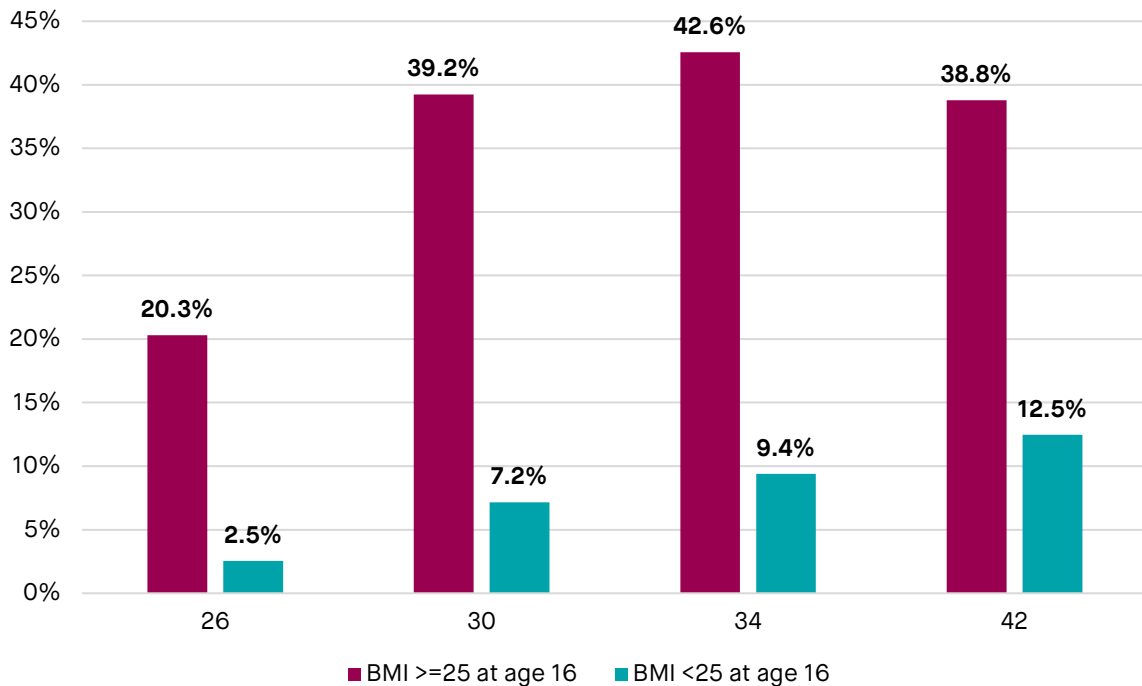
SMF analysis of the 1970 British Birth Cohort Study, undertaken for this report, examined the correlation between an individual’s body mass index (BMI) at age 16, and their BMIs at ages 26, 30, 34, and 42. The analysis shows that BMI at age 16 explains 37% of the variation in individuals’ BMI at age 26. Even when individuals in the 1970 cohort reached age 42, BMI at age 16 explained 22% of the variation seen in the data. This is shown in the scatter plots below.

Figure 2: BMI at age 16, versus BMI at ages 26, 30, 34 and 42



Source: SMF analysis of 1970 British Birth Cohort Study

Among those with a BMI greater than 25 at age 16, close to two-fifths (39%) had obesity (BMI greater than 30) at age 42. This compared with a much lower rate of 12% among those that had a BMI of below 25 when they were aged 16. In other words, obesity rates at age 42 are over three times higher among those with a BMI greater than 25 at age 16.

Figure 3: Obesity rates by age, segmented by BMI at age 16

Source: SMF analysis of 1970 British Birth Cohort Study

Intuitively, it seems plausible that attitudes towards diet and physical activity formed in adolescence are likely to at least partially persist into adulthood. This is indeed borne out in academic research; for example, one study found that adolescents' attitudes toward sports, exercise and fitness predict physical activity 5 and 10 years later.⁹ Evidence also indicates that dietary habits acquired in childhood persist through to adulthood.¹⁰

Drivers of adolescent obesity

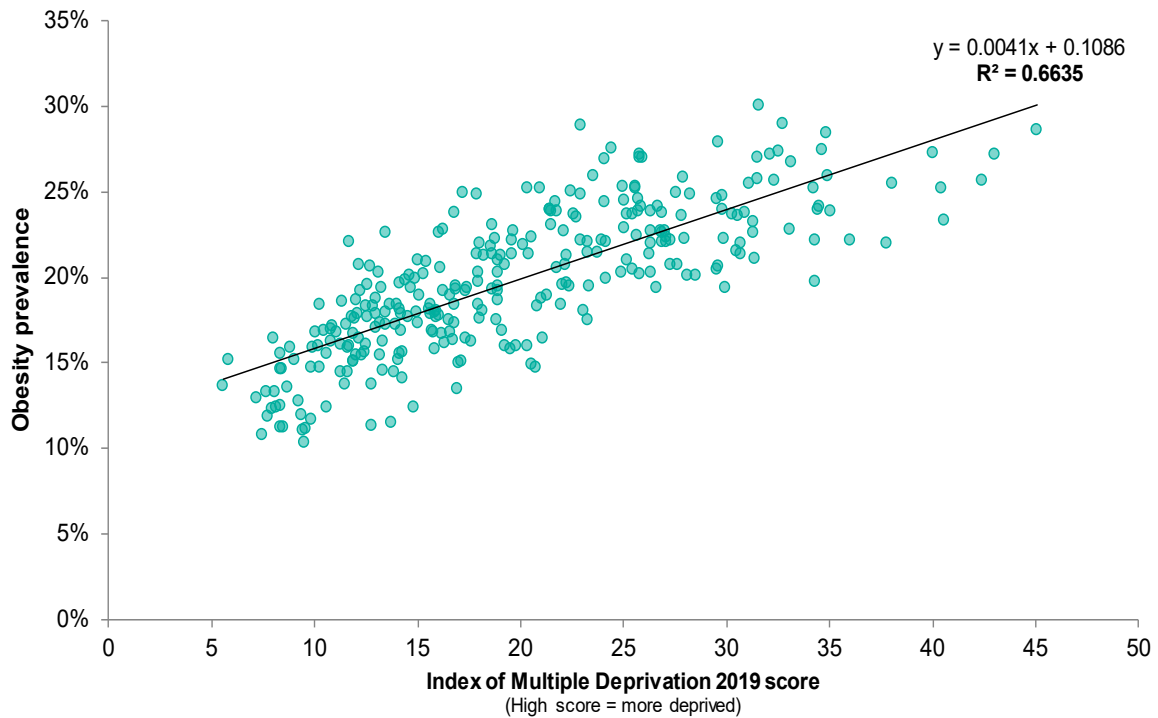
As with adults, poor diet and low levels of physical activity are the primary causal factors driving excess weight.¹¹ Research by Public Health England has found that sugar makes up 14% of teenagers' daily calorie intake – almost three times the recommended amount.¹² At the same time, only a minority of those in school years seven to eleven (47.6%) are meeting recommended levels of physical activity.¹³ A recent study by academics at the University of Bristol found a dramatic drop in children's physical activity levels by the time they finish primary school and enter adolescence; between the ages of six and 11, children lost on average more than an hour of exercise in the week, with an even greater fall on weekends.¹⁴

