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Living with obesity in Ireland: determinants, policy and future perspectives

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Globally, the prevalence of those living with obesity ($\geq 30 \text{ kg/m}^2$) is rising, with this trend expected to continue if firm and decisive policy interventions are not introduced. Across Europe, despite many consecutive policies aiming to reverse rising trends in weight status over recent decades, no country is currently on track to halt and reverse current trends in the coming years. This is evident in Ireland too, whereby the reporting of nationally representative weight status data show that targets have not been achieved since reporting began. The aim of this review is to critically appraise recent evidence relating to the key determinants of obesity including weight status, diet quality and physical activity with an emphasis on socioeconomic inequalities. And to consider these in the context of respective policy measures and propose future-focused recommendations. Furthermore, as with the complex nature of obesity, multifaceted approaches that shift the focus from the individual and place responsibility at a societal level will be reviewed.

Obesity: Overweight: Determinants: Obesity policy

Obesity is a complex, progressive and relapsing chronic disease, characterised by excess or abnormal body fat, that impairs health⁽¹⁾. At present, alongside undernutrition and climate change, obesity represents one of the gravest threats to human health and survival⁽²⁾. The development of obesity is the result of multifaceted relationships between genetic, socioeconomic and cultural influences which are affected by consumption patterns, urban development and lifestyle habits⁽³⁾. Prevalence rates of obesity have continued to rise globally over the past five decades and the disease is now considered one of the largest contributors to poor health in most countries⁽²⁾. Across the World Health Organization (WHO) European Union (EU) region, consistent increases in prevalence have been reported, with no Member State on track to reach the previously set target of halting the rise in obesity by 2025, and only rare incidences of stabilisation have been noted among global obesity

prevalence data for adult populations^(4,5). While, recent childhood obesity rates within the WHO EU region are reported as either swiftly growing or stabilising, and high prevalence rates are found to disproportionately affect those of low socioeconomic backgrounds⁽⁶⁾.

Given the rise in overweight and obesity prevalence in recent decades, health organisations have been seen to call on policy- and population-based approaches to disrupt the current ‘obesogenic’ environment⁽⁷⁾. It has been stated that government-led action is essential to improve the healthiness of food environments and reduce obesity prevalence, diet-related non-communicable diseases (NCDs), and related inequalities⁽⁸⁾. The aim of this review is to critically appraise relevant published literature pertaining to key determinants of obesity^(9–11), while considering these in the context of respective policy measures. Evidence will be presented in terms of the international, European and Irish perspectives.

Abbreviations: EU, European Union; HI, Healthy Ireland; NCDs, non-communicable disease; OPAP, obesity policy and action plan; SSDT, sugar-sweetened drinks tax.

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Determinants

Central to the challenge of obesity prevention and management is a thorough understanding of its determinants⁽¹²⁾. The Foresight report, commissioned by the UK government to better understand how to respond to rising obesity levels, produced the obesity systems map in 2007 which describes the complex multifaceted system of obesity determinants⁽¹³⁾. The map shows no single dominant influence, but instead a collection of determinants which can be broadly grouped into physiological factors, eating habits, activity levels and psychosocial influences⁽¹³⁾. Despite the passing of time, these determinants and the systems map continue to remain relevant today⁽¹⁴⁾. Socioeconomic status is a known predictor of obesity, whereby lower status is associated with higher levels of obesity in adult populations of high-income countries and is therefore a key consideration when discussing obesity and its determinants^(11,15).

Weight status trends

Excess body weight is an important risk factor for mortality and morbidities from many NCDs, including Cardiovascular Disease (CVD), diabetes, cancers and musculoskeletal disorders⁽⁵⁾. Data estimating trends in obesity and weight status are an important source of information for researchers, policy-makers and public health practitioners about the evolution of the prevalence over time⁽¹⁶⁾. In addition, such data is useful in benchmarking goals for reducing obesity guiding policy and interventions, assessing the effectiveness of such interventions and in steering priorities in healthcare planning⁽¹⁶⁾. Reliable data on Body Mass Index (BMI) is continually needed in order to perform such tasks⁽¹⁷⁾.

The use of BMI as an arbitrary measure of health has been widely discussed throughout the literature. At a population level, health complications increase in parallel to increasing BMI, hence BMI is often used as a surveillance measure in epidemiological research⁽¹⁸⁾. It must be noted however, that BMI does not directly measure body composition such as visceral fat or fat distribution making the measure less reliable in certain population groups, ethnicities and across the life cycle⁽¹⁹⁾. Despite the limitations associated with BMI, the index has been found to be a reasonable measure of prevalence when used for large sample sizes, with correlations found between BMI and total body fat and total abdominal adipose tissue⁽⁴⁾. It is therefore commonly relied upon to understand weight status trends but requires careful interpretation on an individual basis.

