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CURRENT OPINION

Using Economics to Impact Local Obesity Policy: Introducing the UK Centre for Economics of Obesity (CEO)

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Abstract
Worldwide, population obesity levels are at their highest recorded levels, having nearly tripled between 1975 and 2016. This leads to substantial pressure on health systems, a negative impact on economic development, and results in adverse physical and mental health outcomes. There are many economic reasons why reducing population obesity should be a priority, and global targets have been set with many governments pledging to reduce obesity levels by 2030. To achieve these targets, a 'system-wide' approach has been widely advocated in direct recognition of the wide-ranging complex interacting determinants of the disease. This system approach requires action at all levels, including at the local government level, to use all fiscal and non-fiscal levers to bring about local system change that promotes healthier population behaviours. Like many country contexts, in England, local resources for achieving this system change have been drastically reduced in recent years. Economic evaluation offers a formal explicit framework to support local decision making but, to date, there has been a disconnect between national guidance on cost-effectiveness and how that informs local action. A new Centre for Economics of Obesity has been purposively developed to work closely with local government to adapt methods to help achieve efficiency and equity gains. By working across six workstreams to begin with, this Centre will use economics to inform policy action on different but interrelated parts of the obesity system and act as a training hub for health economists working in obesity policy.

1 Background

Obesity is defined as an abnormal or excessive fat accumulation and is associated with several serious chronic diseases such as cardiovascular disease, diabetes, and stroke. In all countries, obesity levels have been rising steadily since 1975, with the global prevalence rising approximately 2 percentage points per decade [1] and in Europe, the prevalence of obesity has tripled since 1980 [2].

There is a clear economic case for preventing and treating obesity. Worldwide, the costs of obesity are considerable and estimated to be 3.3% of total GDP in OECD countries [3]. Within Europe, the costs associated with obesity account for 2–8% of the health budget [4] and in the UK, the direct annual costs from treating health complications associated with obesity is over £6 billion, with wider costs to society of £27 billion [5].

As well as the overall rates rising, there is a clear socioeconomic gradient. In high-income countries, the risk of obesity is higher in population groups who have lower socioeconomic status. For example, in England, 39.5% of women who live in the most deprived areas compared to 21.9% of women who live in the least deprived areas are living with obesity [6]. The latest (2020/21) English National Child Measurement Programme figures show that the prevalence of obesity in children aged 4–5 years is more than double in the most deprived versus the least deprived areas, and this gap is increasing [7]. The recent COVID-19 pandemic has highlighted that obesity is a risk factor for severe symptoms from COVID-19 [8], and government restrictions imposed on society acted in a way that further increased population levels of obesity and contributed to the increasing health inequalities across our society. It is imperative that Government action is taken to control levels of obesity to improve population health and reduce disparities.

With a focus on the UK, this paper will first outline the various strategies that have been proposed by the UK

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Key Points for Decision Makers

Obesity levels are continuing to rise with considerable costs for both health care systems and wider society.

Local governments have a role to play with helping to achieve national targets but with a reduction in budgets in real terms and growing public health need, an understanding of the opportunity cost of resource allocation is urgently required.

To pursue value in local obesity policy it is necessary to account for the financial and political context for decision making including how responsibility for policy is divided between government departments and the influence of the commercial sector and the public.

The Centre for Economics of Obesity will adopt a shared learning approach to adapt methods of economic evaluation and decision modelling to generate economic evidence to inform local obesity policy. By having an explicit framework to inform decisions this will improve efficiency on how local resources are managed to prevent population obesity.

national and local government to tackle obesity. It will then describe how economics can offer a theoretical explanation for the rising rates and how economic analyses can help inform a policy response, paying particular attention to the regional or local policy making context. It will introduce the new Centre for Economics of Obesity and describe the research that is being conducted to illustrate how economics is being used to generate evidence that can help decision makers with managing finite resources to achieve efficiency and/or equity gains.

2 The National and Local Policy Response

Increasing calls have been made for a 'system-wide' response to the obesity crises with an emphasis on prevention recognising the multiple and interacting determinants of the disease [9]. The World Health Organization (WHO) strategy on diet, physical activity, and health [10] have described the actions needed by national governments and communities to support healthy diets and regular physical activity, and this strategy is recognised within the 2030 Agenda for Sustainable Development Goals (SDG) [11]. Governments have set national targets to reduce levels of mortality from non-communicable diseases through prevention and treatment (SDG target 3.4) by 2030 [11].