Deprivation and adolescent obesity

Poverty and deprivation are strong drivers of obesity. Income, housing, education, access to space, exposure to advertising, and sale of unhealthy foods can all impact upon whether we can be active or eat healthily and thus ultimately our risk of developing obesity. These factors can also impact the ability of parents to help their children maintain a healthy weight.

In 2019/20, the prevalence of obesity in children aged 10–11 was 27.5% in the most deprived 10% of areas in England and 11.9% in the least deprived 10% of areas. As the scatter plot below shows (with the “R-square” measure of fit), deprivation, as measured by the “index of multiple deprivation”, explained about two thirds of the variation in obesity rates across local authorities in this year.

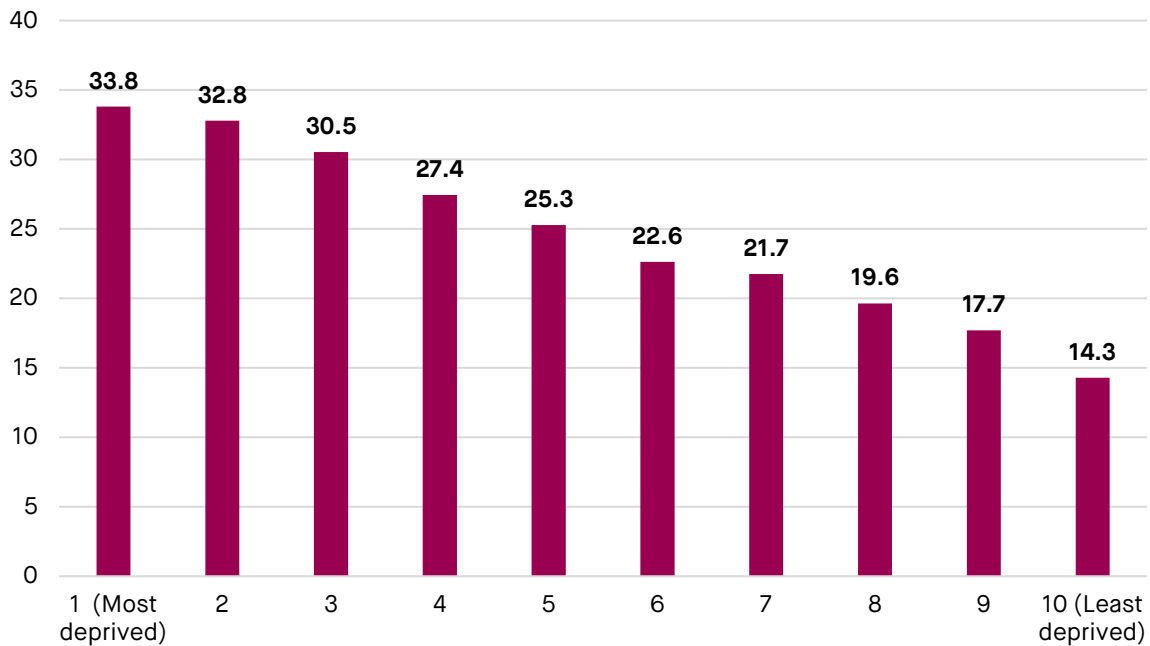
Figure 4: Obesity prevalence among Year 6 children by local authority, 2019/20



Source: Public Health England, “Patterns and Trends in Child Obesity”

The gap in obesity prevalence between children from the most deprived and least deprived areas is stark and growing, with an increase from 8.5 percentage points in 2006/7 to 15.6 percentage points in 2019/20.¹⁵ Worryingly, recently released data from the National Child Measurement Programme suggest that the gap widened to 19.5 percentage points in 2020/21, with an obesity rate of 33.8% among 10–11 year olds in the most deprived 10% of areas, compared with 14.3% in the least deprived 10% of areas. This suggests the socioeconomic impacts of the COVID-19 pandemic have disproportionately pushed up childhood obesity rates among those in deprived parts of the country.

Figure 5: Obesity rates among Year 6 children in England, 2020/21, by index of multiple deprivation decile, %



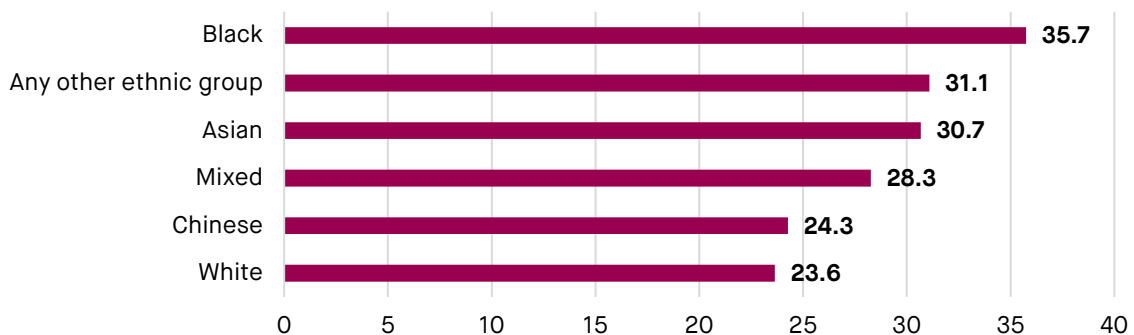
Source: National Child Measurement Programme

Ethnicity and adolescent obesity

As the SMF noted in a previous report on obesity, ethnicity is an important consideration. Not only are there significant variations in obesity rates by ethnicity, but excess weight and measures such as the body mass index (BMI) have different implications for different ethnic groups. For example, research has found that, at the same BMI, Asians are more than twice as likely to develop type 2 diabetes than white populations, and have higher risk of cardiovascular disease.¹⁶

As with adults, there are significant differences in obesity rates among the young. Data from the 2020/21 English National Child Measurement Programme, for children in Year 6 (aged 10-11) shows that over a third of Black children had obesity. This compared with less than a quarter (24%) of White children in this age group.

