



Prevention and Harm Reduction of Obesity (Clinical Prevention)

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KEY MESSAGES FOR HEALTHCARE PROFESSIONALS



- **Obesity is a complex chronic disease, characterised by dysfunctional or excess body fat (adiposity), that impairs health.**
- **It is a heterogeneous disease that can develop via slow and steady weight gain over an extended period, or from rapid bursts of weight gain.** Not all individuals who have a higher body weight will develop the disease of obesity due to differences in genetic predisposition and exposure to environmental factors.
- **Obesity prevention takes place in a range of settings that access whole populations or high-risk groups.** The individual-based approach to prevention is primarily used by healthcare professionals and targets those with

the highest level of risk of obesity. The population-based approach addresses the behavioural, socio-cultural, and environmental factors that contribute to non-communicable diseases in populations, including obesity.

- **There is a critical and urgent need for cross-governmental and cross-sectoral policies and initiatives to address the effects of the unhealthy environment on non-communicable diseases through meaningful legislative change and societal factors.**
- **Common population-level primary-prevention strategies for chronic disease include unhealthy food and drink taxation, calories on menus, limiting food and beverage advertisement, affordable physical activity options, improving the built environment and addressing social determinants of health.**

KEY MESSAGES FOR HEALTHCARE PROFESSIONALS - Continued

- **Primary care clinicians have an important role in early identification of obesity through regular screening.** Using the Edmonton Obesity Staging System is recommended to determine if an individual who has a higher weight has adiposity-related health impairments and has developed the disease of obesity.
- **In healthcare settings, clinicians should initiate discussion around weight early, consider the individual's life circumstances in the development of obesity and contemplate interventions that consider its complex causes, providing guidance beyond "eat less and move more."**
- **Many medications are associated with weight gain side effects that can contribute to long-term weight gain.** The risks and benefits of such medications should be weighed up for each specific patient before prescribing.
- **Excess pregnancy weight gain and post-pregnancy weight retention are significantly reduced with behavioural interventions.** Clinicians should counsel women attending prenatal care regarding pregnancy weight gain guidelines, and also give pregnant women the necessary counselling, as well as dietary, physical activity and psychological interventions to support achievement and maintenance of a healthy weight at prenatal and antenatal visits.
- **Health benefits of smoking cessation outweigh the cardiovascular consequences associated with smoking cessation-related weight gain.**
- **Short-term behavioural interventions (generally six months or less) aimed at preventing weight gain in young adulthood, menopause, smoking cessation, and breast cancer treatment have not yet been shown to be effective.**
- **Studies with interventions of longer duration are needed to identify effective strategies for preventing weight gain for many of these high-risk groups and for the general population.**
- **Secondary prevention aims to reduce the impact of obesity on individuals' health and quality of life.** It includes early identification and management to prevent progression to more severe obesity with additional complications.
- **Tertiary prevention aims to support people to manage long-term, complex health problems to improve their ability to function, their quality of life and their life expectancy.**

KEY MESSAGES FOR PEOPLE LIVING WITH OBESITY



- **Obesity rates increase with age.** Reducing weight gain and preventing obesity as you get older is preferable to trying to lose significant weight, considering the difficulty in sustaining weight loss, especially as we age.
- **Causes of, and risk factors for, weight gain are wide ranging, extending beyond personal lifestyle choices, such as food intake and exercise, and include factors that you may or may not be able to control.**
- **Obesity develops when excess or dysfunctional body fat impacts a person's health.** Not all individuals who have a higher body weight have obesity. However, research indicates that obesity can develop with small gains in weight over a long period of time, or from rapid bursts of weight gain that impair an individual's health.
- **The estimated annual average weight gain for an adult in a high-income country such as Ireland ranges from 0.2 kg to 1.0 kg per year.**
- **People are prone to greater weight gain during certain life stages, including adolescence, young adulthood, and pregnancy.**
- **Raise any concerns that you may have with a healthcare professional (HCP) as soon as you feel weight is affecting your health.**
- **Regular screening and conversation with HCPs can help to identify patterns and factors contributing to obesity earlier.**

Introduction

In our modern environment, there are numerous factors that put adults at risk for weight gain and the development of obesity. From a public health standpoint, prevention of obesity and related health consequences should be a focus of healthcare systems. Preventing obesity can be targeted at the primary, secondary and tertiary care levels, and aimed anywhere from the individual to the population level. These factors are wide ranging and our understanding of them is growing at a rapid pace. Most research interventions and public health initiatives to date have focused on nutrition and physical activity. However, there are other modifiable factors, such as sleep, stress, use of medications that cause weight gain, gut dysbiosis secondary to antibiotic use¹, other chronic conditions or smoking that may also influence weight regulation. Other factors that influence weight gain but are much less modifiable include age, genetics, epigenetics, income, physical environment, socio-political environment and adverse childhood events, including abuse and neglect². While many of these factors are less subject to individual control, they may nonetheless act as potentially important influencers.

