Obesity is a growing epidemic and affects 1 in 4 Canadian adults and over 1 billion people worldwide. It is a significant risk for many other chronic diseases including type 2 diabetes, cardiovascular disease, fatty liver, certain cancers and most recently COVID-19. In 2020 the Clinical Practice Guidelines for Adults living with Obesity in Canada were published in the CMAJ and outlined an extensive overview of the evidence in obesity management. Although these guidelines were deeply impactful, there are still significant challenges in the ability for health care providers to translate these guidelines into clinical practice.

We will provide a summary of practical, commonly encountered questions and challenges in obesity management and cover a breadth of topics including epidemiology, pathophysiology and in-depth discussion on the 3 pillars of treatment divided into two separate supplements. These supplements aim to provide internal medicine specialists, general practitioners and subspecialists with a resource for the practical application of the Clinical Practice Guidelines into day-to-day patient care.

**Guest Editor - Megha Poddar**

Dr. Megha Poddar is an endocrinologist and obesity medicine specialist in Toronto, Ontario. She has been a diplomate of the American Board of Obesity Medicine since 2016 and is an assistant professor (adjunct) in the Department of Medicine at McMaster University.

She has a multidisciplinary, team-based approach to obesity management which encompasses all 3 modalities of treatments including behavioural counselling, medications and surgical treatments. Dr. Poddar is the clinical director of the LMC Weight Management Program and the medical director of the Medical Weight Management Centre of Canada (MWMCC) which delivers evidence based behavioral and medical treatment for obesity.

Dr. Poddar is the lead author on multiple resources for obesity education including the Obesity section of the McMaster textbook of internal medicine and is a co-author of the Assessment chapter of the 2020 Canadian Adult Obesity Clinical Practice Guidelines. She is also a principal investigator in randomized control trials in type 2 diabetes and obesity. She is a mentor for obesity management and clinical development for healthcare providers both nationally and globally and is passionate about advocating for patients living with obesity.

**Guest Editor - Maria Tiboni**

Dr. Maria Tiboni is an internist-hospitalist and obesity specialist. She has been appointed associate professor in the department of Medicine at McMaster University. Dr. Tiboni sits at the Ontario Advisory Board for the Ontario Bariatric Network and is a diplomate of the American Board of Obesity Medicine.

Dr. Tiboni has been the medical lead at the St Josephs Health Care Bariatric Center of Excellence in Hamilton, Ontario since its inception. Her main focus is in the perioperative care of patients undergoing metabolic surgery including patient selection, preoperative optimization, post operative care and management of medical complications arising following metabolic surgeries.

Dr. Tiboni is passionate about teaching and education. She is the Director of the McMaster University Metabolic and Bariatric Fellowship Program. Dr. Tiboni participates actively in research in the field of obesity and is a strong advocate of patients living with obesity.
1. HOW FREQUENTLY WILL I ENCOUNTER A PATIENT WITH OBESITY IN MY CLINICAL PRACTICE?

(Objective: prevalence of obesity, cost burden to the healthcare system)

As of 2018, 26.8% of adult Canadians reported height and weight data consistent with obesity, with an additional 36.3% being classified as overweight. Thus, most Canadians, specifically 63.1%, reported some degree of excess weight. Unfortunately, this is a chronic medical issue that is still currently underdiagnosed and undertreated. Most healthcare providers understand that obesity can lead to multiple comorbidities which consume the majority of healthcare provider’s time in the outpatient setting (e.g., metabolic disease, osteoarthritis, malignancy, etc); however, many still consider obesity simply as a risk factor for these other conditions and not a chronic condition within itself. This leads to a lack of access to evidence-based treatment and a lack of support for this patient population.

Many healthcare providers do not feel adequately equipped to treat obesity due to lack of time, education and funding. There is still significant bias and stigma within the field of obesity, where both patients and providers still believe that this is a “lifestyle” issue can should be managed simply through diet and exercise changes. A study looking at the attitudes towards obesity in over 2500 Canadians including those living with obesity, healthcare providers and employers (ACTION study) showed that 72% of healthcare providers felt that patients with obesity are not motivated to manage their own weight, whereas 83% of people with obesity felt that the healthcare system is not set up to support their needs. This is a call action and one of the reasons that this supplement was written. In order to improve access to treatment and support Canadians living with obesity it is important that we understand the evidenced based treatments available, provide this treatment in a stigma free environment and advocate for improvement in resources available for our patients.