Figure 6: Obesity prevalence by ethnicity, children in Year 6 (aged 10-11), 2020/21, %



Source: National Child Measurement Programme

Parental obesity and adolescent obesity

While adolescent obesity appears to have a significant impact on future adult obesity, it is also the case that adult obesity rates have a bearing on child and adolescent obesity rates. Parenting styles and attitudes to meal preparation and physical activity within households can ultimately influence the weight of children.

The Health Survey for England 2017 explored, for the first time, the association between parent and child weight, looking at those who have overweight and obesity.¹⁷ The survey found that 28% of children of a mother with obesity also had obesity, compared with 8% of children whose mother had neither overweight nor obesity. 24% of children of a father with obesity also had obesity, compared with 9% of children where the father had neither overweight nor obesity.

This suggests that increases in adult obesity rates in recent decades may have contributed to higher rates of childhood and adolescent obesity. Evidence suggests that parental obesity can have a particularly significant impact on obesity rates for older children.¹⁸ Furthermore, maternal obesity appears to have a more significant impact than paternal obesity.¹⁹ Conceivably, this reflects in part mothers accounting for an overwhelming majority of time spent preparing meals within households.²⁰

A Norwegian study found that maternal weight reduction was significantly associated with lower offspring BMI scores. Reductions in physical activity among mothers were associated with higher offspring BMI. Fathers' lifestyle changes, however, did not significantly affect adolescent offspring's weight.²¹

THE ECONOMIC AND SOCIAL COSTS OF ADOLESCENT OBESITY

Like most public health issues, the obesity debate is often framed around the notion of harm: the 'costs' that are incurred by individuals and wider society from the implications of excess weight.

Among those that wish to reduce the negative consequences of overweight and obesity, an assessment of costs can help to identify the overall impact of obesity and inform policymakers about what a proportional response may look like.

In establishing the various costs of obesity, it can also become possible to estimate the benefits of mitigating them and, in turn, the potential impact of future interventions. As we show below, a reduction in obesity in adolescence can lead to considerable lifetime gains – not just for those living with it, but also for society as a whole.

Health and social costs of adolescent obesity

In childhood and adolescence, obesity can lead to immediate physical health outcomes, including liver disease, sleep apnea, diabetes, asthma, skin conditions, and orthopaedic problems.²²

Not only does childhood obesity lead to more severe disease risk factors in adulthood, but it can also have an impact on a child's social development – with significant consequences in the long-term. Overweight and obesity in childhood can lead to

increased likelihood of being bullied, bullying others, poor self-esteem, poorer social skills, stress and anxiety, and behavioural problems.²³

Children with obesity have been found to have fewer friends,²⁴ to be more likely to be bullied,²⁵ and to show lower satisfaction²⁶ than non-obese children. Because of less social interaction and play, they are also more likely to spend time in sedentary activities – potentially exacerbating their condition.²⁷ From a young age, children begin to experience the effects of weight stigma²⁸ while adolescence is a critical period for developing one's body image, self-esteem, and self-confidence.²⁹ This is a particular issue for teenage girls, who, with more pressure to conform to social standards and beauty ideals, can become obsessed with body image.³⁰ Women who had obesity as children are more likely to experience persistent, severe issues with body image throughout later life.³¹

How adolescent obesity translates into costs associated with adult obesity

The negative consequences of adolescent obesity often persist into adulthood. As our analysis earlier showed, many children with excess weight continue to have overweight or obesity as adults. According to the Royal College of Paediatrics and Child Health, four in five children with obesity will have obesity for life.³²

Because of the persistence of obesity into adulthood, higher rates of adolescent obesity are likely to contribute to higher future costs associated with *adult* obesity. Below we briefly describe the nature and magnitude of such costs:

- **Worse health outcomes and reduced life expectancy** – Adults with obesity are 2.5 times more likely to develop high blood pressure, three times more likely to develop colon cancer, and five times more likely to develop diabetes.³³ Having overweight or obesity also increases the risk of heart and liver disease, stroke, bone and joint problems, respiratory difficulties, sleeping disorders, reduced fertility, over 12 kinds of cancer, and mental health conditions.³⁴ In 2015, research by Cancer UK found that 360,000 (6%) of all cancer cases in the UK were caused by overweight and obesity.³⁵
- In the UK, it is estimated that obesity is responsible for more than 30,000 deaths per year,³⁶ and it can reduce life expectancy by an average of three to ten years.³⁷
- **Financial costs to the healthcare system** – In 2020, the National Audit Office (NAO) estimated that the cost of the treatment of obesity-related conditions in England to the NHS is £6.1 billion per year.³⁸ The NAO has also estimated that local authorities in England spent £61.7 million on childhood obesity in 2018/19.³⁹
- **Productivity costs and lost earnings** – As the World Bank has highlighted, overweight and obesity can have a significant impact on economic outcomes. Not only do they create a need for healthcare to treat higher incidences of disease, they can also lead to increased business costs and a loss of productivity, for example increased employee absenteeism, disability rates, or earlier retirement.⁴⁰

In 2014, Public Health England estimated that there were 16 million days of sickness absence reported because of obesity.⁴¹ However, research has also suggested that obesity can also be associated with permanent work loss, incurring additional costs to the state by way of unemployment benefits.⁴² A review carried out by the Department for Work and Pensions found that obesity could be a cause of unemployment; analysis found there was a 2% employment rate gap between adults with a healthy weight and overweight, and adults with obesity in 2016. For those with severe obesity, that gap widened to 10%. The review also estimated that in the UK there were around 1,600 claimants of Employment and Support Allowance (ESA) where the main disabling condition was obesity, but that people with obesity could also be claiming for other health conditions – it suggested that 807,000 ESA cases, 35% of the overall caseload, had conditions that could be obesity-related.⁴³

In the UK, the McKinsey Institute has estimated that the total impact of obesity upon employers is £5.2 billion.⁴⁴