In line with the Sláintecare Report of the Oireachtas Committee on the Future of Healthcare³, the 10-year vision for the health service in Ireland, there are a number of health strategy, guideline and model of care documents that advocate for a person-centred approach to healthcare and chronic disease management with an emphasis on prevention, early diagnosis and early intervention. Chief among these documents is the National Framework for the Integrated Prevention and Management of Chronic Disease⁴ which describes how “end-to-end” care for adults can be provided within a health service that offers a spectrum of preventive, diagnostic, care and support services which are integrated, collaborative, person-centred and provided as close to home as possible⁵. The Model of Care for the Management of Overweight and Obesity in Ireland⁶, reflecting the National Framework, outlines the spectrum of best practice care and services for the management of overweight and obesity in Ireland throughout the life course. It is preventive and proactive in its approach and seeks to secure timely access to holistic services for individuals living with overweight and obesity, with particular attention paid to supporting high-risk groups. These documents describe international best practice in the prevention and management of chronic disease and aim to empower health and social care professionals (HSCPs) working in Ireland to address chronic disease risk factors in all clinical encounters.

Healthy Ireland is a government-led initiative which aims to create an Irish society where everyone can enjoy good physical and mental health, and where wellbeing is valued and supported at every level of society. The Healthy Ireland Framework 2013–2025⁷ is the national cross-governmental framework for improving health and wellbeing and reducing chronic disease. The implementation of the Healthy Ireland Framework, under the oversight of the Cabinet Sub-Committee on Social Policy, is co-ordinated by the Department of Health. It is a roadmap for building a healthier Ireland. In the Healthy Ireland Framework, body weight is a key indicator domain of population health and is included in the Healthy Ireland survey (an annual survey conducted with a representative sample of the population aged 15 and older living in Ireland; sample size

is typically approximately 7,500 people). The Healthy Weight for Ireland Obesity Policy and Action Plan 2016–2025⁸ sets out the strategic approach for tackling obesity in Ireland and is a key policy within the Healthy Ireland Framework. It sets out the Government’s commitment to prevention and management of overweight and obesity, as “Ten Steps Forward.” Recognising that the solutions require action across a range of sectors and at different levels, these 10 steps chart a course for reversing the obesity trends, preventing obesity related complications, and reducing the overall burden for individuals, their families, and the health system. Implementation of the policy is overseen by a cross-sectoral and cross-departmental group (Obesity Policy Implementation Oversight Group or OPIOG) chaired by the Department of Health.

In the absence of comprehensive national surveillance data on overweight and obesity, prevalence of overweight and obesity is derived from population-level surveys and longitudinal studies, such as Healthy Ireland⁹, Growing Up in Ireland¹⁰, Childhood Obesity Surveillance Initiative (COSI)¹¹, The Irish Longitudinal Study on Ageing (TILDA)¹², the Trinity, University of Ulster and Department of Agriculture Study (TUDA)¹³ and cross-sectional national nutrition surveys of various population subgroups (pre-school children, school children, teenagers, adults and older adults) undertaken by The Irish Universities Nutritional Alliance (IUNA)¹⁴. These surveys classify overweight and obesity based solely on body mass index (BMI), and do not account for weight-related complications. In Ireland, at least one in five children aged five years¹⁰ and at least one in four young people aged between 17 and 18 years are living with BMI-classified overweight or obesity¹⁵. With regard to adults, it is estimated that 60% of the adult population in Ireland have a BMI > 25 kg/m²⁹. The differences across the social spectrum are apparent: there is double the rate of overweight and obesity in children attending Delivering Equality of Opportunity in Schools (DEIS) programme schools compared to other schools. This gap is widening. Prevalence in sixth class children is 38% vs. 19% in other schools¹¹. Moreover, individuals living in deprived areas are more likely than those living in affluent areas to have a BMI > 25 kg/m² (65% and 55%, respectively)⁹.

It is against this backdrop that these national clinical practice guidelines with a focus on obesity treatment are published in Ireland. This chapter specifically discusses the evidence supporting obesity-prevention interventions at the primary, secondary and tertiary levels. The documents described above highlight the scheduled multiple healthcare contacts that individuals are offered at important stages throughout the life course, all of which are important opportunities for HSCPs to engage in preventative, early diagnosis, and early intervention activities for overweight and obesity. The Making Every Contact Count Framework¹⁶ provides guidance and training on how HSCPs may undertake brief interventions in any contacts that they have with patients who are living with overweight or obesity. It adopts the “5As approach” to brief interventions. This is a flexible framework to help healthcare professionals (HCPs) to have helpful, non-stigmatising conversations with patients about weight and health^{17,18}. The 5As framework involves the following steps: ask permission to discuss weight and health; advise on weight and health in the context of the individuals life circumstances; assess

options collaboratively; assist with information of health behaviours related to weight and arrange referral to additional support if appropriate.