Increases in BMI over the past 50 years are now considered to be at pandemic levels and may have the potential to reverse life-expectancy gains in high-income nations^(17,20,21). A large-scale, international study analysing data from 68.5 million persons, both children and adults, reported a doubling in the prevalence of obesity since 1980 in more than seventy countries and a continuous increase in most other countries⁽²²⁾. Elsewhere, estimates using global BMI data have identified a 0.4–0.5 kg/m² increase in age-standardised mean BMI per decade

between 1980 and 2008⁽¹⁷⁾. There is a plethora of estimates of expected prevalence of overweight and obesity (BMI ≥ 25 kg/m²) among the published literature for the coming years and decades. One such set of estimates is from The World Obesity Federation's World Obesity Atlas which predicts that over 4 billion people are expected to be overweight or living with obesity by 2035, which represents over 50% of the world's population⁽²³⁾. And in the context of Ireland, it is estimate that 47% of Irish adults are expected to be living with obesity by 2035 if prevention, treatment and supports do not improve⁽²³⁾.

The trajectory of the prevalence of obesity in Ireland over the past three decades has already surpassed expectations. One of the earliest nationally representative quantifications of obesity in Ireland was gathered as part of the Irish National Nutrition Survey carried out by the Irish Nutrition and Dietetic Institute in 1990. This identified 8% of men and 13% of women to be living with obesity⁽²⁴⁾. Over a decade later, the North South Ireland Food Consumption Survey found 20% of men and 16% of women living with obesity⁽²⁵⁾. The prevalence of obesity in Ireland has continued to increase exponentially as evidenced by the findings of the National Adult Nutrition Survey where 26% of men and 21% of women were found to be living with obesity in the survey period between 2008 and 2010⁽²⁶⁾.

As part of A Healthy Weight for Ireland Obesity Policy and Action Plan (OPAP), weight status prevalence data have been collected on a rolling basis through the Healthy Ireland (HI) surveys. Initial targets for overweight and obesity set in the OPAP sought to achieve a 0.5% sustained downward trend in both weight status categories⁽²⁷⁾. Data on weight status as part of the HI surveys has been published every second year since 2015, with the exception of 2020 when data collection was suspended due to the Covid-19 pandemic. It should also be noted that trained interviewers collected anthropometric measurements in the surveys conducted between 2015 and 2019, physical measurements were not conducted in 2021 and self-reported measurements were collected in 2022. These data provide rolling evidence of weight status trends in Ireland. According to the annual reporting of the HI surveys, progress towards the OPAP targets has not been met (Table 1). The HI Survey 2022 acknowledges the possible over-estimation of population weight status reductions since 2019, due to change in methodology. Therefore, the picture remains somewhat unclear based on these data alone⁽²⁸⁾.

Weight status trends and socioeconomic status

Socioeconomic status and its drivers such as income, educational attainment and occupation have been long recognised as important determinants of obesity, health and lifestyle. Socioeconomic inequalities in weight status continue to prevail and widen in the EU. This is evidenced by retrospective nationally representative data from fifteen EU countries whereby meta-regressions showed a statistically significant overall increase in absolute inequalities of those living with obesity of 0.11% (95% CI 0.03, 0.20) per year among men and 0.12% (95%



Table 1. Irish weight status prevalence as report by the Healthy Ireland Survey's and OPAP targets 2015–2022

	2015	2016	2017	2018	2019	2020	2021	2022
Reported weight status								
% overweight BMI ≥ 25 kg/m ²	37	–	39	–	37	–	–	35
% obesity BMI ≥ 30 kg/m ²	23	–	23	–	23	–	–	21
OPAP targets								
% overweight BMI ≥ 25 kg/m ²	–	36.5	36	35.5	35	34.5	34	33.5
% obesity BMI ≥ 30 kg/m ²	–	22.5	22	21.5	21	20.5	20	19.5

OPAP, obesity policy and action plan.

Index, '–' indicates data not reported. Italicised results indicate self-reported measures. Data extracted from OPAP and Healthy Ireland Survey reports 2015, 2016, 2017, 2018, 2019, 2021 and 2022^(27,28,61,115–119).

CI 0.04, 0.20) per year in women between 1990 and 2010⁽²⁹⁾. These data also show larger increases in obesity prevalence among the lower-educated compared to the highly educated group⁽²⁹⁾. These widening inequalities are evident in relation to socioeconomic status and weight status despite concerted efforts to reduce health inequalities, as stated in various policies, and most recently in the WHO European Food and Nutrition Action Plan 2015–2020⁽³⁰⁾. Due to the large number of comorbidities associated with excess body weight, it is widely accepted that reducing the socioeconomic gradient in obesity prevalence is a fundamental step towards addressing socioeconomic gradients in morbidity and mortality for chronic disease⁽³¹⁾.