Obesity has been estimated to cost the Canadian economy anywhere from $4.6 billion-$7.1 billion annually, based on an assessment of the costs of common chronic diseases that are consistently linked to obesity. These costs include not only healthcare dollars but increased rates of absenteeism from employment, increased rates of disability and higher rates of multiple comorbidities leading to higher healthcare costs and more frequent hospitalization. It is well understood that treating obesity, especially early in the course of the disease would provide an economic advantage to the outcomes of most other chronic diseases, in addition to quality and quantity of life.

2. HOW DO I DIAGNOSE OBESITY? WHAT ARE THE PITFALLS IN USING THE BMI?

(Objective: understanding the Edmonton Obesity Staging System, value of waist circumference and downsides of BMI)

A medical diagnosis of obesity is defined as excess adiposity that is adversely affecting an individual’s physical, psychological, and/or metabolic health, leading to increased morbidity and shorter lifespan. Traditionally, the diagnosis of obesity was centered
around the body mass index (BMI) which is a calculation that looks at weight divided by height squared (weight/height²). Using the BMI criteria, overweight is defined as BMI > 25 and obesity is broken down into multiple classes based on the degree of higher weight; class I (BMI 30–34.9), class II (BMI 35–39.9) and class III (BMI > 40). It is important to note that the term “morbid obesity” is no longer utilized when defining severity of obesity, given the large degree of weight bias implied with this terminology. Higher degrees of elevation in BMI predict increased morbidity and mortality on a population level and is still used as the primary diagnosis and inclusion criteria for obesity in most research studies. It is also used as the clinical criteria for indication to use certain treatment, for example a BMI > 40 kgm² is needed for referral to bariatric surgery or a BMI > 35 kgm² with medical comorbidities related to weight.

In recent years, the limitations of using BMI alone to diagnose obesity in individual patients have been increasingly recognized. BMI cutoff were primarily created for white european males and not for females and do not take into account ethnicity. Redefined cut-off have been created for asian ethnicity, but not for others and the cut-offs are generic, unlike ethincs groups that are not a monolith. This bias plagues the use of BMI cutoffs. Solely using weight-based metric does not adequately describe the effect that excess adiposity has on an individual patient's health. This prompted the development of the Edmonton Obesity Staging System (EOSS) which considers weight-related comorbidities in defining the severity of obesity. The EOSS has been shown to be a better predictor of mortality compared to BMI alone. This is also a very useful clinical measure to better understand how much weight impacts a patients overall mental, mechanical and metabolic health. An example of the shortfall that BMI causes is in those with a high degree of lean muscle mass (e.g., football player). Because of their higher weight, likely their BMI will fall into class II or III, however their rate of metabolic disease and EOSS score is likely much lower than someone with a lower BMI, but with a sedentary lifestyle and increased waist circumference and higher EOSS score. One would likely recommend obesity treatment in the latter case as opposed to the initial case, despite the patient’s higher BMI. Lastly, it is important to note that traditional BMI criteria for obesity does not accurately reflect health risk in many ethnicities. For example, in patients of South-, Southeast- or East Asian background, there is a higher risk of metabolic complications at a much lower BMI (see Table 1 below).

Waist circumference to assess abdominal adiposity is another tool which can be combined with BMI in order to better elucidate degree of cardiovascular risk in an individual patient with obesity. Waist circumference should be performed in a standard way in order to accurately measure it throughout follow-up visits. A waist circumference ≥ 102 cm in men and ≥ 88 cm in women is generally considered to indicate higher rates of visceral adiposity and cardiovascular risk which can be particularly helpful in those with lower BMI’s. Use of the EOSS and waist circumference measurements, in addition to BMI, aids in identifying patients with a higher risk of negative metabolic outcomes related to obesity, and who may be more likely to benefit from obesity treatment.

In general, the recommendation is to use all three clinical criteria 1) BMI 2) EOSS 3) Waist circumference to diagnose obesity, understand its severity and help to establish the most effective treatment plan together with the patient.