These clinical practice guidelines will complement existing advice and will enable HSCPs to deliver holistic, evidence-based, person-centred care to individuals living with obesity in Ireland.

Primary prevention

The aim of primary prevention is to prevent overweight and obesity from developing at a population level. It has been suggested that early identification and primary prevention is the most cost-effective option for addressing obesity at a population level¹⁹. Brief opportunistic interventions delivered by HCPs are acceptable to patients and can be an effective way to support self-management of the behaviours that can impact on weight, such as eating, activity, sleep and stress. Due to the high prevalence of obesity, it can be argued that population-level interventions aimed at primary prevention may be more appropriate than interventions aimed at individual-level factors. Commonly proposed population-level actions to improve the environment in which people live, work and play include unhealthy food/beverage taxation²⁰, calories on menus²¹, healthy food programmes and subsidies, limiting food and beverage advertisement, affordable physical activity options, increasing mixed land use and improving the walkability of the built environment²².

Population-level approaches

Ireland has a strong track record in implementing population health approaches using legislative and fiscal tools to target the prevention of chronic disease and health-related consequences in many areas, including tobacco, alcohol, and air pollution²³⁻²⁵. The following population health approaches target the prevention and management of overweight and obesity in Ireland:

Dietary guidelines for each life stage

Ireland has invested significantly in assessing dietary intake among population sub-groups nationally¹⁴. This data has been used to develop national food-based dietary guidelines for the general population above the age of five years, and specific sub-groups (older adults, pregnant women, pre-school children and infants)²⁶⁻³¹, taking the increasing prevalence of overweight and obesity into account^{26,28}. The guidelines provide recommendations on how healthy people of different ages, genders and activity levels can meet population-level nutritional requirements using common foods and patterns. Dietary guidelines for older adults highlights the particular nutritional issues to consider for this group, including the need to maintain lean tissue mass as age increases to prevent frailty³². Older adults with overweight, particularly those with an abdominal body fat distribution, are encouraged to combine a balanced, nutrient-rich diet with physical activity to avoid further weight gain and maintain lean body tissue, and avoid weight-loss diets to prevent loss of muscle mass³². These dietary guidelines have been translated into national standards for food provision

in a number of sectors where public monies fund food provision, including schools³³ and healthcare³⁴.

Reformulation of processed foods towards healthier options

The Food Industry in Ireland and the European Union have made commitments to reformulate their products to ensure healthier food in terms of lower calories (smaller food portions) with lower fat, saturated fat, sugar, and salt content. In Ireland, the OPIOG Reformulation Sub-Group have produced a roadmap which proposes a strategic approach to food reformulation as part of Ireland's Food Vision 2030 strategy³⁵. This sets out priority foods, targets, and a high-level implementation plan. Monitoring of food reformulation towards healthier options in line with the roadmap is being undertaken by a Food Reformulation Taskforce established in the Food Safety Authority of Ireland (FSAI), and as part of EU-wide food reformulation efforts (EU Best ReMaP programme). Baseline surveys of foods marketed in Ireland in categories considered to be part of a healthy diet have shown that some of these "apparently healthy" foods (e.g., breakfast cereals and yogurt) provide excessive amounts of fat, sugar and calories³⁶⁻³⁸. Similar surveys were undertaken in baby foods and foods targeting toddlers aged 36 months, which showed that 15% of baby foods marketed in Ireland were inappropriate due to high sugar and fat content (e.g., chocolate, biscuits, desserts) for infants from four to 12 months of age³⁹. In snack foods for infants and toddlers, some finger foods were equivalent to low salt crisps and reduced sugar jelly sweets^{40,41}.

Sugar Sweetened Drinks Tax (SSDT)

The SSDT came into effect in Ireland on 1 May 2018 and applied to water and juice-based drinks. The scope of the tax was extended with effect from 01 January 2019 to include certain plant protein drinks and drinks containing milk fats. The tax applies to water and juice-based drinks which have added sugar and a total sugar content of five grams or more per 100 millilitres, and plant protein drinks and drinks containing milk fats if they do not have a calcium level of at least 119 milligrams per 100 millilitres. The SSDT has had a significant effect in driving reformulation, where substantial reductions in sugar content was introduced by industry across almost the majority of such beverages marketed^{42,43}.