The importance of tackling health inequalities is also evident in public health policy in Ireland. The recent Health Services HI Implementation plan 2023–2027 identified reducing health inequalities as a key component of the plan, highlighting activities such as population needs-based assessments, targeted interventions, place-based delivery and campaigns informed by behavioural science as means to achieve such change⁽³²⁾. Tackling weight inequalities is a feature of both the OPAP, and The Health Service Executive Model of Care for the Management of Overweight and Obesity with explicit statements outlining the need for resourcing to be tailored and targeted to higher risk areas of deprivation^(27,33). In view of the persistent, and often intergenerational impact of socioeconomic circumstances on weight status, effective policies tackling inequalities in BMI are urgently required.

Diet quality

Poor diet quality is a leading cause of disease worldwide⁽³⁴⁾, and is considered a major modifiable determinant of obesity, with diet quality defined as the degree to which a diet reduces the risk of diet-related NCDs⁽¹⁰⁾. To understand the relationship of diet with NCDs, analysis of dietary patterns is considered a more appropriate approach as opposed to placing focus on single foods or nutrients, given the complex nature of interactions between foods and nutrients⁽³⁵⁾. This has given rise to the development of various defined indices aiming to assess the nutrient adequacy of dietary patterns, allowing for greater interpretation, and understanding of modifiable dietary risk factors related to obesity.

Dietary quality indices most commonly examine prospective and cross-sectional associations between diet and health outcomes and have the ability to synthesise a large amount of dietary information as a single indicator of health or diet-related disease risk^(36,37). It has been noted among the published literature that the most preferred indices include versions and iterations of the Diet Quality Index; the Healthy Eating Index; the Mediterranean Diet Quality Score and the Overall Nutritional Quality Index⁽³⁸⁾. The dietary pattern with the greatest body of evidence is the Mediterranean diet, given the known benefits of this dietary pattern in terms of prevention and treatment of NCDs and mortality reduction⁽³⁹⁾. Measurement of diet quality is complex and multidimensional given that individuals generally do not consistently achieve all dietary standards advised through dietary guidelines⁽⁴⁰⁾. Furthermore, indices are limited by the inherent limitations of dietary recall methodologies, such as under- or over-reporting⁽⁴¹⁾. Despite these limitations, the use of diet quality indices continues to be commonly used in nutritional research and provide a marker to access the relationship to NCDs.

On a global level, diet quality is generally considered 'modest'⁽³⁴⁾. Assessment of diet quality using data from 185 countries between 1990 and 2018 applying the alternative Healthy Eating Index as the index of choice identified slight improvements in diet quality over this time period but the overall score remained relatively low at 40.3, measured on a scale ranging from 0 (least healthy) to 100 (most healthy)⁽³⁴⁾. Between 1990 and 2018, the mean global Alternative Healthy Eating Index score increased by 1.5⁽³⁴⁾. This increment was driven by increases over time in scores relating to the consumption of non-starchy vegetables, legumes and nuts and fruits, alongside decreases in the consumption of red and processed meat, sugar-sweetened beverages and sodium⁽³⁴⁾. In relation to weight status, diet quality indices have been found to be inversely associated with parameters of weight, whereby adherence to dietary guidelines has a favourable effect on weight status⁽¹⁰⁾. At the European level, a study which explored the association between dietary quality and weight status using five diet quality scores found higher scores to be associated with lower BMI, lower waist:height ratio and waist circumference and higher diet quality scores, which are reflective of optimal dietary patterns and better overall nutritional status⁽⁴²⁾.

Socioeconomic disparities are evident in the literature with persistent findings of lower dietary quality associated with lower-educational attainment^(34,43). In an Irish context, the Probability of Adequate Nutrient Intake scoring system was applied to data from the National Adult Nutrition Survey, a representative survey of Irish adults, and found higher scores to be associated with higher-educated participants⁽⁴³⁾. Diet quality indices can therefore provide useful information at a population level regarding adherence to dietary guidelines, allowing for the monitoring of policy or guidance in the form of a single metric⁽⁴⁴⁾.

Physical activity

Participation in physical activity, coupled with reducing sedentary behaviour has long been cited as a means of preventing and treating many diet-related NCDs faced by populations worldwide at all stages of the life cycle^(45,46). Morbidity and mortality associated with obesity and physical inactivity combined produce a large burden on both economies and health care systems⁽⁴⁷⁾. A protective role between the presence of overweight or obesity and accumulated metabolic equivalent of task minutes for physical activity has been observed in paediatric populations, while higher levels of physical activity are likely associated with a lower risk of developing obesity^(48,49). Despite the known benefits of incorporating regular physical activity inequalities arise in participation by age, sex, disability, pregnancy, socioeconomic status and geographical location^(50,51). Evidence suggests that girls, women, older adults, people of low socioeconomic status, people living with disabilities and chronic diseases, marginalised populations and inhabitants of rural communities often have less access to safe, affordable and appropriate spaces in which to be physically active⁽⁵⁰⁾.