In terms of the UK response, the UK Government has set a target to reduce the number of adults living with obesity and to halve childhood obesity by 2030 [12]. The government has published two childhood obesity plans. The first was in August 2016 [13] that was widely criticised for not being bold enough with too much emphasis on voluntary action. The second plan published in June 2018 [14] was improved with tighter controls on marketing and advertising of unhealthy foods and an indication of extending the UK soft drinks levy to other foods. A prevention green paper [15] and the National Health Service (NHS) Long-Term Plan [16] have also outlined the start of a process to reduce levels of obesity with an emphasis away from treatment towards investing in changes that prevent the onset of disease. More recently, the UK Food Strategy [17] recommended a comprehensive set of measures including fiscal measures, to reduce levels of salt and sugar in foods; mandatory reporting for large food companies; improvement in food education provided in schools; expanding eligibility for free school meals and the healthy start scheme; and supporting sustainability of land use through supporting farmers and encouraging innovation as part of the Government's Innovation strategy. For physical activity, the latest guidelines recommend short bouts of activity and instead of setting a daily threshold, to focus more on achieving an average number of daily minutes of physical activity across a whole week [18]. All these documents together show positive signs that the obesity policy is now being considered more holistically with multiple actions being taken to address the wide range of determinants.

This 'whole system' response also filters down to local jurisdictions and taking a 'place-based' approach by galvanising local assets within local systems to tackle the disease. In England, this responsibility is led by local authorities who provide more than 800 different services to local populations ranging from 1.5 million (Kent County Council) people to 2000 people (Isles of Scilly). Local authorities have a clear role to play in helping to achieve the national obesity targets, by using their fiscal and non-fiscal powers to alter the local obesogenic environment and bring about local system change; with supporting national-led policies to ensure effective implementation at the local level, and by working closely with local communities and partners to complement work at a national level. This is similar to many local government organisations around the world such as municipal governments in the USA [19], 'concejos municipals' in Mexico and Colombia [20], and city councils in Australia [21]. Of course a system-wide approach means a movement away from considering single interventions and instead thinking about a whole suite of interventions all working together to shift the system in a favourable way. From a methodological perspective, when assessing how and

to what extent these interventions are 'effective' this raises some challenges, which are discussed in detail in Sect. 3.

3 Pursuing Value in Obesity Policy

Economics can offer both a theoretical framework and empirical evidence to explain why population obesity levels have increased at such a rapid rate. The macroeconomic objective of economic growth is underpinned by increased consumption of goods, including food and drink [22], and the obesogenic environment in relation to the availability, affordability, and accessibility of food alongside our interaction with the education, workplace and home environment have all contributed to the obesity epidemic. Economics offers insight into the real 'price' of food, recognising that it is not just about the relationship between income and food prices. It is also about the time and effort it takes to obtain food so that it becomes cheaper and more accessible, then this combined effect causes obesity levels to rise [23]. How individuals allocate their time towards leisure and work-related activities is of interest to economists; the role of incentives, and the growth of the 'sedentary' industry (spectator sports, cable TV) relative to other industries helps to provide an economic explanation for changing levels of a population's physical activity [24], all of which have contributed to the rising obesity rates.

As well as offering a theory and understanding for why obesity levels are rising, economics can also offer a framework for recommending different courses of action dependent upon the values of the policy decision maker. By 'values', we mean the objectives of what the decision maker is trying to achieve, which can relate to the pursuit of efficiency and/or equity. The theory of economic evaluation is based on the principles of scarcity, that there is limited funding available for all services and therefore these services must 'compete' for the same pool of resources. This is particularly relevant to the English Local Authority public health grant, which was reduced in real terms by 24% in 2020/21 compared to 2015/16 [25]. This means that funding is more constrained than ever, and against the backdrop of increasing public health need, addressing questions of efficiency is a priority. Within the context of obesity services, economic evaluation can help to inform decisions on how to allocate the grant *between* different types of services. For example, is there enough funding for smoking cessation versus obesity services (allocative efficiency); and how best to allocate funds *within* a given service. For example, what is the most cost-effective means of offering weight management services (technical efficiency)?

A special consideration of obesity policy is that many of the interventions targeting obesity are delivered in non-health settings. For example, active travel initiatives are the responsibility of the local transport team or altering school settings to encourage uptake of healthy food would sit within the local education team, and this raises interesting methodological issues of capturing the opportunity cost of investment across different local government budgets, and across different administrations. Identifying the 'metrics' that matter for the spectrum of obesity interventions is key to engaging all decision makers with considerations of efficiency at the societal level. The public health outcomes framework [26] exists to guide investment decisions, comprising 75 high-level indicator categories that include 161 individual indicators. Within this framework, short- and medium-term indicators relevant to obesity interventions are productivity metrics such as employment levels and absenteeism rates, utilisation of outdoor space, percentage of physically active adults, and health improvement outcomes such as childhood obesity levels and self-reported well-being. More long-term indicators are life expectancy and inequality in life expectancy at birth. How interventions are judged to be effective will depend on impact upon these indicators alongside consideration of the joint strategic needs assessment; and the criteria for 'judging' value will be determined by a collective group of local government decision makers, including the Director of Public Health and the elected members who are voted in by the public. These circumstances create a funding context that is very different to the conventional health care setting for which health economic evaluation is normally applied as rationing decisions are explicit, politics plays a role, and budgets and resulting metrics vary dependent on the type of intervention being considered.