Calorie menu labelling

In 2011, calorie menu labelling was introduced, which supports consumers to make informed choices about what they eat. A national consultation showed this is hugely supported by consumers in Ireland⁴⁴, while the food service industry required support to implement this⁴⁵. A free online calorie calculator, MenuCal (www.menucal.ie)⁴⁶ was developed for use by food businesses to implement calorie menu labelling, which was independently validated⁴⁷. Calorie menu labelling has been shown to support healthier choices and significantly reduce calorie intake at breakfast and lunch in a staff and visitor hospital canteen in a disadvantaged area of Dublin. Calorie menu labelling has also been shown to increase consumer demand for more fruits and vegetables and less high-fat, high-calorie dishes⁴⁸⁻⁵⁰. Calories displayed to the right of the price in the same font and size on food menus lead to consumers eating fewer calories and having greater knowledge of how many calories were in their meal⁵¹.

Food labelling

Since December 2016, all pre-packaged food must carry nutrition information in labelling⁵². This supports individuals to choose healthier food products. While food labelling provides accurate information, it is complex to interpret. Work is ongoing to develop harmonised EU front-of-pack nutrition labelling that is effective and easy for consumers to use to identify healthier food choices (e.g., NutriScore or Traffic Light System).

Limiting food and beverage advertising

The Broadcasting Authority of Ireland (BAI) Children's Commercial Communications Code 2013⁵³ applies specifically to commercial communications that promote products, services or activities that are deemed to be of particular interest to children and/or broadcast during and between children's programmes, i.e., children's commercial communications. It includes provisions to limit the marketing and promotion of high fat salt sugar foods (using the nutrient profiling model developed by the UK Food Standards Agency) and unhealthy lifestyle/eating habits.

In 2018, the voluntary codes of practice for Non-Broadcast Media Advertising and Marketing of Food and Non-Alcoholic Beverages, including Sponsorship and Retail Product Placement was published⁵⁴. The purpose of this is to ensure that foods high in fat, especially saturated fat, sugar, and salt are marketed and advertised in a responsible way, thereby reducing the exposure of the Irish population to marketing communication concerning these foods to exert a positive influence on healthier eating patterns. The nature of voluntary codes of practice is such that they have no statutory basis and are therefore developed and implemented by mutual agreement between stakeholders. Consequently, these codes must address the desire to protect consumers and balance this against the need of the food industry to continue its economic development. To date, no process has been established to monitor implementation of the codes.

Food poverty

One in 10 households in Ireland report experiencing food poverty⁵⁵. The affordability of healthy eating was also assessed as part of the development of food-based dietary guidelines in Ireland^{26,28}. When family budgets for food are limited, oversized food portions offer more affordability. This research demonstrated the higher cost of healthier food options (fruit, salad and vegetables compared with confectionery, pastries, and fried takeaway foods) and how this impacts negatively on socio-economically disadvantaged groups. Families with children who are dependent on social welfare were the group most at risk of food poverty^{26,28}.

To address the higher risk of obesity among disadvantaged groups, effective action on the social determinants of health that negatively impact an individual's ability to dedicate time or resources to healthy living fundamentals is required. In Ireland, the School Meals Programme, funded by Department of Social Protection, provides healthy school meals in primary and post-primary schools⁵⁶. The scheme was expanded in 2022 to include hot meals. In allocating

funding, priority is given to schools participating in the Department of Education's initiative for disadvantaged schools (DEIS), thus targeting children and families at risk of food poverty.

In 2021, Sláintecare Healthy Ireland in the Department of Health, working with the Health Service Executive (HSE), local authorities and community agencies, launched the Sláintecare Healthy Communities Programme to provide increased health and wellbeing services in 19 community areas across Ireland. A core group of services will be established in each area to support people's wellbeing within that community, providing better access to the range of services needed to help improve and promote healthier lifestyle behaviours, e.g., Healthy Food Made Easy nutrition and cookery courses, social prescribing and parenting programmes⁵⁷. The Safefood Community Food Initiative programme operates at local level within low-income communities. The aim is to positively influence the eating habits of families with children in low-income communities through development of knowledge and skills around healthier eating, shopping and cooking⁵⁸.

Individual-level approaches

Although poor nutrition and decreased physical activity are important risk factors for the development of obesity, other factors play a significant role. This means that clinicians must use a patient-centred approach and consider the individual's life circumstances and underlying root cause for weight gain, as opposed to only targeting the symptom of weight gain. For example, stress, shift work or insufficient sleep could be the underlying reason for increased dietary intake; depression and fatigue can lead to decreased physical activity. Furthermore, depending on the situation, attenuating weight gain as opposed to achieving weight loss may be a more reasonable outcome goal.