- **Reductions in social mobility.** The social costs of obesity can contribute to downward social and economic mobility.⁴⁵ In 2020, a House of Lords report cited research produced by the OECD which argues that, due to being at an increased risk of poor educational attainment and social mobility, "children were paying a high price for obesity".⁴⁶ According to the research, children with overweight are more likely to get lower marks and be absent from school and, when they get older, they are less likely to complete higher education.⁴⁷

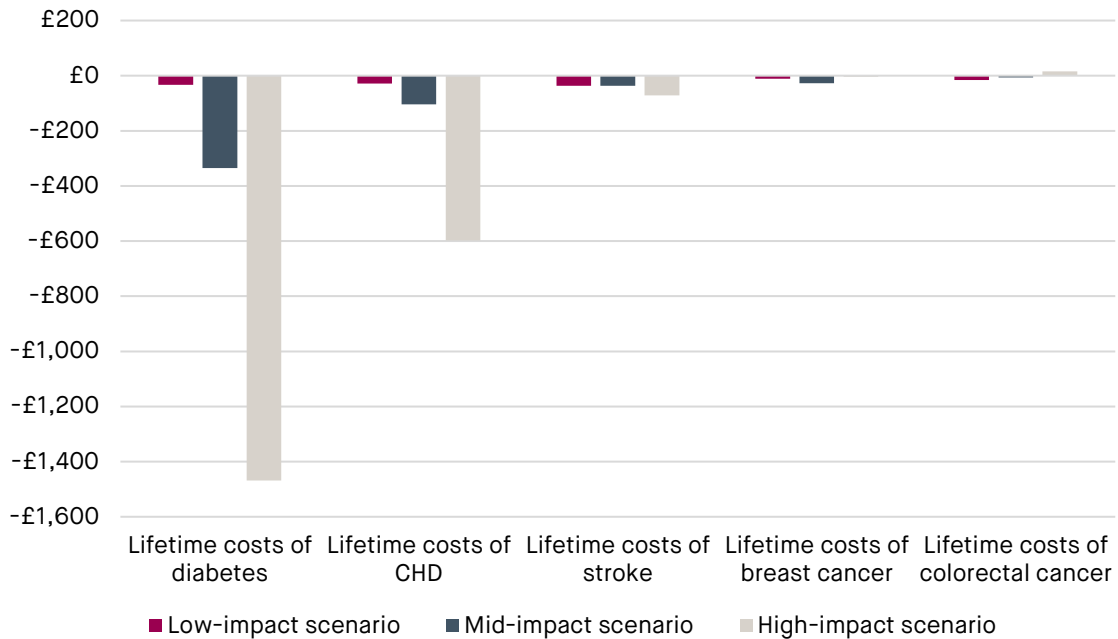
The UK's obesity challenge presents a significant financial cost to the NHS, to employers, and to economic development. The government has estimated that the wider costs to society in England, which includes the financial costs of healthcare, workplace absences, and reductions in quality of life, could be as much as £27 billion per year.⁴⁸ However, this figure represents a significant underestimate of the actual economic burden of obesity, as the figure excludes other countries in the United Kingdom, and does not reflect the most up-to-date data.⁴⁹ Without intervention, the wider costs to society are estimated to reach £49.9 billion every year by 2050.⁵⁰

Cost savings of reducing adolescent obesity

Above, we have outlined some of the societal costs that are caused by obesity. If mitigated, those harms would represent benefits to the UK – not only to people that live with obesity, but also to the state and to wider society.

A UK-based study explored the cost effectiveness of lifestyle interventions to treat children with overweight and obesity, which would in turn reduce rates of adult obesity. It found that a moderate intervention costing £400 per child with obesity could, in an upside scenario, result in increased life expectancy of as much as one year, and increased chance of living above the age of 75 rising from 53.7% to 57.8%. Further, the NHS would benefit from reduced costs associated with diabetes, coronary heart disease, stroke and cancers.⁵¹

Figure 7: Reduction in NHS costs from reducing obesity rates in children aged 10-11, with a £400 per child with obesity intervention

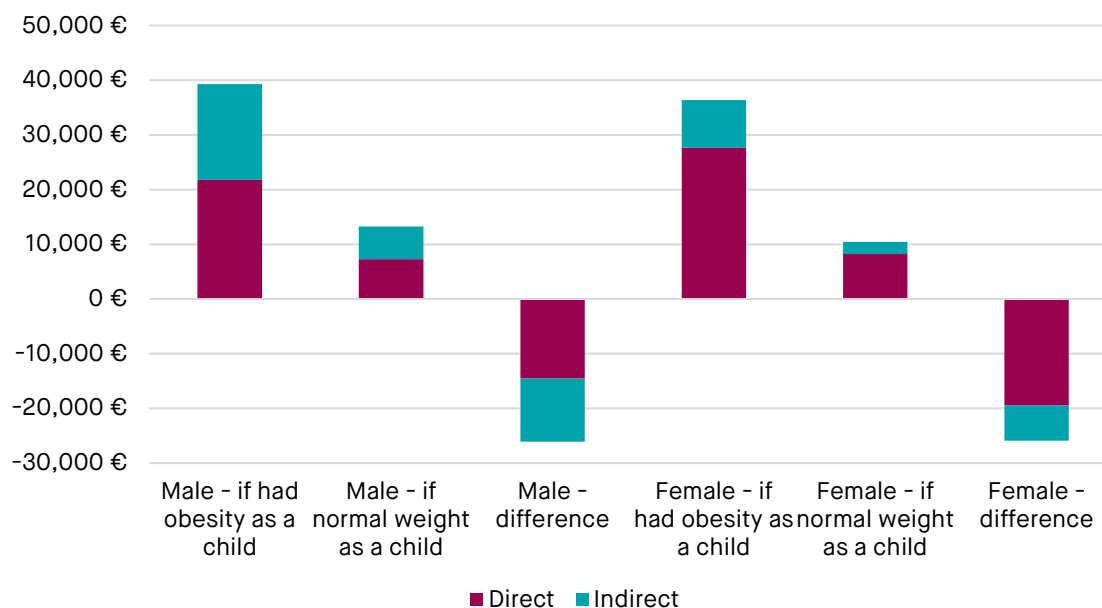


Source: Hollingworth et al (2012), “Economic evaluation of lifestyle interventions to treat overweight or obesity in children”

International evidence also suggests that reductions in childhood obesity, resulting in a reduction in future adult obesity prevalence, could lead to significant long-run improvement to socioeconomic outcomes.