The WHO global status report states that 27.5% of adults worldwide do not currently meet WHO physical activity recommendations⁽⁵¹⁾. However, there are disparities in physical activity participation between high- and low-income countries across the world, which contributes significantly to the burden of diet-related NCDs and consequently, obesity prevalence. Elsewhere, it has been estimated that 61.5% of European adults attain current guidelines on a regular basis⁽⁵²⁾. Yet, this level of adherence is considered insufficient and continues to contribute to the burden of NCDs in high-income countries⁽⁵³⁾. Furthermore, it is noted within the WHO global status report that there is a dearth of data globally on sedentary behaviours⁽⁵¹⁾. This deficiency in global and national surveillance systems requires direct and immediate attention⁽⁵¹⁾.

The prevalence of insufficient levels of physical activity in low- and middle-income countries has been estimated to be 16.2 and 26%, respectively⁽⁵⁴⁾. With reasons cited for poor participation in physical activity driven by lack of economic supports which result in insufficient facilities and resources⁽⁵⁵⁾. Among Irish adults, findings from the North South Ireland Food Consumption Survey (2001) confirmed declining levels of physical

activity with increasing age among a representative sample of Irish adults (n 1379) aged 18–64 years. The National Adult Nutrition Survey (2010) found 88% (42.1% of men and 45.9% of women) of the nationally representative sample met the then national physical activity recommendations^(56–58). With regards to sedentary activities, both the North South Ireland Food Consumption Survey and National Adult Nutrition Survey identified that television accounted for the majority of leisure time activity^(58–60). More recently, the HI Survey (2019) estimated that 46% of all adults achieved National Physical Activity Guidelines of at least 150 min of moderate activity per week⁽⁶¹⁾. From these data it is clear that Irish physical activity behaviours require improvement to meet the guidelines. This gives rise to an immediate need for intervention given the known benefit of physical activity participation in the management of obesity and weight status⁽⁶²⁾.

Engagement in both physical activity and sedentary behaviour has been found to follow a socioeconomic gradient. Evidence suggests an inverse relationship between socioeconomic status and attainment of physical activity recommendations whereby those of higher socioeconomic status are less likely to experience the adverse health outcomes associated with inactive lifestyles than their less advantaged peers^(63,64). Furthermore, geographical areas of high poverty rates have been associated with reduced levels of perceived safety in terms of the most basic forms of physical activity such as walking, resulting in increased physical inactivity and other sedentary behaviours. Improving levels of physical activity while decreasing sedentary behaviour in socioeconomically disadvantaged populations is a significant public health challenge⁽⁶³⁾. Current recommendations, including those from the WHO and HI both include actions aiming to address inequalities in physical activity participation^(51,65,66).

Obesity policy

The importance of appropriate policy measures in the context of both the prevention and treatment of obesity cannot be understated. Well-designed policies have the potential to meaningfully and substantially improve diets on a local, national and global scale, particularly in relation to social inequalities, and therefore have an essential role to play in the global obesity pandemic⁽⁶⁷⁾. Conversely, inappropriate policy measures which place personal responsibility on those living with obesity, and disregard evidence of the many biological and genetic drivers of weight regulation are considered stigmatising and have the ability to lead to lifetime, even intergenerational, inequalities^(68,69). There are several policy measures commonly relied on by policymakers to disrupt the rising prevalence of obesity at a national level. These include actions such as front-of-pack nutrition labelling, taxes on unhealthy foods, subsidies for healthy foods, restrictions on advertising to children and food reformulation programmes⁽⁷⁰⁾. It should be noted that there is considerable disparities in the breadth and



depth of obesity-related policies worldwide, leading to slow and inconsistent results⁽⁷¹⁾.

Obesity policy in Ireland

The current obesity policy in Ireland, A Healthy Weight for Ireland OPAP was launched in 2016 and spans until 2025⁽²⁷⁾. This policy emanated from the government's framework for improving health and wellbeing – HI. Prior to the current policy, a 2005 report of the National Taskforce on Obesity identified ninety-three actions needed to address the challenges posed by rising rates of overweight and obesity in Ireland. This report failed to meet the objectives set out, and it was later acknowledged that the taskforce lacked oversight in terms of responsibility for implementation of the actions highlighted. To overcome this, the 2016 OPAP established a Special Action Group on Obesity whose purpose is to support the implementation of the recommendations set out in the obesity policy⁽²⁷⁾.

In addition to the OPAP, the Irish Clinical Practice Guidelines for the management of obesity in adults in Ireland, adapted from the Canadian edition, were launched in 2022⁽¹⁸⁾. These guidelines reflect substantial advances in the understanding of the determinants, pathophysiology, assessment and treatment of obesity as a chronic disease. There is a clear shift in the focus of obesity management towards improving patient-centred health outcomes, functional outcomes and social and economic participation opposed to weight loss alone⁽¹⁸⁾. Furthermore, it is noteworthy that the lived experience of obesity was included throughout the adaptation process of the Clinical Practice Guidelines. These policy measures, coupled with the implementation of the Health Service Executive Model of Care for the Management of Overweight and Obesity provide evidence of progress made in the area of overweight and obesity prevention and management in Ireland over recent years, a timeline of such progress is depicted in Fig. 1⁽³³⁾.