Currently, there are very few randomised control trials that examine primary prevention for obesity. Of those published, most examine short time periods that are associated with high risk for rapid weight gain. Very few published studies demonstrate the effectiveness of interventions at the population level. Most of the studies demonstrate effects on eating or physical activity behaviour, but it is unclear whether these results translate into clinically relevant differences in obesity⁵⁹. Most of the evidence that suggests diet and physical activity play a role in preventing unhealthy weight gain and obesity comes from observational trials⁶⁰⁻⁶³. Observational trials do not provide strong evidence of causality on which to base recommendations. Nevertheless, the lack of strong evidence from interventional trials supporting recommendations for obesity prevention should not necessarily preclude clinicians from incorporating these recommendations into practice. It is important to also consider that there are several challenges and barriers that are inherent to conducting prevention research.

Primary-prevention studies tend to be short in duration (less than six months) and are predominantly focused on nutrition and physical activity interventions. This is problematic as primary-prevention efforts will likely need to be far longer in order to demonstrate

weight gains less than the 0.5–1.0 kg/year reported in high-income countries^{64,65}. Research funding tends to focus on the evaluation of individual-level interventions, with only a small proportion devoted to assessment of policy actions. Biomedical research methods investigating cause and effect can provide evidence for treatment and prevention but are less useful in providing guidance for designing environmental systems to support obesity prevention. Addressing the complex challenge of obesity at the population level will require complex system approaches to both the generation and use of evidence.

This chapter will focus on the prevention research examining weight gain in high-risk populations or during short periods associated with high risk for weight gain, such as pregnancy or postpartum weight retention⁶⁶⁻⁶⁸, smoking cessation^{69,70}, certain cancer treatments⁷¹, patients using medications associated with weight gain^{72,73}, menopause⁷⁴ and young adults⁷⁵. Of these, limiting pregnancy and postnatal weight gain has received the most attention; behavioural intervention has been demonstrated to be effective in these scenarios. The limited pharmacological options for weight-gain prevention have mainly been examined in populations who are more likely to have obesity, such as people with type 2 diabetes mellitus (T2DM) or those taking anti-psychotic medications.

Pregnancy: Gestational weight gain and postpartum weight retention

The causes of maternal obesity are multi-faceted, including societal, environmental, and other factors, and require a multi-system, life-course approach to obesity prevention and management (see Chapter 18 [Weight Management for Adult Women Living with Obesity during preconception, pregnancy and postpartum](#)). Postpartum weight retention can significantly alter the weight-gain trajectory of a woman during childbearing years, especially in the case of multiple pregnancies. The preconception and postpartum periods are key time points for interventions to delay or prevent the development or progression of obesity in women, promote health and reduce inter-generational risks⁷⁶. The International Federation of Gynaecology and Obstetrics recommends that pregnant women with a BMI ≥ 30 kg/m² should be advised to avoid high gestational weight gain⁷⁷. Guidelines recommend aiming for limited weight gain of 5–9 kg. The Institute of Medicine recommendations suggest weight gained through pregnancy should be between 5 kg and 18 kg^{78,79} depending on the woman's pre-pregnancy BMI category. A 2012 Irish study⁸⁰ showed that gestational weight gain exceeded recommended targets in 10.7%, 20.1% and 53.8% of women with ideal weight, women with overweight and women with obesity, respectively. This is of concern, as greater gestational weight gain results in greater postpartum weight retention⁸¹. Studies demonstrate that many women retain 2–5 kg per pregnancy⁸². Thus, pregnancy and the postnatal period may be particularly important periods for targeted primary weight-gain prevention. Obesity in pregnancy should be considered in the context of a life-course approach, linking with preconception, antenatal and postpartum services to prevent excess weight gain before and during pregnancy⁸³. In this context, obstetricians,

midwives, general practitioners, and practice nurses are well placed to implement interventions to support women with overweight and obesity attending preconception counselling, antenatal or postnatal care. HCPs should be supported to have supportive conversations around weight and weight-related health behaviours^{77,84}.

Behavioural interventions to prevent excessive gestational weight gain have ranged in their intensiveness and delivery methods. Most use medical nutrition therapy and/or exercise interventions, ranging from in-person to telephone or other electronic messaging systems⁸². Some interventions also incorporate behavioural change strategies to supplement the programme. To date, it is unclear which aspects of the intervention or which combination are the most effective.

A Cochrane review of high-quality evidence published in 2015 by Muktabhant *et al.*⁸⁵ reported that nutrition and/or exercise randomised controlled trials are associated with a 20% reduction in risk for excessive gestational weight gain. In this review, the effectiveness of the interventions was not clearly demonstrated in women with overweight or obesity, which is concerning given the already higher risk for negative pregnancy outcomes for both the mother and baby in these populations⁸². The authors hypothesised there may be differences in physiology and/or other barriers that may require a more intensive intervention to prevent excessive gestational weight gain in women already affected by overweight or obesity. In one study by Yeo *et al.*⁶⁸, the authors suggest that interventions delivered by prenatal HCPs may be more successful than those delivered outside prenatal care, resulting in 3 kg less gestational weight gain. Though behavioural interventions are effective at reducing gestational weight gain, it is less clear whether these interventions are sufficient to improve maternal and foetal complications⁸⁶. Nevertheless, prenatal behavioural interventions may present a unique opportunity for obesity prevention at a life stage when women are regularly engaged with their HCP⁸².