In Germany, researchers have explored the long-run economic impact of childhood overweight and obesity by calculating how prevalence trends affect lifetime costs.⁵² This includes “direct” costs – predominantly healthcare ones due to an increased risk of developing obesity-associated diseases that need treatment – as well as indirect costs related to sick leave, reduced productivity, and premature death. The study found that, per child, a shift from obesity to healthy weight could result in lifetime direct and indirect societal savings of £26,000 for both males and females.

Figure 8: Estimated direct and indirect lifetime costs of overweight and obesity in Germany, per sex, € (2010 prices)



Source: Sonntag D, Ali S, De Bock F: *Lifetime indirect cost of childhood overweight and obesity: a decision analytic model.*

Another study, in the US, calculated lifetime costs of childhood obesity among the US elementary school population aged 6-11 in 2008, estimating them to be \$31,869 for boys with obesity and \$39,815 for girls with obesity.⁵³

Other studies suggest that societal gains from childhood obesity reduction could be even greater. A systematic review of 13 studies found that the mean total lifetime cost of a child or adolescent with obesity was €149,206 (range: €129,410 to €178,933) for a boy and €148,196 (range: €136,576 to €173,842) for a girl. This was divided into an average of €16,229 in healthcare costs and €132,977 in productivity losses for boys and €19,636 and €128,560, respectively, for girls.⁵⁴

PREVENTING AND TREATING ADOLESCENT OBESITY

When thinking about how to prevent and treat adolescent obesity, it is helpful to consider the micro and macro level domains of what is commonly called the ‘obesogenic environment’.⁵⁵ This refers to the way that our surroundings, opportunities, and conditions influence individuals’ and society’s capacity to manage weight.

At the micro level, this includes a young person’s home, school, family income, proximity of spaces for physical activity, and venues of social interaction. The macro level encompasses advertising legislation, fiscal interventions, school food standards, the structure and funding of public transport and health systems, and so on. These factors not only interact with each other but also with an individual’s biological make-up and behaviours. What is clear when we think about the obesogenic environment is that practitioners and policymakers have considerable scope to intervene to address adolescent obesity.

Table 2: components of the obesogenic environment at the micro (e.g. individual, household) and macro (e.g. regional, national) levels

Physical	What is available? E.g. buildings, amenities, facilities and use patterns? Includes the built environment, landscapes, internal/enclosed spaces
Economic	What are the monetary cost factors/influences/consequences? Includes price incentives/disincentives/taxes and cost savings driven measures
Legislative	What are the legal/statutory/political messages? Also includes codes of conduct and acceptable standards of behaviour.
Socio-cultural	What are the attitudes, beliefs, perceptions and values, and cultural norms at the national and community level?

Source: analysis grid for environments linked to obesity adapted from Mooney et al (2015).⁵⁶

Preventing and treating adolescent obesity at the micro level

Lifestyle and behavioural interventions

Goal setting, dietary changes and therapies, increasing levels of physical activity, and reducing sedentary behaviour are all ways of addressing overweight and obesity in young people. Interventions can be aimed at adolescents individually or their families too, reflecting the importance of how the home environment can impact weight management. Multi-behavioural change interventions are considered to be the most effective in leading to sustained weight loss.⁵⁷ Indeed, a Cochrane review has identified that for 13–18-year-olds, dietary or physical activity interventions *alone* are ineffective at reducing BMI.⁵⁸ The success of such interventions depends on a young person’s interaction with the obesogenic environment; for example, living in an unsafe neighbourhood may impact on an individual’s capacity to exercise.

One area of particular interest is in the potential for digital technologies to support successful behaviour change interventions amongst adolescents. Given that smart devices and social media are deeply embedded in most young people’s lives,

smartphone apps and tracking devices could prove fruitful in encouraging sustained weight loss. Incorporating social media into interventions, such as communicating progress with peers or ‘gamifying’ goals, has been shown to produce positive results in terms of encouraging healthy behaviours and improving nutrition, particularly amongst those from more deprived backgrounds.⁵⁹ Digital technology may also have an application beyond treatment and act as a primary preventative intervention, for example if innovations such as the SMASH app, which offers discounts on healthy products for young people, become more widespread.⁶⁰

Surgical treatments

For adolescents with multiple comorbidities or serious psychosocial difficulties resulting from obesity, referrals to specialist Tier 3 weight management services may eventually lead to pharmacological or surgical treatments. Current NICE guidelines⁶¹ state that bariatric surgery will only be considered in “exceptional circumstances” for those adolescents with a BMI of 40 kg/m² or more, or between 35-40 kg/m if they have other significant disease (like Type 2 Diabetes). High-quality data on the effectiveness of bariatric surgery in adolescents is lacking, and this is a serious intervention with major ethical considerations and risks of medical complications.⁶²

Of the limited evidence available, there is some cause for optimism, however. The only published randomised control trial with adolescent participants (14-18) reported an average weight loss of 35kg amongst the surgery group (laparoscopic adjustable gastric banding), compared to 3kg for the lifestyle intervention group.⁶³ Clinical and observational studies have also reported sustained weight loss and improved comorbidities, although complications were not uncommon.⁶⁴ A University College London study has found that bariatric surgery in adolescents with severe obesity would be a “highly cost-effective” alternative for the NHS compared with no surgery, as has been shown to be the case for adults also.⁶⁵ This suggests that should the evidence base continue to indicate that surgery can lead to sustained weight loss and improved quality of life for young people, policymakers may need to cautiously review the provision of such treatments in the UK.

Preventing and treating adolescent obesity at the macro level

Physical environments

Adolescents have a lower degree of mobility, autonomy, and ability to influence their surroundings than adults.⁶⁶ In many ways this therefore makes the physical environment – such as proximity of physical activity spaces, food environment, building design, and so on – a particularly important part of preventing adolescent overweight and obesity, whilst also enabling and empowering those who need and wish to lose weight to do so.⁶⁷ And if improving outcomes for those from socioeconomically disadvantaged backgrounds is a priority for policymakers, as is the case in the UK, the built environment is vital to consider: a US-based study has shown that obesity and overweight are 30-60% more likely among children living in unsafe neighbourhoods or those characterised by poor housing and conditions.⁶⁸

There are no silver bullets for reducing childhood obesity and the evidence for built environment interventions is not altogether conclusive. However, a range of interventions at the local have been identified and implemented, including:⁶⁹