Obesity policy implementation

Policies should readily lead to implementation and evaluation, otherwise the risk of ineffectiveness or failure becomes inevitable⁽⁷²⁾. This is acknowledged in the OPAP, given that a suite of performance indicators monitoring the progress of implementation were embedded within the policy⁽²⁷⁾. As such, an Implementation Progress Report 2016–2019 and mid-term review have been published, both providing a status update on the main deliverables of the OPAP⁽⁷³⁾. Alongside the mid-term review, an independent evaluation of the implementation of the policy was performed which evaluated the opinions of independent experts on the level of implementation and rate of progress⁽⁷⁴⁾. Additionally, the Healthy Food Environment Policy Index (Food-EPI) was conducted between January 2018 and June 2020. This work was directed by an expert-led team which assessed the governments' level of implementation of policies and support for improving the healthiness of the food environment and benchmarked performance against international best practice⁽⁷⁵⁾.

An annual bulletin or score card was the method of progress evaluation initially proposed as part of the OPAP. However, as acknowledged in the mid-term review this action was not delivered in light of the other forms of review which were subsequently conducted. As is evident from the aforementioned, there has been a great deal of evaluation of the current OPAP and as such these reports will guide appraisal of obesity policy implementation to date. Outlined next are some of the actions implemented as part of the OPAP.

Healthy eating guidelines

Regarding areas of high-level implementation, the development of healthy eating guidelines to support a healthy diet is commended across all reports of evaluation. According to the Food-EPI, Ireland scored well against



Fig. 1. Timeline of obesity policy and related actions in Ireland 2013–2022^(18,27,33,73,120).

international benchmarks for ensuring the public has access to nutritional information. This is through the availability of food-based dietary guidelines, monitoring of overweight and obesity prevalence and subsequent occurrence rates for diet-related NCDs and their risk factors, and the existence of mechanisms to coordinate multi-sectoral action on policy coherence and NCDs prevention policies⁽⁷⁵⁾. However, it was also noted that despite the high level of implementation for these particular areas, these actions alone are unlikely to enable healthier eating habits without other major, wider reaching policy interventions⁽⁷⁵⁾.

Sugar-sweetened drinks tax

The implementation of taxation on foods considered unhealthy is based on the premise that consumers are encouraged to reassess preferences at the point of purchase due to higher costs⁽⁶⁷⁾. The sugar-sweetened drinks tax (SSDT) was introduced on the 1st of May 2018 in Ireland. The impact of taxation measures are largely dependent on the taxation design in the country of implementation, however the available data suggest policies have generally led to reductions in purchasing trends and have been seen to have the greatest affect among low-income groups and high sugar-sweetened beverage consumers^(76,77). Although the health impact of this measure have yet to be fully understood in Ireland, modelling prior to its introduction estimated that such a tax would have small but meaningful effects on obesity rates, impacting the whole population but likely to have the greatest predicted impact among younger adults who are the main consumers of sugar-sweetened beverages⁽⁷⁸⁾. In contrast to this, recent Irish analysis has found, in 60% of cases, that leading brand full-sugar and sugar-free carbonated soft drinks are sold at the same price point, hence undermining the effectiveness of the SSDT⁽⁷⁹⁾. The total revenue collected since the introduction of the SSDT to February 2023 has amounted to €149.1 million⁽⁸⁰⁾. Nevertheless, it should be noted that this revenue is not ring-fenced for obesity treatment or services as this is not a feature of the Irish taxation system, instead the funds are returned to the national exchequer. There have been multiple calls from experts to ring-fence such funds, and indeed increase the level of taxation to ensure effectiveness of the measure in terms of obesity prevention^(79,81). A government evaluation of the SSDT is expected in late 2023.

The food environment

It is well established that obesity is determined by environmental factors such as the increased availability and marketing of energy-dense, inexpensive foods and beverages alongside economic growth, accelerated urbanisation, widening health inequalities, increased screen time and changes in working patterns ultimately leading to a 'health disrupting' environment⁽¹⁸⁾. The term 'obesogenic', first described in the 1990s, describes the sum of influences that promote obesity and is recognised as the net result of biological, behavioural, and environmental impacts that act through the mediators of energy intake

and expenditure which are at play over the course of an individual's lifetime⁽⁴⁾. Addressing obesogenic environments are considered central to reducing obesity prevalence as food environments themselves are seen to create inequalities^(2,82). With regards to the food environment, the OPAP set out a prevention approach which aimed to gradually change Ireland's food environment to one that facilitates consumption of healthier foods and drinks⁽²⁷⁾.