Smoking cessation

Smoking cessation is associated with substantial cardiovascular benefits but is also associated with weight gain. For example, Tian *et al.*⁸⁷ report that individuals who quit smoking gained 2.6 kg more than those who continued to smoke over six years. However, it is important to note that a recent meta-analysis suggests the mortality risk associated with smoking-cessation weight gain is far less than the mortality rate⁸⁸ associated with continuing to smoke. Nevertheless, post-cessation weight gain is a significant concern⁶⁹, and may negatively impact smoking-cessation efforts, particularly in individuals of white ethnicity and those with existing weight concerns. Thus, interventions that address post-cessation weight gain may be important for improving smoking-cessation success.

Weight gain associated with smoking cessation is largely attributed to increased energy intake and reduced energy expenditure⁸⁸. Several studies that tested a combination of smoking cessation and traditional energy-restriction interventions (using meal replacement or low-energy diets) report mixed results on cessation and weight

gain⁸⁹. Furthermore, there is a concern that strict energy restriction may impede smoking-cessation attempts^{90,91}. Not all agree on this point, as some suggest that combined weight and smoking-cessation programmes may in fact improve abstinence in the short term (< three months)⁸⁹. Unfortunately, there does not appear to be long-term benefits of behavioural interventions for weight-gain prevention⁸⁹. Similarly, it does not appear that exercise alone is associated with improved weight-gain prevention. That said, evidence from observational trials suggests that individuals who quit smoking are better able to manage their weight if they are physically active^{88,92}. A recent study reports that post-cessation weight gain in young adults was not related to dietary and physical activity patterns⁸⁷, suggesting that post-smoking weight management may be far more complicated than can be explained by behavioural habits alone. Nevertheless, physical activity and improved dietary habits are likely to have beneficial health effects independent of changes in body weight. A recent Cochrane review⁹³ suggests that there is short-term evidence to support the effectiveness of pharmacotherapies to attenuate post-cessation weight gain, but as with short-term behavioural interventions, it is unclear whether these benefits extend past one year, or which, if any, pharmacotherapy is superior^{93,94}. Thus, it appears that pharmacotherapy delays but does not prevent post-cessation weight gain.

In summary, individuals who attempt to quit smoking should be aware of the risk of weight gain. Nevertheless, the health benefits of smoking cessation generally exceed the consequences of some weight gain. However, there is insufficient evidence to strongly recommend any single type of intervention to prevent post-cessation weight gain. Adoption of healthy behavioural habits is recommended as an adjunct for smoking-cessation programmes.

Cancer treatment

Though weight loss is more common with cancer treatment, some patients gain weight. Weight gain is particularly more common with breast, colorectal, prostate and ovarian cancers^{70,95,96}. Individuals need support and information that weight gain may be related to certain medications, chemotherapy, and hormonal changes⁹⁷.

The research is mixed, and this area needs further study on how to intervene for benefit. Thus, care must be given to ensure that weight-management efforts do not cause any harm to individuals already coping with a diagnosis and subsequent treatment and supports are needed for individuals following treatment.

Medication use

Use of several classes of medications, such as anti-psychotics, anti-depressants, hypoglycaemic agents and corticosteroids, are associated with weight gain^{72,73}. The amount of weight gain they are associated with varies; some can be a potentially large contributor to obesity. Thus, from a primary-prevention standpoint, clinicians may wish to consider the weight-gaining side effects, if possible, when initiating medications (see Chapter 6 [Clinical Assessment of](#)

[People Living with Obesity](#) for further guidance). In general, there is insufficient evidence to support the routine prescription of adjunct medications for preventing weight gain, and it is likely inappropriate from a primary prevention perspective. However, for many of these medications, the magnitude of associated weight gain and the potential for cardiometabolic consequences should be considered when making a clinical decision on the most appropriate medication to prescribe for a patient, and individuals starting these medications should be supported and informed on the risk of weight gain.