### 3. RISK ASSESSMENT OF THE PATIENT WITH OVERWEIGHT AND OBESITY. WHAT TESTS SHOULD I ORDER?

(Objective: screening for comorbid conditions, assessments- EOSS)

Risk assessment of patients living with obesity should begin with a detailed history targeted at elucidating factors...
contributing to excess adiposity as well as potential impacts of obesity on mental and physical health. Screening for obesity-related comorbidities such as type 2 diabetes mellitus, hypertension, dyslipidemia, obstructive sleep apnea, mood disorders, weight-related malignancies, and osteoarthritis should be undertaken through a combination of history, physical examination, and laboratory investigations. In assessing a patient’s EOSST stage, the treating clinician will also potentially identify targeted areas for treatment beyond weight lowering. For example, if hypertension is diagnosed, lowering of blood pressure to target would be a key therapeutic goal. It is important to ensure that assessment of obesity is conducted in a sensitive manner and that the office environment is conducive to care of individuals with larger bodies. Appropriately sized blood pressure cuffs and gowns, bariatric scales, and appropriate seating should be available.

Given the extensive impact that excess adiposity can have on human health, completing a thorough screening for weight-related comorbidities in an individual patient may feel overwhelming. The 4Ms framework (Mental health, Mechanical, Metabolic, Monetary Health/Milieu) is a structured assessment tool that provides a framework for assessing contributing factors, barriers to therapy, and complications of obesity. Practically speaking, undertaking a full assessment of obesity may require multiple clinic visits. A detailed review of assessment of obesity is available in the 2020 Canadian Adult Obesity Clinical Practice Guidelines.

4. IS OBESITY PRIMARILY A LIFESTYLE PROBLEM AND IF IT IS A BIOLOGICAL DISORDER, WHAT IS THE PATHOPHYSIOLOGY OF OBESITY?

(Objective: Definition of obesity as a chronic disease, review of the pathophysiology including the homeostatic and mesolimbic reward pathways, review causes of obesity including genetic predisposition)

Obesity is a complex chronic disease caused by a combination of genetic, metabolic, neurobehavioural and environmental factors, it is not a choice. The definition of obesity is abnormal or excess adiposity that impairs health causing adverse metabolic, mechanical, and psychosocial health and reduces lifespan. As any other disease process obesity has symptoms (increased hunger and decrease satisfaction after eating), signs (excess adiposity), a pathophysiology (abnormal energy balance due to altered signaling to the brain) and complications (metabolic syndrome, diabetes, hypertension, sleep apnea, etc). Just as lifestyle plays a significant role in the development and management of other chronic diseases, such as type 2 diabetes mellitus or hypertension, it is only one aspect of treatment of obesity. Increases in the industrialization of society and sedentary occupations began long before the increased prevalence of obesity and the number of hours spent on engaging in physical activity for leisure has been relatively stable. Therefore, although decreased physical activity may have contributed, the primary driver of the increased prevalence of obesity is most likely primarily due to the clash between the adaptive and heightened regulatory nature of our appetite system and the modern obesogenic food environment. The neurohormonal system regulating appetite and energy expenditure developed to survive long periods of limited food supply or high physical activity, like in famine or migration, and to compete with other behaviours to motivate people to work to obtain optimal food sources. Thus, the neurobiology of appetite control and energy balance involves mechanisms that strongly resist weight loss and weakly resist weight gain. Further, evidence showing the contributions of genetics to obesity, including twin studies, has shown a 50–80% heritability of BMI and eating behaviours. The majority of genes associated with weight are expressed in the central nervous system and the appetite regulation system.

The brain regulates weight with three interconnected systems: the homeostatic, mesolimbic, and executive or frontal lobe systems (Figure 1). The hypothalamus, or homeostatic system, closely monitors energy supply and storage through interactions with hormones and neural signals from peripheral organs. Weight loss is sensed by the hypothalamus and leads to multiple defenses including an increased appetite and decreased energy expenditure, beyond what would be expected with body weight and composition changes. Peripheral neuroendocrine hormones that regulate the hypothalamic drive towards hunger and fullness, such as glucagon like peptide 1 (GLP1), leptin and ghrelin change with weight loss through calorie restriction and increased exercise in order to maintain a “set point” and physiologically increase appetite and decrease satiety. These changes in peripheral hormones that regulate appetite and resting metabolic rate favour weight regain and can persist for at least six years after weight loss. This can make it very difficult for people with obesity to be able maintain a lower body weight with diet and exercise alone and is one of the fundamental principles of why obesity is a chronic disease.
reward pathway compared to whole foods. Thus, using treatment strategies such as cognitive behavioural therapy to help patients understand the reward pathways and their connection with food related behaviours can be a highly effective tool for improving food behaviours and one’s relationship with food.