- Exclusion zones in areas for children and families aimed at limiting the availability of fast food.⁷⁰
- Improving walkability – for example by creating safe routes to school – and encouraging active travel.^{71 72}
- Increasing the quality and quantity of physical activity spaces, such as parks and skateparks, to encourage exercise and reduce the likelihood of sedentary behaviours⁷³

A growing evidence base has highlighted the contribution local authorities can make to promoting health weight environments through use of the planning system, reflected in Public Health England's 2020 updated guidance to local public health teams.⁷⁴ Yet, as previous SMF research has highlighted, facing often competing objectives, under-resourced planning teams are not consistently prioritising public health; Local Government Association research has, for example, shown an underuse of health impact assessments in local authority strategic plans.⁷⁵ To that end the Obesity Health Alliance has called for an explicit primary focus on public health in national planning and licensing policies.⁷⁶

Economic environment

The potential of fiscal levers to reduce obesity by applying a levy to unhealthy food and drinks products has become a widely-discussed policy solution. But what of the specific impact on young people? Unpublished evidence cited in the National Food Strategy has suggested that the introduction of the Soft Drinks Industry Levy (SDIL) has already resulted in 36,000 fewer cases of obesity in children and teenagers in England. An evidence review from the Glasgow Centre for Population Health has suggested that taxing sugary beverages could reap health benefits for secondary school-age pupils, particularly for those from disadvantaged households. However, there are concerns that where other high-calorie drinks like sugary milk drinks are not included in such levies (as is currently the case in the UK), adolescents offset the decrease in taxed beverages with an increase in untaxed ones, cancelling out any potential benefits.⁷⁷ In essence, the success of these interventions in actually reducing adolescent's consumption of unhealthy food and drinks products depends upon their scale and scope, with more all-encompassing measures more likely to be successful.

Political (legislative) environment

Exposure to an obesogenic advertising environment is positively associated with increasing adolescents' consumption of unhealthy foods.⁷⁸ The UK Government estimates that children are exposed to 15.1 billion online high fat, salt, and sugar food product adverts annually.⁷⁹ Given that screen time increases as children get older⁸⁰ it is not unrealistic for us to infer that adolescents are disproportionately exposed to online advertising of unhealthy food products amongst under 18s. Similarly, research has suggested that the proportion of adverts promoting fast-food products on television is significantly higher for adolescent programming.⁸¹

The rationale and evidence for advertising and marketing restrictions has been set out by the UK Government in advance of the forthcoming HFSS restrictions.⁸² However, such restrictions are arguably only a preliminary step available to policymakers, and lessons may be implementable from tobacco advertising. A New Zealand-based study seeking to ascertain the effect of different restrictions on young people's propensity towards sugary beverages found a 54% reduction in predicted preferences for sugary beverages when plain packaging was used and a 20% reduction from use of warning labels.⁸³

Socio-cultural environment

As adolescents develop and become more independent of their family environments, the influence of peer groups, popular cultures, and life online have an impact on their interaction with and adoption of beliefs, norms, and values. One particular area to consider here is social media. The House of Commons Women and Equalities Committee (WaEC) recent inquiry into body image in the UK⁸⁴ has highlighted several concerns around perpetuating idealised body images (for example through image editing and influencer promotion) whilst research has found an association between social media usage and eating concerns.⁸⁵ Naturally, policy interventions become complex and multidimensional in this space, both in terms of conceptualising the problem and designing and implementing an intervention, with effectiveness highly attenuated to the individual. Nevertheless, as the WaEC sets out in its report, Government should work alongside regulators and social media companies to prioritise encouraging positive body image during childhood and adolescence, reflecting the fact that an effective childhood obesity strategy is not only about encouraging sustained weight loss but furthering the acceptance of diverse body types and destigmatising obesity.

Evidence from abroad – whole-systems approaches

EPODE (*Ensemble Prévenons l'Obésité Des Enfants - Together Let's Prevent Childhood Obesity*) – France⁸⁶

Launched in 2004, France's EPODE programmeⁱ is a community-based, social marketing methodology for addressing childhood obesity, designed to be adapted to local contexts. The model evolved from a longitudinal study of a school-based nutrition education programme that showed that without long-term buy-in from the whole community – parents, young people, teachers, health practitioners, political leaders, the media, etc. – efforts to reduce obesity were limited.⁸⁷

The EPODE approach is spearheaded by a series of successive campaigns, each highlighting one specific theme at a time, founded on principles of destigmatisation, collective action and positivity. As an example, in France, one such campaign aimed at increasing fruit consumption included the distribution of recipes and storybooks to families, and breakfast events in schools.⁸⁸ The programme is driven by a Central

ⁱ EPODE is not explicitly a model for addressing adolescent obesity. The French programme was principally aimed at children aged 0-12. Yet whilst specific local level interventions would need to be modelled specifically for adolescents, the broad principles of the model merit consideration.

Coordination Team which develops tools and materials for interventions, coordinates with stakeholders (such as health experts, businesses, sports groups, the media etc) and conducts advocacy work. Monitoring and evaluating the success of interventions and communicating these with local, national and international stakeholders is a vital part of the EPODE approach. And, crucially, the programme seeks to embed and build upon healthy behaviours and, thus, must be committed to over the long long-term. The model's success has been widely praised and, in France, results from the eight pilot towns showed a significant decrease of 9% in overweight and obesity over a four-year period.⁸⁹ EPODE has since been adopted and adapted in hundreds of communities worldwide, with notable examples in Scotland, Belgium, and the Netherlands.

Figure 9: The EPODE model



Source: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3492853/>

AAGG - Amsterdamse Aanpak Gezond Gewicht (Amsterdam Healthy Weight Programme) – The Netherlands

Running for two decades until 2033, AAGG is a whole-systems, city-wide approach to reducing childhood obesity – and more specifically, the unequal distribution of overweight and obesity. Of the city's children (aged 2-18), 21% were classified as having obesity or overweight at the start of the programme. Progress has been impressive: between 2012-2017, rates of child obesity and overweight fell by 12%.⁹⁰

Expanding the EPODE approach for a metropolitan setting, the programme's guiding principle is the adage "it takes a village to raise a child" which, in policy terms, means:

- Multi-level action aiming to adapt the political, physical, social, health education, and care environments in multiple settings (such as the home, school, neighbourhood etc) to improve individual outcomes.
- Collaboration across sectors at the municipal level (public health, spatial planning, sport, education, poverty reduction etc) and between public private and community stakeholders to design and implement interventions.
- Evaluation and learning to ensure programmes are adapted to the local environment.⁹¹

Specific interventions have included improving the safety of cycle routes; subsidising sports club memberships for low-income households; assigning youth healthcare nurses; action on the advertising environment; and improving support for teenage parents and more deprived mothers.⁹² A focus on adolescents is one of the ten pillars of the AAGG and since 2014 the programme has pivoted towards focusing on children aged 12+. This includes the LIKE (Lifestyle Innovations based on youths' Knowledge and Experience) programme, an intervention aimed at adolescents (10-14 years) in lower socioeconomic, ethnically diverse groups, designed and informed by a participatory approach, including both teens and their families.⁹³

WHERE NEXT FOR POLICY?