Anti-psychotics

Several anti-psychotic medications are well documented to be associated with weight gain and are associated with the highest levels of weight gain⁹⁸. In the short term, anti-psychotics are associated with weight gains of approximately 3.2 kg, and long term with gains of 5.3 kg compared to placebo control⁷². Of these, olanzapine and clozapine are associated with the largest amounts of weight gain⁷³ with as much as 10 kg gains reported⁹⁸. Anti-psychotics are thought to increase the risk of weight gain through changes in appetite and altered metabolism⁹⁹. Thus, initiating medications with less weight-gain tendencies^{100,101} (see Chapter 6 [Clinical Assessment of People Living with Obesity](#) for further guidance) may be preferred options, if clinically appropriate. It may also be important to consider if medications are needed for long-term management, and whether switching to a medication with a better weight-gain profile for maintenance therapy may be appropriate¹⁰². If the decision is made to switch medications, symptoms should be closely monitored to address side effects, such as rebound insomnia, and to ensure relapse does not occur.

To prevent medication-related weight gain, pharmacological and behavioural interventions have been examined with variable success. Medical nutrition therapy, physical activity and cognitive behavioural strategies are associated with medium effect sizes for weight-loss trials and large effect sizes for weight-gain-prevention trials¹⁰³. However, even with intervention, many patients are still likely to gain weight. Weight gain is also associated with untreated mental illness, and not treating is not an option. Consequently, it may be more beneficial to initiate behavioural interventions early after initiating anti-psychotic use. Of the pharmacological choices, support exists for metformin as an adjunct therapy¹⁰⁴, but this is likely to only be applicable to populations who already have obesity. See Chapter 7 [The Role of Mental Health in Obesity Management](#) for more information. In general, there is no strong evidence to suggest the routine prescription of adjunct medications for preventing anti-psychotic-associated weight gain or for achieving weight reduction after weight gain¹⁰³.

Anti-depressants

Anti-depressants are associated with a more moderate amount of weight gain than anti-psychotics, with a recent review citing a 2–5 kg weight gain associated with tricyclic anti-depressants, monoamine oxidase inhibitors and selective serotonin reuptake inhibitors⁹⁸. However, anti-depressants may have a higher global weight gain burden as there are more individuals with depression

than schizophrenia⁷³. Upon initiation of an anti-depressant, close monitoring of weight changes is needed as early changes in body weight are highly predictive of long-term changes¹⁰⁵. Thus, clinicians should consider early intervention in preventing excessive weight gain if possible (see Chapter 6 [Clinical Assessment of People Living with Obesity](#), and Chapter 7 [The Role of Mental Health in Obesity Management](#) for further guidance). Weight gain with anti-depressant use may be associated with increased appetite but could also indicate changes in the underlying mood disorder⁹⁸. In observational trials, dietary choices are associated with differences in weight gain¹⁰⁶, but depression is often an exclusion criterion for weight-management trials. It is thus unclear whether medical nutrition therapy or physical activity therapy are effective in preventing weight gain associated with anti-depressant use, particularly in populations without obesity. Again, weight gain is associated with untreated illness as well, and so whenever possible, supporting the individual to engage with healthy weight-related behaviours, as well as weight monitoring, are important when initiating and continuing treatment of depression.

Diabetes medications

Most individuals with T2DM have obesity, and patients are recommended weight loss to improve risk factors. Some diabetes medications are paradoxically associated with improved insulin sensitivity and increased weight⁹⁸. Thiazolidinediones, rosiglitazones, pioglitazones, sulfonylureas and meglitinides are associated with weight gains of 1–4 kg and insulin with higher associated weight gains of 5–6 kg⁹⁸. The mechanisms responsible for weight gain vary between the medications, but include increases in appetite, increased lipid storage and fluid retention⁹⁸. Patients who are prescribed sulfonylureas as a first-treatment strategy typically have greater weight gains⁷³ than with other medications. Metformin is the most commonly prescribed first-line treatment option and is associated with weight loss of 1.0–2.9 kg⁷³, and may help prevent some of the weight gain associated with other T2DM medications, such as insulin therapy¹⁰⁷ (see Chapter 6 [Clinical Assessment of People Living with Obesity](#) for further guidance).

Menopause

The transition to menopause is associated with greater-than-normal fat gain, but with only normal rates of age-related weight gain⁷⁴. Due to the hormone changes in menopause, there are losses in muscle mass that mask the accelerated gains in fat mass. Despite the beneficial effects of hormone replacement on body fat distribution, it should not be recommended as a treatment for abdominal obesity due to increases in cardiovascular risk⁷⁴. Menopause is also associated with increases in sedentary time and physical inactivity, which further exacerbate cardiovascular risk¹⁰⁸. Several large interventions have examined the impact of behavioural interventions on weight management, though most examined middle-aged women¹⁰⁹, and not necessarily the menopausal-transition women. Simkin-Silverman *et al.*¹¹⁰ undertook one of the few studies to demonstrate that behavioural intervention is successful in preventing weight gain over five years in women transitioning to menopause. Similarly, Kuller *et al.*¹¹¹

reported prevention of weight gain over 54 months. More research is needed to determine which components are most important in preventing menopausal-related increases in adiposity.