Finally, the prefrontal cortex, or executive system, also plays a role in eating behaviour. Cognitive choices about when and what to eat are strongly modulated by the homeostatic and mesolimbic systems which are subconscious. Overriding the powerful homeostatic and mesolimbic systems may work under optimal conditions, but many modulators such as stress, sleep, and mental health conditions can decrease the frontal lobes’ ability to override pleasure seeking urges and can strengthen the homeostatic hunger and mesolimbic systems making it harder for patients to achieve their behaviour goals in times of difficulty. Cognitive behavioural therapy and pharmacotherapy are treatments that can help improve patients’ ability to override these subconscious signals and strengthen the frontal lobes’ ability to follow-through on the intended behaviour goals.

The appetite system has been sufficient for body weight regulation over most of human history where the highest weight is strongly defended for survival. However, this system has clashed with our modern obesogenic food environment with increased availability of both hyperpalatable calorie-dense food with ubiquitous consumptive cues that promote a net-positive energy balance. It is for this reason that obesity is a chronic disease and appropriate treatments that target this pathophysiology are needed in order for long term, successful treatment to be a reality.

Lastly, calling obesity simply a lifestyle problem promotes negative attitudes towards people with obesity and increases rates of stigma and bias in this already vulnerable population. People with obesity have high levels (~60%) of internalized bias, where they themselves feel that their weight is their fault and that they simply need to try harder or be more motivated to achieve their goals. We now understand that the disease pathology of excess adiposity that defends high weight takes the control away from the person and into the hands of their biology, hormones, and genetics. Educating our patients and explaining the pathophysiology of obesity itself can improve outcomes related to morbidity and mortality, decrease stigma, and bias and improve access to treatment.

The mesolimbic pathway rooted in the dopamine system is responsible for creating a drive towards food, or ‘wanting’ to promote survival. These drivers are far more effective at motivating behaviour such as food seeking compared to hunger from the hypothalamus, in most people. When food is consumed, opioid and endocannabinoid signals are released creating 'liking.' Conditioning, or reward learning, occurs when you pair a neutral cue, such as the time of day or an emotion, with a reward such as food. The environment itself becomes a trigger for motivation to get food, or ‘wanting’, through dopamine release. The most common clinical example of this pathway is the description of cravings often in the evening time or the emotional connection that many people have with food. Amplification of ‘wanting’ can create long-lasting changes in motivation in susceptible individuals, even when the ‘liking’ or pleasure from the stimulus is no longer present and is a common cause of over-consumption of calories. This affinity for liking and wanting are both significantly impacted by genetics. The modern-day food environment has also manufactured food to be highly palatable and calorie dense, triggering higher levels of activation in the mesolimbic

Figure 1. Appetite regulation in the brain.
5. HOW DO I START THE DISCUSSION OF OBESITY WITH MY PATIENTS?

(Objective: 5As approach)

Adapted from the smoking cessation tool, a 5 As framework is a practical clinical tool that can be used to approach the discussion, diagnosis, assessment, and treatment of obesity. The 5 As include: ask, assess, advise, agree, and assist (Figure 2).

The first step is to start a discussion about overweight or obesity with patients by asking the patient for permission to speak about weight. A simple question such as “Would it be okay if we discussed your weight today?” allows an invitation to the therapeutic relationship and builds trust to begin to explore the patients readiness to change. Asking permission should be grounded in principles of motivational interviewing with the goals of creating an open, stigma-free clinical environment to discuss obesity. Most patients with obesity live with internalized bias and have likely encountered a negative experience related to their weight in their lifetime. We cannot presume that they want to or are ready to discuss treatment and therefore an invitation to ask permission from the patient is often seen as a welcomed introduction to the obesity assessment compared to dictating that obesity treatment is what the patient needs.