The current approach to adolescent obesity in England

The Government currently does not have a distinct strategy for addressing adolescent obesity. Rather, its efforts are part and parcel of the wider childhood obesity plans (COPS), which outline three ambitious goals to:

1. Halve childhood obesity by 2030.
2. Significantly reduce the gap in obesity between children from the most and least deprived areas by 2030.
3. Aim to reverse the emergence of Type 2 diabetes in children.

Of around 40 interventions identified in the COPs by the National Audit Office, progress has been mixed, as the table below sets out.

Table 3: Selected childhood obesity plan actions and interventions relevant to treatment and prevention of adolescent obesity

	Progress
Sugar, calories, and reformulation	<ul style="list-style-type: none"> • The introduction of the SDIL led to a 35.4% total reduction in sugar sales from soft drinks subject to the levy in its first year.⁹⁴ • 3% reduction between 2015-2019 in the sugar content of retailers' and manufacture branded products; the target was a voluntary 20% reduction by 2020. • A ban on the sale of energy drinks to under-16s has been announced but is yet to be implemented.

	<ul style="list-style-type: none"> • Public Health England scaled back its voluntary 20% calorie reduction target across foods most commonly eaten by children, citing that its plans were “unrealistic”. Many products are now set at either 5% or 10%. • 5th set of voluntary salt reduction targets has been published.
<p>Marketing & promotions of food and drink</p>	<ul style="list-style-type: none"> • Government committed to a ban on advertising HFSS products before 9pm on TV and online by end of 2022. • From October 2022, certain promotions of HFSS products by location and price in medium and large retailers will be banned.
<p>Education, local area action and supporting actions</p>	<ul style="list-style-type: none"> • £100 million investment in weight management services and programmes to help children, adults, and families maintain a healthy weight; £4.3 million of funding for 11 local authorities to support expansion of child weight management services and brief interventions (2021-2022) • £12 million NHS Digital Weight Management Programme was launched in July 2021 • £300,000 over three years to five local authorities to deliver trailblazer childhood obesity programmes • PHE has issued guidance to help local authority planning departments utilise the planning system to promote healthy weight environments • Government has “paused” wider reforms to School Food Standards, making only minor updates after Brexit • Green Infrastructure Standards Framework has been delayed from 2019 to 2022.

What is clear from the above is that the Government has taken some significant steps at the macro level to address the UK’s obesogenic environment. Many of these policies are welcome interventions, notably the HFSS restrictions and introduction of the SDIL, which campaigners have long called for.

And yet, it is difficult to say that these policies come close to matching the Government’s ambitions. There continues to be a strong emphasis on voluntary industry efforts to improve the nutritional value of food products. Progress on several measures, including reforming school food standards, have also stalled. And, at the local level, cuts to public health budgets (24% in real terms since 2015/16) have recently been described as “unfathomable” by the Association of Director of Public Health, raising concerns about English councils’ capacity to implement effective local-level plans to address adolescent obesity.⁹⁵

Adolescent obesity is a complex public health issue, with many contributing factors. There is no silver bullet intervention that will, in isolation, reduce obesity rates and indeed evidence is often mixed on the effectiveness of certain measures, such as restrictions on the proximity of fast-food restaurants to schools. Ultimately, a “whole systems” approach to reducing adolescent obesity is necessary – taking into account the wide range of drivers and aspects of the obesogenic environment, from healthy food affordability; to the built environment; to weight management services. Below, we set out some next steps for policy that could be explored as part of this whole systems approach.

1. Local-level partnerships

There is a key role for local-level partnerships to focus on reducing adolescent obesity, with interventions targeted at the specific challenges of a given locality – such as economic deprivation and an urban landscape that discourages physical activity. Working closely with other public services, private enterprise, and the third sector, health and care partnerships can play an important role in reducing adolescent obesity.

Integrated care systems (ICSs) may be particularly well-placed to deliver such partnerships. ICSs are new partnerships between organisations that meet health and care needs across an area, to coordinate services and to plan in a way that improves population health and reduces inequalities between different groups. Since 2018, they have been deepening the relationship in many areas between the NHS, local councils and other important strategic partners such as the voluntary, community and social enterprise sector.⁹⁶

Already, such partnership approaches are delivering on child obesity. More than 21,600 pupils from at least 120 primary schools are now walking, jogging or running their way to better health thanks to the “Daily Mile” initiative in Gloucestershire, a simple programme that gets children active for at least 15 minutes each day. With childhood obesity rates rising, the scheme encourages physical activity at an early age as research has shown that children who have overweight in primary school are less likely to revert to a healthy weight in later life.⁹⁷

A partnership between the clinical commissioning group, voluntary sector, county council, and local schools, the initiative has been underway since March 2017. While focused on pre-adolescent children, in primary schools, there is scope to extend similar initiatives into secondary education.

Beyond ICSs, there is also scope for metro mayors to lead on adolescent obesity reduction with a whole systems approach. A briefing paper produced by University College London’s Obesity Policy Research Unit explored the feasibility of implementing Amsterdam AAGG-style programmes in England, and concluded that larger cities such as Manchester and Birmingham would be best placed.⁹⁸

Currently, the Department for Health and Social Care is providing support for five localities to establish themselves as Childhood Obesity “trailblazers” – Birmingham, Bradford, Lewisham, Nottinghamshire and Pennine Lancashire. The Childhood Obesity Trailblazer Programme aims to⁹⁹:

- Test the limits of existing powers through innovative and determined action to tackle childhood obesity.
- Share learning and best practice to encourage wider local action.
- Develop solutions to local obstacles and consider further actions government can take to enable ambitious local action and achieve change at scale.