Initial steps taken between 2016–2019 towards this action included holding a cross-governmental stakeholder forum and commissioning a behavioural study on how best to proceed with implementing calories on menus, which led to drafting of proposed legislation. The development of this legislation has since been suspended, and according to the Review of the Obesity Policy & Action Plan (2016–2025) this was due to redeployment of personnel during the Covid-19 pandemic. The Food-EPI evaluation raised particular concern over the 'low implementation' of food environment policies when compared to best practice during the early–mid stages of OPAP which the evaluation was tasked with reviewing (January 2018–June 2020)⁽⁷⁵⁾. Gaps identified included a lack of government action on the introduction of targets for out-of-home food consumption, failure to restrict the promotion of unhealthy foods to children on food packaging, no discernible progress towards establishing public sector procurement standards and a failure to implement policies that encourage the availability of outlets selling nutritious foods⁽⁷⁵⁾.

However, since the publication of Food-EPI evaluation, there has been significant progress in implementation of the relevant OPAP actions relating to improving the food environment, namely through measures relating to food reformulation. Food product reformulation has been described as the process of altering food or beverage products in terms of their recipe or composition to improve the products health profile⁽⁸³⁾. Implementation of actions relating to food reformulation to date has seen the publication of the Roadmap for Food Product Reformulation in 2021⁽²⁷⁾. As part of this roadmap, a dedicated Reformulation Task Force, situated within the Food Safety Authority of Ireland was established with the aim of implementing and driving the actions of the roadmap. The roadmap provides a framework and targets for voluntary food reformulation by the food industry, including food service providers from 2021 to 2025. These targets aim to reduce energy (kilojoules) by 20% and simultaneous reductions in target nutrients by 20% sugar, 10% salt and 10% saturated fat within food groups which contribute greatest to consumption of these nutrients⁽⁸⁴⁾.

Voluntary commitments have been made by the Irish food industry to improve the nutritional quality of foods available for purchase. Such commitments are monitored by the Food Safety Authority of Ireland and results of monitoring activities are made publicly available⁽⁸⁵⁾. To date, the Task Force has reported on initial monitoring of sodium content, noting scope for further sodium reduction⁽⁸⁶⁾. That being said, the



Reformulation Roadmap does state that legislative measure may be considered if sufficient progress is not made during the tenure of the Task Force⁽⁸⁴⁾.

Elsewhere, in the UK reformulation has largely relied on voluntary reformulation of single nutrients in key food groups with targets set in relation to reductions in energy, sugar and salt⁽⁸⁷⁾. Evidence to date suggests that such voluntary measures have not led to significant changes in the nutritional quality of foods, with the exception of soft drinks where the soft-drink industry levy has been applied⁽⁸⁷⁾. Regarding soft-drink industry levy, significant reductions have been noted in the total volume and per capita sales of sugars sold in soft drinks since its introduction⁽⁸⁸⁾. Given the success of the levy on soft drinks, calls have been made on the government to consider additional policy measures which would accelerate progress in other categories considering the voluntary targets have not been met⁽⁸⁹⁾.

Advertising restrictions

Evidence suggests that there are considerable potential health and economic benefits from restricting the advertising of high-fat, salt and sugar products⁽⁹⁰⁾. This is recognised in the OPAP, as measures were included which sought to improve the commercial promotion of unhealthy foods. A code of practice for food and beverages promotion, marketing and sponsorship was developed and published⁽⁹¹⁾. More recently, the Online Safety and Media Regulation Act 2022 was signed into law. This act makes provisions for the prohibition or restriction of commercial communications directed to children relating to foods or beverages containing high-fat, *trans*-fatty acids, salts or sugar⁽⁹²⁾. In order to enact the provisions of the act a dedicated commission, Coimisiun na Meán, has been established in 2023.

Evidence from the UK suggest that similar restrictions led to relative reductions in purchasing of products high in fat (57.9 g, 95% CI 22.1, 93.7), saturated fat (26.4 g, 95% CI 12.4, 40.4) and sugar (80.7 g, 95% CI 41.4, 120.1) when comparing an intervention and control group after broadcasting restrictions were introduced⁽⁹³⁾. In addition to this form of marketing restriction, the current Irish coalition government pledged to introduce planning restrictions on outlets selling high-energy 'junk-food' and beverages adjacent to schools as part of The Programme for Government: Our Shared Future⁽⁹⁴⁾. However, this has yet to be implemented with organisations such as the Irish Heart Foundation calling on the government to fulfil this commitment as well as the commitment to introduce a Public Health Obesity Act, as proposed in the government's manifesto.

Physical activity guidelines

In order to improve physical activity participation rates among populations worldwide the WHO suggest four key policy areas which should underpin national efforts: active societies, active environments, active people and active systems. This multipronged set of recommended areas for action is collectively referred to as a whole systems approach. In essence, it is recognised that

addressing physical inactivity cannot be achieved by simple, single solutions alone but rather through application of integrated approaches⁽⁹⁵⁾.