A large scale study called the ACTION study, looked at the beliefs of people with obesity and it showed that patients living with obesity would like their physician to start the discussion related to obesity with them. However, often barriers to starting the discussion around obesity management are practitioner driven and may be due to time constraints, uncertainty regarding treatment, low outcome expectations, and sensitivity of the topic. Messages of blame and shame, with overly-simplistic and ineffective advice of “eat less and move more” fail to address the complexity of obesity, and treat the medical condition as a lifestyle choice. Using non-judgemental and sensitive communication in initial conversations related to obesity can positively impact a patient’s outcomes. When discussing obesity, patients may prefer terms such as “weight” or “BMI.” For the practitioner, heavy workloads and time constraints in the clinical encounter can be significant barriers to starting the conversation. However, patients are now becoming their own self advocates and are often approaching their provider to seek treatment. In addition, given the multiple comorbidities related to weight, most healthcare providers are overwhelmed with managing all the complications of higher weight that they do not manage the weight itself. If the outcome was refocused on treating obesity itself, this would likely be a more efficient and effective population-based healthcare strategy. There are safe and effective treatments for obesity well described in the 2020 Canadian Adult Obesity Clinical Practice Guidelines and these treatments can be safely started in the primary care setting. Obesity medicine clinics for specialist referrals can also be found through a clinic locator on the Obesity Canada website (https://locator.obesitycanada.ca).

After asking for permission to discuss obesity and exploring readiness to change, the second step is to assess the patient (Figure 3). This involves establishing the diagnosis of obesity, identifying causes of weight gain, complications of adiposity, and barriers to treatment. After an initial diagnosis, a systematic approach to assessment is grounded in the 4Ms framework - mental health, mechanical, metabolic, and milieu/monetary health. Use of this clinical tool helps practitioners to efficiently explore the major drivers, barriers to treatment, and complications of obesity.

The EOSS can be used to synthesize this information and analyze the impact of adiposity on a patient’s medical, mental and functional health and is used to determine the stage of obesity (Figure 4). The EOSS staging is a better predictor of mortality than the BMI alone as it is better correlated...
internalized weight bias and opening the door to effective treatment. The fourth step involves agreeing on expectations, long term health and behavioural goals in the context of the patients’ values. The final step is to assist in identifying barriers to obesity management, access to appropriate resources and providers, and arranging regular follow-up. A full review of the obesity assessment, as well as access to the clinical tools described above can be found in the assessment chapter of 2020 Canadian Adult Obesity Clinical Practice Guidelines.

6. WHAT IS INTERNALIZED WEIGHT BIAS AND HOW DOES IT AFFECT SUCCESS WITH TREATMENT FOR MY PATIENT?

(Objective: review the impact of bias and stigma with a focus on patient outcomes independently related to internalized bias, discuss how to assess your own bias (ex. harvard implicit association test) and how to mitigate bias)

Patients living with obesity experience weight bias and weight stigma across multiple facets of their life. As healthcare practitioners we should be aware of how deeply embedded weight bias and weight stigma is in our society. Weight bias is defined as “negative weight-related attitudes, beliefs, assumptions, and judgements toward individuals who are overweight or have obesity”. Weight stigma refers to the discriminatory acts and ideologies targeted towards individuals because of their weight and size. Weight stigma is essentially a result of weight bias. Microaggressions exist throughout the media and within interpersonal relationships and can result in patients experiencing weight related stigma and bias, increasing the likelihood of these thoughts and beliefs becoming internalized and informing a negative self-narrative, also known as internalized bias. When patients hear or see weight-based stereotypes and prejudices, they begin to believe that these accurately describe themselves. This internalized weight bias can have a profound impact on patients and can manifest in different ways, such as increased body dissatisfaction, low self-esteem, psychological distress, and greater challenges related to eating behaviours. There is also resounding evidence to show that internalized bias is an independent predictor of negative health outcomes related to obesity treatment. Patients with internalized bias often present later in the course of their disease, with higher rates of comorbidities and have a lower rate of response to treatment. This is true within the healthcare setting in general. Patients with the impact that weight has on a patient’s overall health rather than a weight and height calculation alone. This is also a helpful tool to guide treatment decisions, as patients with stage 0 EOSS may not agree that the risks of bariatric surgery outweigh the benefits, despite meeting the BMI criteria and treatment may be more focused on sustainable behaviour goals towards maintaining health instead of focusing on weight loss. Furthermore, assessing values can help guide treatment and goals that are important to the patient long into the future.