Young adults

Early adulthood has been a life-phase associated with increased risk for weight gain, with one study reporting an average weight gain of 14 kg over 15 years of follow-up in young adulthood¹¹². Onset of obesity is common in this age group and thus may represent an important life stage to target with weight-gain-prevention incentives. In particular, young adults attending post-secondary education are reported to have significant weight gain. A meta-analysis suggests the weight gain in the first year of college to be less than 2 kg¹¹³, comparable to the average weight gain for the general population. Most of the literature in young adults that examines obesity prevention involves, in fact, weight-loss or weight-loss-maintenance trials¹¹⁴ or observational studies. These interventions use nutrition and physical activity approaches, behavioural-change strategies, technology-based programmes, and educational programmes. Interventions in this age group tend to be challenging, with several reporting no effect of intervention^{115–117} on weight-gain prevention. Interventions that do demonstrate significant effects are typically weight-loss studies^{75,118}, and overall show results of less than 2 kg, with very limited evidence that this is maintained long term¹¹⁴. This is in accordance with other clinical weight-loss research that suggests that younger age is associated with worse weight outcomes¹¹⁹. Thus, as younger adults may be a particularly high-risk group for weight gain, further research is required and individuals need support with prevention of weight gain while managing the risk of harm, such as developing unhealthy attitudes to weight and size.

Secondary prevention

Secondary prevention aims to reduce the impact of the disease that has already developed. This is accomplished by early detection and treating the disease as soon as possible in order to slow or stop its progression. Ultimately, the aim of secondary prevention is to return the patient to their original health and functional status to prevent long-term problems.

In terms of obesity, this can be thought of as regular screening and preventing further weight gain in individuals with uncomplicated mild obesity (i.e., Edmonton Obesity Staging System stage 0 or 1). Although obesity is strongly associated with morbidity and mortality, there is substantial variation in the health profiles observed between individuals with the same BMI. Further, at the lower border of obesity, there are individuals who have not yet developed obesity-related comorbidities, such as hypertension, dyslipidaemia, orthopaedic problems, or T2DM. It has been reported that up to 40% of the population may present with an elevated BMI, yet can be described as “metabolically healthy” (depending on the definition used to define healthy)¹²⁰, or 20%–25% with an Edmonton Obesity Staging System stage 0 or 1¹²¹. Unlike tertiary

prevention wherein weight loss is clearly associated with health benefits for patients with prevalent obesity-related morbidity, it is unclear what, if any, benefits there may be for patients who present with metabolically healthy obesity¹²² or Edmonton Obesity Staging System stage 0 or 1¹²³. There is debate in the published literature as to whether people with metabolically healthy obesity have better long-term health outcomes and a lower mortality risk compared to individuals with obesity and obesity-related complications^{120,124}. Individuals with metabolically healthy obesity tend to be more physically active, with less consistent evidence reported for dietary differences¹²⁵. This suggests that behavioural strategies may also play an important role in secondary prevention.

Importance of self-weighing

Whilst a population-health approach is important to address the complexity of obesity, healthcare services play an important role in obesity prevention through screening and referral. One of the key considerations for primary and secondary prevention is the concept of regular monitoring and early diagnosis. Obesity is hard to diagnose without objective assessments¹²⁶, and may be challenging to recognise as 60% of the adult population in Ireland now has a BMI > 25 kg/m². Consequently, despite the attention given to obesity, HCPs and the general population may be less likely to recognise the need to pursue obesity-prevention interventions¹²⁷. This would suggest that regular assessments of obesity and weight gain need to be addressed early, preferably as a primary-prevention method at primary care. However, to our knowledge there are no randomised controlled trials that examine regular self-weighing

in a primary or secondary prevention context. In observational trials, such as the Pound of Prevention Trial and the STOP Regain trial, individuals who engaged in self-weighing had less weight gain over time^{128,129}. In the context of weight loss or weight-loss maintenance, self-weighing is also associated with better weight outcomes^{130,131}. In populations with complex obesity, regular weighing and unhelpful clinical conversations about weight may be a source of stress and frustration that can contribute to obesity stigma and adversely affect outcomes. The clinician should initiate respectful conversations around weight and weight gain before the development of obesity. The HSE [Making Every Contact Count Talking About Weight](#) module provides guidance for clinicians in having helpful and supportive conversations about weight and weight-related health behaviours.

Tertiary prevention

Tertiary prevention aims to attenuate the impact of an ongoing illness or injury that has lasting effects. This is done by helping people manage long-term, often complex health problems and injuries (e.g., chronic diseases, permanent impairments) in order to improve as much as possible their ability to function, their quality of life and their life expectancy. For obesity, this would be synonymous with long-term obesity management as a chronic disease. This is where the majority of research lies and is the topic of the other guideline chapters.

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