Physical activity guidelines have had to adapt to rising physical inactivity. In 2020, the WHO launched updated guidelines on physical activity and sedentary behaviour⁽⁶⁶⁾. These guidelines recommend that all adults should undertake 150–300 min of moderate-intensity, or 75–150 min of vigorous-intensity activity, or an equivalent combination of moderate- and vigorous-intensity aerobic physical activity per week⁽⁹⁶⁾. A blanket recommendation to reduce sedentary behaviours across all age groups and abilities has been advised, although evidence was insufficient to quantify an exact threshold⁽⁹⁶⁾. These guidelines support the implementation of the Global Action Plan on Physical Activity 2018–2030 target to achieve a 15% relative reduction in the global prevalence of physical inactivity in adults and adolescents by 2030⁽⁵⁰⁾.

Future considerations for the obesity policy in Ireland

Successive policies have failed to result in decreased prevalence of obesity, in Ireland, the EU and internationally. The WHO European Regional Obesity Report (2022) has stated that despite the publication of several policy frameworks and action plans to halt the rise in obesity, there has instead been consistent increases in the prevalence of overweight and obesity in the region. Projections of trends in obesity prevalence among the Member States in the WHO European Region signify an unlikely possibility that global obesity targets to halt obesity at 2010 levels by 2025 will be met, as adopted during the World Health Assembly in 2013⁽¹⁶⁾. In the UK, obesity targets set in the Government Food Strategy and the preceding fourteen obesity strategies spanning from 1992 to 2020 proposed by the English government have been met with criticism by academics for failing to reduce prevalence of obesity to date⁽⁷²⁾. As discussed earlier, Ireland too has failed to meet targets set in relation to weight status. Against a backdrop of a persistent obesity pandemic, there is much interest in the promise of public policies and their ability to reduce prevalence rates of the disease⁽⁹⁷⁾. When looking to the future of obesity policy in Ireland it is important to consider the successes, failings and novel approaches taken elsewhere. With less than 2 years remaining to achieve the goals set in the OPAP, it is time to consider how best to produce tangible reductions in obesity prevalence.

Diet quality

Improvement of food and diet quality is an important consideration in any suite of measures to disrupt the current food environment. In 2016, Chile set out an 'aggressive' national legislative package to combat obesity and has since been remarked as a leader in obesity policy⁽⁹⁷⁾. Chile has set an example as the first country to implement national regulation jointly mandating front-of-

package warning labels, restriction of child-directed marketing and banning sales in schools of all food and beverages containing added sugars, sodium or saturated fats that exceed set nutrient and energy thresholds driven by nutrient profiling and dietary quality⁽⁷⁶⁾. An observational study aiming to understand the efficacy of the approach has identified significantly decreased purchasing of beverages high in sugar since the introduction of the multipronged policy, however causality cannot be assumed due to the observational nature of the study⁽⁷⁶⁾. Elsewhere, Colombia has become one of the first countries in the world to introduce a tax on ultra-processed foods⁽⁹⁸⁾. The evidence emanating from numerous systematic reviews supports the negative association between increased consumption of ultra-processed foods and increased risk of adverse health outcomes⁽⁹⁹⁾. The overall success or failure of these collective actions will have international ramifications, and is worth observing given the difference in approach to Ireland's current policy⁽⁹⁷⁾.

Physical activity

There is a growing body of evidence supporting the relevance of the social environment in physical activity engagement, and as a consequence obesity prevalence⁽¹⁰⁰⁾. The planned transition of Irish health care to a predominately primary care focus under Slainte Care has been described as an opportunity to further develop physical activity programmes which align with government policy and to integrate these within wider health reform⁽¹⁰¹⁾. It has been suggested that population-focused health promotion campaigns are unlikely to offer the same long-term success as more sensitive and individualised strategies⁽²⁵⁾. Policy interventions seeking to improve physical activity should be designed with a broad range of benefits in mind, rather than obesity prevention alone, and with the aim of improving engagement among marginalised groups such as the socioeconomically disadvantaged⁽⁶³⁾. The Netherlands is considered a world leader in active travel, a means of activity which has been found to exert a significant influence on population physical activity levels⁽¹⁰²⁾. The Dutch example provides learnings on infrastructure requirements and policy instruments needed to encourage participation⁽¹⁰²⁾. On a wider European level, an evaluation of the implementation of physical activity policies across member states identified a need for greater investment in policies which focus on improving physical activity among senior citizens, within the working environment and more broadly in the 'environment, urban planning and public safety' sector⁽¹⁰³⁾. It is clear that no single sector or government agency has sole responsibility for physical activity, rather it is a whole systems approach needing engagement from all sectors including transport, education, health, sport and recreation, urban planning and tourism⁽¹⁰⁴⁾.

Socioeconomic considerations

It is clear from the literature that alongside a growing obesity pandemic, there is also a socioeconomic decline

in health and widening health inequalities. Gross inequalities currently exist in the context of the food environment, and government policies must assess how existing socioeconomic inequalities will be exacerbated and identify relevant actions to reduce them⁽⁸²⁾. It has been proposed in the literature that sociocultural analysis should be included in the planning and design stage of developing policies aiming to promote sustainable health in order to understand acceptability⁽¹⁰⁵⁾.