A further consideration is the nature of how obesity interventions tend to be implemented. Often, the design, funding, and schedule for implementation of interventions are outside the control of the researcher, and therefore it is necessary to adopt quasi-experimental methods for evaluation. With these types of study designs the researcher controls for variation in exposure to the intervention by using factors exogenous (external) to the intervention [27]. An example is the recent evaluation of the UK Soft Drink Industry Levy that examined data both before and after the policy change to assess impact on sugar content, price, and product size of soft drinks [28]. Flexibility in research design is required adopting realist approaches to understand how the context is influencing effectiveness and to assess what it is about an intervention that is working, for whom, and in what circumstances [29].

4 Increasing Capacity for Research Within English Local Authorities

In recognition that the burden of obesity is determined by the social, environmental, and economic conditions that people live in, and appreciating the role local authorities can

have with influencing these wider determinants, there is a key priority to increase capacity for research working closely with these local organisations. Currently, there is a disconnect between the evidence that is generated at the national level and how that filters down to influence policy at a local level, and local authorities can help fill gaps in knowledge by working closely with academic institutions to conduct research to generate much needed evidence of what is 'working' at the local level. Working together with academic partners, third-sector organisations and public services, local authorities can be research active by evaluating the impact of national interventions on the health and wellbeing of local populations; as well as piloting new policies, interventions or actions as part of a local whole systems approach to tackling obesity, and adopting a shared learning approach. Local authorities are in a position that they understand the needs of their local populations and can work with communities and local businesses to adopt a 'health in all policies' approach recognising the multiple determinants of the disease. These actions can be local authority-led (local authority-funded and implemented) or can be led by local stakeholders as a result of the engagement work done by local authorities across the system to develop a shared strategy and coordinated response. Examples include restricting access to motor vehicles along local streets as part of an air-quality campaign while simultaneously encouraging local people to increase active travel such as walking or cycling; or working within schools to embed healthy dietary behaviours while engaging local farmers to sell fruit and vegetables to the school pupils and families.

5 The Centre for Economics of Obesity

Funded by the UK National Institute for Health Research (NIHR) a new research centre for using health economics to support English local decision makers to tackle population obesity has been established [30]. The overarching aim is to generate economic evidence that adequately captures the societal impact of the disease and outlines the short- and long-term costs and benefits of alternative courses of action. The objectives are to work with local authorities and local research partners to generate evidence on (i) knowing which interventions are best value for money in terms of obesity services for the local population, and (ii) ensuring that all relevant costs and benefits are appropriately captured so that an evidence-based case can be made for obesity prevention across all sectors at the local level, and (iii) methods development that account for the unique nature of obesity interventions and fit with the evidence requirements of multiple local decision makers, and (iv) undertaking research that enables local decision makers to understand the impact of nationally-led obesity policy within their local populations.

The Centre will initially focus on six research workstreams working across the local obesity 'system' and will establish new workstreams for a range of population obesity prevention interventions as it grows. The fundamental principle behind establishing the Centre is to build on the robust economic evaluation structures that have worked well within the health care sector and create decision-making tools that assist resource allocation at the local level. The focus is on obesity policy, but the frameworks and ways of working will translate to other local public health functions, in different settings.

A central cross-cutting theme will be the methodological development for economic evaluation, working closely with the local authorities and local research partners. The intention is to generate economic evidence that resonates with all stakeholders who are part of the local system and thus provide a 'common language' that facilitates co-production and a shared approach to obesity prevention and thus in turn support the functions of the local authority. As well as economic evaluation addressing questions of efficiency, we will also make methodological progress towards capturing equity effects to track the distributional consequences of interventions [31]. For obesity policy this is important, as inequalities in obesity are increasing and addressing these inequalities is a priority for both national and local government. Distributional economic evaluation offers a potential framework to formally assess any 'trade-off' questions between efficiency and equity and this will be a key feature across all the workstreams. Another methodological theme will be the inclusion of implementation costs [32] as these costs are often excluded from economic evaluation and can have important impacts on local budgets. Additionally, the Centre will evaluate interventions tracking how local costs and benefits flow between the different sectors including health care, transport, environment, education and commercial sectors [33].