The third A, advising, involves discussing the health risks of obesity, benefits of modest weight loss, importance of a long term strategy and treatment options. Educating patients that obesity is a chronic disease with complex biological and environmental drivers is an important step to combating with the Edmonton Obesity Staging System (EOSS).

Figure 3. 4Ms of Obesity.

Figure 4. Edmonton Obesity Staging System (EOSS).
with obesity and internalized bias do not present as often for routine cancer screening or annual physical examinations. The role of a health practitioner is to assist in helping patients to understand what weight bias and stigma is as well as how this impacts self-image and their overall health, in a stigma-free clinic environment.

Patients often struggle to label experiencing weight bias and stigma because these microaggressions are typically a normal occurrence, especially for those patients who have experienced a lifetime struggle with weight; this can be all that a patient has ever known. Patients must be able to identify their own stigma and bias in order to understand how it is internalized, and how it becomes embedded in one's own belief system and normalized as the truth. Assisting patients in gaining a deeper understanding of societal and personal social bias and weight stigma is imperative as quite often, internalized weight bias impacts weight loss expectations, how weight-loss success is defined, as well as treatment options patients are open to exploring and committing to. While approaching this topic with patients in a sensitive manner that makes patients feel safe may seem difficult, most patients are ready to discuss weight and weight loss strategies. Discussions should begin with a review of the complexity of this disease and identifying the patient’s goals. Patients are often not aware of why they have experienced significant, ongoing challenges in achieving long term sustained weight loss as they are not aware of the complexity of obesity as a chronic disease. Many patients are not aware of how internalized weight bias reinforces an ongoing struggle with obesity, and focus on a perceived inability to follow with obesity and internalized bias do not present as often for routine cancer screening or annual physical examinations. The role of a health practitioner is to assist in helping patients to understand what weight bias and stigma is as well as how this impacts self-image and their overall health, in a stigma-free clinic environment.

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Lastly, when meeting with patients, it is important to use person-first language to emphasise the person before the condition, “a patient with obesity” rather than “an obese patient”. Does the equipment at the clinic for a patient living with obesity make the patient feel welcome and accepted? Do patients feel like this is a space where they belong? Patients should not need to worry about whether they will be able to sit in the chairs or use the equipment in the clinic due to their size (ex. Blood pressure cuffs). When meeting with the patient, embedding discussions and strategies to cope with internalized weight bias throughout clinic environment is imperative. Internalized weight bias is not a one-time discussion at the beginning of a patients’ care with a new health-care provider. This type of education should be a part of each discussion with a patient, embedded within clinic materials and be consistent throughout all touch points with the patient (ex. administrative staff). When focusing on treatments and behaviour change, principals consistent with grief and loss, cognitive behavioural therapy, and acceptance and commitment therapy are important. Strategies should also
be consistent with motivational interviewing when assessing readiness for change. Internalized weight bias is a complex phenomenon which can have a profound impact on a person living with obesity as well as the healthcare providers who work with them. It is imperative to be aware of these biases and provide care to patients living with obesity in a way that is respectful and free from bias and stigma.

7. HOW DO WE DEFINE SUCCESSFUL TREATMENT?

(Objective: setting realistic expectations for patients, benefits of modest (5–10%) weight reduction, heterogeneity in treatment response)

Weight loss expectations can be a very challenging discussion to have with patients living with obesity. Expectations with regards to how much weight a person wants to lose can be influenced by many different factors including what the BMI indicates as a patient’s “ideal weight”, weight loss goals set at previous diet programs, the previous lowest weight for the patient, and the weight of family members or friends. Sometimes, the patient chooses a seemingly arbitrary number, but is related to a time period in their lives (ex. when I got married, before moving etc). No matter what the weight loss expectation is for a person living with obesity, there is a recognition in the Canadian Adult Obesity Clinic Practice Guidelines that due to the complexity and multi-faceted causes of obesity, the focus of management of obesity needs to move away from weight based goals and towards improving the health and overall well-being of the patient. While this is a good idea in theory, it can be difficult for a patient living with obesity to shift their definition of success away from the number on the scale. The reason for this can be directly related to the weight bias and stigma that exists. In discussions with patients regarding weight loss expectations, incorporating education regarding obesity as a chronic disease in this discussion is highly beneficial and can help explain why our bodies may not allow our weight to be reduced to a prespecified number or “normal” level, especially long term. This can assist patients in gaining an understanding regarding the complexity of weight and why they continue to struggle to achieve long term sustained weight loss.