Repeated calls have been made for targeted public health interventions with the aim of reducing health inequalities, through tailored interventions specifically with the best interest of those within the lower social economic groups in mind⁽¹⁰⁶⁻¹⁰⁸⁾. Others suggest that public health measures, especially those regarding childhood obesity require consideration of consumption patterns among different groups, particularly of those from different socioeconomic groups within society and as such, the impact among these groups should be assessed⁽¹⁰⁹⁾. It is recognised that engagement with marginalised groups is a challenge in evaluating policy implementation, and this should be a consideration in designing research within this field⁽¹¹⁰⁾.

Geopolitical considerations

The fragility of food systems must be considered and embedded in future nutrition policies. Following a comprehensive review of the UK food system, the Government Food Strategy was published in 2022⁽¹¹¹⁾. Given the timing of this review, it provides a recent example of a nutrition-related policy acknowledging the significant challenges facing by food systems in light of increased food prices driven by international unrest, post-Brexit trading implications and learnings from food insecurity faced during the Covid-19 pandemic. These issues are not unique to the UK alone and are worth considering from an Irish perspective with respect to future obesity-related policies.

Sustainability considerations

A return to more traditional eating patterns is becoming evident among recent iterations of food-based dietary guidelines, aiming to provide dual benefits in terms of health and climate. A sustainable diet is defined as one which is protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimising natural and human resources⁽¹¹²⁾. For example, the Latin American food-based dietary guidelines have sought to redefine 'traditional cuisines' not only as traditional recipes and meals but by consuming minimally processed, local foods⁽¹⁰⁵⁾. While the Brazilian food-based dietary guidelines recommend consuming natural or minimally processed foods in line with the Brazilian culture, and a similar approach has been taken in Uruguay⁽¹⁰⁵⁾. Inclusion of socially acceptable traditions or norms within food-based dietary guidelines may aid acceptability and desirability for sustainable healthy diets given the known influence of sociocultural factors⁽¹⁰⁵⁾.



Addressing obesity has also been noted as key in achieving the sustainable development goals, particularly in relation to sustainable development goal 3: ensuring health lives and promoting well-being for all people at all ages⁽⁴⁾. Given Ireland's commitment to implementation of such goals it is imperative that these form part of future policy measures.

The aim of obesity policies going forward in Ireland should be comprised of a suite of interventions, including mandatory legislation and regulations, where necessary, to alleviate the current obesogenic environment⁽¹¹³⁾. Here, we propose considerations for future obesity policy in Ireland based on the evidence presented in this review.

- (1) The funds collected through current and future fiscal policies related to unhealthy dietary behaviours, such as the SSDT should be protected for resourcing of obesity-related services and projects which endeavour to promote healthy diets and lifestyles. This could, for instance, fund healthy food subsidies and advertising messaging included in food-based dietary guidelines.
- (2) Close monitoring of initiatives elsewhere. Should the evidence suggest such measures are effective in reducing the burden of NCDs and obesity, this monitoring should be met with a political willingness and swift implementation.
- (3) Bold, decisive and coordinated action to produce meaningful improvements in physical activity uptake. This will require continued and sustained collaboration and investment from various government departments.
- (4) Prioritisation of addressing socioeconomic inequalities must be a fundamental part of future obesity policies. This should be achieved through setting clearly defined actions, which are monitored and evaluated regularly throughout the lifetime of such policies. Additionally, engagement with marginalised groups should be prioritised in public policy design.
- (5) Consideration of our changing world should be incorporated in future obesity policy in Ireland particularly in relation to wider geopolitical events and the climate impact of our food system.

Conclusions

Obesity as a disease is considered complex, with multifaceted determinants and health consequences, meaning that no single intervention or policy can possibly halt the rise in its prevalence observed over recent decades. Hence, it is important that obesity policies acknowledge the complexity of the disease itself, moving past antiquated approaches which place personal responsibility on those living with obesity and instead focus on influencing societal change that address the wider determinants of health associated with obesity. Robust obesity and weight status trend data are critically important in the development of preventative strategies for the reduction of obesity rates, both nationally and internationally. To

turn the tide on rising obesity levels both in Ireland and across Europe socioeconomic inequalities must be addressed, and a whole systems approach towards both improved diet and physical activity engagement will allow for healthier overall environments for individuals.

On the issue of global climate change, in response to rising temperatures it has been said that 'leaders must lead. No more hesitancy. No more excuses. No more waiting for others to move first'⁽¹¹⁴⁾. This sentiment too resonates with the actions needed to address decades long rising levels of those living with obesity; strong leadership, lack of hesitancy, lack of excuses and swift, decisive action is needed.

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Conflict of Interest

None.

Authorship

C. M. D. conducted the literature review and prepared the manuscript. B. Mc.N. advised in relation to the content and critically reviewed the manuscript. Both authors reviewed and approved the final manuscript submitted for publication.

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