5.1 The Workstreams

Workstream 1: Green/Blue Space Policies to encourage physical activity often include use of natural environments such as green or blue space. Green space is defined as an area of vegetated land within an urban area such as parks or gardens, and blue space is an outdoor environment that can be natural or man-made that prominently features water. The accessibility and availability of natural environments offers the opportunity to engage with physical activity at both individual and community levels [34]. Examples of effective interventions include improvements in access, walking/cycling paths, safety attributes (e.g. lighting) and facilities [35]. In economic terms, modifications in green and blue space are associated with high costs and demand funding allocation from a variety of stakeholders. This workstream

will involve two separate programmes of research. First, we will work closely with our local authority partners to measure the economic value of green space, paying explicit attention to the complex funding model and recognising the role of the third sector (charity) and volunteers. This work will explore how interventions can encourage interaction with green space that in turn promote levels of physical activity within the local populations. Second, we will work closely with the UK National Canal and River Trust to assess the economic value of blue space and develop an economic model that predicts how alternative uses of Trust funding alters population outcomes at the local level.

Workstream 2: Workplace Workstream 2 focuses on the workplace and what local businesses can do to promote the health and wellbeing of the workforce. This fits within a local systems approach and considers the wider stakeholder agendas such as productivity and employability. Here the emphasis is on evaluating upstream interventions that address the health literacy skills in the workforce. This work forms part of the National Childhood Obesity Trailblazer Programme and is in partnership with Birmingham Local Authority piloting health and wellbeing training designed to enhance local authority-led apprenticeship training programmes. The work is being led by the local authority acting as a test bed for a new approach to considering the determinants of obesity and the Centre will provide the academic support for evaluation.

Workstream 3: Schools Workstream 3 focuses on the role of the school environment in shaping children's behaviours. Given that children spend a significant amount of time at school, schools can have a powerful influence on children's habits, particularly in relation to food. Nevertheless, the evidence around effectiveness and cost effectiveness of school nutrition policies is scarce [36]. Since 2015, the majority of UK schools have been mandated to adhere to the UK national School Food Standards that outline the nutritional principles for food provided at schools and support pupils' healthy eating behaviour. Workstream 3 aims to bridge the current knowledge gap by exploring the resource requirements and impact on health and education outcomes from adhering to the UK national School Food Standards [37] and the School Food Plan [38].

Workstream 4: Retail Workstream 4 is about the retail sector and understanding what retailers can do to create an environment that promotes healthy behaviours. Retailers form part of the local 'whole systems approach'. This workstream will build on the literature studying the effect of vouchers and food stamps on obesity, food composition and food purchasing behaviour [39, 40]. From working closely with a leading supermarket, it will generate evidence on the impact of different discount vouchers upon purchasing behaviours with a particular emphasis on socio-demographic influences. This workstream is an example of how local authorities support the implementation of a national scheme by working to encourage uptake of vouchers and the research evidence will show how the vouchers are impacting purchasing habits across local population subgroups.

Workstream 5: Active Travel In workstream 5, the research will generate cost-effectiveness evidence for active travel interventions developing methods to capture the mortality and morbidity and equity effects associated with active travel. In the first instance, we will be evaluating the impact of a new segregated cycleway upon physical activity levels and subsequent health and wellbeing, with both an efficiency and an equity focus. Early economic modelling will help predict the changes in population behaviour required to offset the level of investment.

Workstream 6: Economic Modelling Finally, workstream 6 will develop modelling methods to estimate the economic burden of obesity from a local authority perspective and assess the economic and health equity impact from 'doing nothing' to help with developing the business case for prevention. This work will have an explicit focus on the local 'system' and adopt scenario analyses to predict how the costs associated with obesity will alter if local population trends were to change over time. It will therefore produce economic data that will help inform a local system response to obesity prevention as the costs 'released' from reducing population levels will be spread across multiple sectors.

The Centre will be internally guided by the following key principles for working:

- to adopt a shared-learning approach by sharing research protocols as a means of developing and testing new methodology;
- to generate a robust evidence base for which local authority obesity policy can be based; and to train the economic researchers of the future, who are skilled with working closely with local authorities.

During the 5-year funding period, the Centre will work collaboratively with all local authorities across the West Midlands (UK) region. To guide progress, a Stakeholder Advisory Group has been established comprising representatives from all relevant sectors including the food system, combined authorities, research funders, public health, active travel, health partners, and the public; and a Public Advisory Committee has been created to enable understanding of the local communities, and to access local knowledge and experience of living and working within the research settings.

By using formal economic evaluation and modelling methods to support resource allocation at the local level, the Centre will improve efficiency on how local resources are managed to prevent population obesity and will help to facilitate the system-wide approach to achieving value and

reducing unfair and unjust inequalities in obesity and therefore health and well-being.

Declarations

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Author contributions EF conceived the idea for the Centre for Economics of Obesity. All authors contributed to the study design. The first draft of the manuscript was written by EF and all authors commented and edited previous versions of the manuscript. All authors read and approved the final manuscript.

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