These trailblazers are engaging in a range of innovative forms of partnership working. For example, Birmingham City Council is working with local universities to embed health messaging in wider employment training, to “upskill a generation that could apply their knowledge in the home and as future parents”.¹⁰⁰ The City of Bradford Metropolitan District Council is working with Islamic religious settings to promote health and identify enablers for systems change with wider partners.¹⁰¹

While we have cited examples above of partnerships delivering on adolescent obesity, it remains the case that too many UK-based initiatives are too small in scope and financially constrained. As was noted at an expert roundtable held as part of this research, local authorities often lack the financial resources to play a leading role on obesity reduction.

Systems and partnership-based approaches work, but they are time and resource-intensive. Ultimately, local government needs to be financially empowered to deliver change on adolescent obesity. Given the sharp increase in childhood obesity rates seen during the COVID-19 pandemic, central government should announce a sizeable and sustained injection of funding for local and mayoral authorities to prioritise this issue.

2. Expanding availability of family-level interventions

We noted earlier that there are important relationships between parental obesity and adolescent/child obesity, with some studies suggesting that parental weight loss and diet improvement can translate into weight reduction among children with overweight and obesity.

As the National Institute for Health and Care Excellence (NICE) notes, there is strong evidence that, for adolescents with overweight and obesity, whole-family interventions, whether directed at individual families or group-based, result in significant decreases in BMI scores.¹⁰² Rather than focusing solely on children with obesity, family-based treatments encourage the entire household to engage in healthier behaviours—improving diet, increasing physical activity and reducing sedentary behaviour. The interventions also often draw heavily from the science of behaviour change, teaching parents strategies for goal-setting, problem-solving, monitoring children’s behaviours and modelling positive parental behaviours.¹⁰³

We agree with the position of NICE, which has argued that policymakers should “ensure family-based, multi-component lifestyle weight management services for

children and young people are available as part of a community-wide, multi-agency approach to promoting a healthy weight and preventing and managing obesity”.¹⁰⁴

There is a need to dedicate long-term resources to support the development, implementation and delivery of these services and build on successes implemented in some parts of the UK – such as Coventry’s “One Body, One Life” programme. One Body, One Life includes an 8-10 week programme for families, “designed to help you and your child choose healthier foods and spend more time together having fun and being active”. The programme is currently delivered in primary schools, sports centres and community venues across Coventry.¹⁰⁵

An evaluation of One Body, One Life found statistically significant self-reported behaviour changes among participants, with improvements in fruit and vegetables eaten and decrease in consumption of crisps, snacks, and take away foods. There were also significant increases in physical activity, and small but statistically significant improvements in BMI/BMI percentile for adults and children who started the programme with overweight/obesity.¹⁰⁶

An expansion of family-based treatments should include investment in the development of digital tools and online programmes to support family-based weight management from home and allow more cost-effective interventions. A US-based study explored the impact of such a programme (“mHealth DRIVE”), which incorporated digital and mobile health tools, including remotely delivered sessions, a wireless scale that enabled a child-tailored weight graph, and a pedometer. The study found a significant reduction in the BMI among children that used the service.¹⁰⁷

Efforts to manage a child or young person's weight are not always supported, and are sometimes undermined, by members of the wider family. Further, many young people with overweight and obesity may have, or come from a family with, a history of failed attempts to manage their weight.¹⁰⁸ Family-based weight management services allow healthcare professionals to explore this shared history, along with family attitudes to diet and physical exercise – generating improved outcomes.

3. School-based interventions

Given the amount of time adolescents spend in education, school-based interventions are vital in the prevention of childhood obesity. Several interventions have shown promising results, supported by a number of effective and high-impact strategies.¹⁰⁹

NICE has argued that head teachers and chairs of governors, in collaboration with parents and pupils, should assess the whole school environment and ensure that the ethos of all school policies helps children and young people to maintain a healthy weight, eat a healthy diet and be physically active, in line with existing standards and guidance. This includes policies relating to building layout and recreational spaces, catering (including vending machines) and the food and drink children bring into school, the taught curriculum (including physical education), school travel plans, and provision for cycling.¹¹⁰

A range of specific school-based interventions have been found to be efficacious for curbing and preventing childhood obesity¹¹¹ and should be explored by policymakers and schools. This includes:

- School teachers acting as role-models and getting actively involved in all targeted behaviours
- Teaching staff and school personnel promoting the availability and accessibility of healthy snacks and water and monitoring the provision of healthy food options.
- Families being targeted via educational/informative material (newsletters), family “homework” assignments or school meetings/ events for the children and their families in order to change the home environment to promote the targeted behaviours (e.g. availability of fruit and vegetables, as well as other healthy food items/snacks)
- School playing fields and playgrounds being accessible after school hours and physical activity during lunch and other breaks being promoted
- Physical education teachers developing and promoting non-competitive, enjoyable activities, and promoting whole class participation

At the expert roundtable we convened for this research paper, it was noted that a constraint on school-based interventions in England is the autonomy given to academy schools, which limits the policy levers that councils can use. Academies opening after 2010 do not have to follow the nutritional standards that apply to grant-maintained schools, with 2,500 reportedly not voluntarily signing up to the standards¹¹², raising concerns about the quality of food on offer.¹¹³

Another frustration expressed at the roundtable was the National Child Measurement Programme (NCMP), in its current form, being a missed opportunity to engage with schools, pupils, and parents on issues related to weight, exercise, and diet. The NCMP measures the height and weight of children in reception (aged 4-5) and school Year 6 (aged 10-11). However, as things stand, local authorities are not required to provide parents with their child’s results, though they are encouraged to do so.¹¹⁴ A study looking at parents’ experience of the NCMP found that some parents thought that communication on their child’s weight was offensive and patronising. Parents often rejected overweight feedback as lacking in credibility and considered NCMP communication to be targeting parents other than themselves. Family and peers collaborated in the dismissal of overweight feedback, legitimising participants’ decision to disregard their child’s overweight categorisation.¹¹⁵

In the words of one of our roundtable attendees:

“[with the NCMP] parents are told if their child has an unhealthy weight but they are not given much help. At the moment it is very clinical.”

We suggest that the NCMP should be overhauled. Communication with parents about their child’s results should be mandatory, rather than merely encouraged. This mandatory communication should include, beyond a child’s weight status:

- Information about the risks of childhood/adolescent overweight and obesity.
- Signposting to community-based support and family-based interventions.

- A framing of the obesity as a societal issue rather than one where the onus of responsibility lies with the children themselves and their parents.
- References to online sources (e.g. recipes) and apps to support positive behavioural change.

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