In order to help foster acceptance around weight, it is important for a patient to explore personal goals and why they want to lose weight. For example, does the patient want to improve health, reduce the risk of acquiring a new health issue, increase mobility, or improve quality of life? These goals and reasons for seeking treatment are important to identify and understand in order to help achieve long term motivation. It is also important to discuss with patients what the average expected weight loss from different interventions are and the fact that response to any intervention (lifestyle changes, medications, surgeries) are very variable person to person.

It can be helpful to review with patients that a modest weight loss of 5–10% weight loss can result in clinically meaningful improvements. A common challenge across interventions for patients living with obesity as they start to lose weight, is wanting to achieve additional weight loss. When this occurs, a patient tends to forget the initial motivation for losing weight at the beginning of their involvement with the healthcare provider. Healthcare providers should regularly review non-weight based reasons for seeking treatment with the patient as a part of the management plan. This reminder of how far they have come and the progress they are achieving towards their behaviour goals can help mitigate the tendency to lose motivation and stop the treatment. There may also be times when a patient feels that the current weight loss is insufficient and may compare themselves to others. When this occurs, it is helpful to review the weight loss expectations of the chosen intervention and that treatment response can be heterogeneous. Weight loss is not as simple as calories in and calories out, which means each person’s journey is different and we need to support patients to be able to control the things that they can and remind them that their weight may not actually be in their control. Behaviour change (increasing movement, improving eating habits) are a better predictor of outcomes related to health like cardiovascular disease than weight loss alone. When defining success, it is important to ensure the patient is engaged in the discussion and is determining what successful treatment means for them. It is important to remind patients, throughout their treatment, what their initial reasons for seeking weight loss were and of the goals that they initially established. While shifting the goal of weight loss away from the number on the scale can be challenging, focusing on improved health outcomes and behaviours may result in more realistic satisfaction and acceptance in their weight management treatment and likely will yield a higher degree of success long term.
8. WHAT ARE THE TREATMENTS FOR OBESITY AVAILABLE FOR MY PATIENTS?

(Objective: discuss the benefit of medical nutrition therapy and physical activity and review the 3 pillars of obesity management including psychological intervention, pharmacotherapy [supplement #2], and bariatric surgery)

The 2020 Canadian Adult Obesity Clinical Practice Guidelines highlight three pillars of treatment for obesity that are based on targeted treatment for the pathophysiology of obesity, mainly centered in the brain. The three pillars include psychological treatment, pharmacotherapy, and bariatric surgery (Figure 5). Historically, healthcare providers have advised patients to focus solely on diet and exercise interventions for weight loss, but research has shown that most patients living with obesity are refractory to behavioral interventions alone, due to hormonal and metabolic adaptations that occur to defend the body’s highest weight. Evidence of the biology and genetics of obesity clarifies our understanding that obesity is a disease state with complex etiology, primarily rooted in brain processes that govern appetite and metabolism. Subjects with obesity are often found to have appetite dysregulation and therefore susceptible to excess calorie intake through strong biological drivers of hunger, blunted satiety and/or wanting. Therefore, the treatment paradigm has moved away from a prescriptive approach of diet and exercise and towards treatments that are focused on the outcome of bolstering our ability to adhere to medical nutrition therapy and physical activity by treating the now dysfunctional adaptive mechanisms in the body using the three pillars of obesity treatment.

Medical Nutrition Therapy is offered most commonly by Registered Dietitians and entails self-monitoring of food intake and individualizing a nutrition plan to enable weight loss and improve the individual’s health parameters (such as glycemic control or blood pressure). A calorie deficit will facilitate weight loss and should only be supported if it is based

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**Figure 5. 3 Pillars of Obesity Management (Canadian Adult Obesity Clinical Practice Guidelines).**
Physical activity has only a modest effect on weight loss but is essential for preserving lean muscle mass during weight loss and important to improve outcomes with weight maintenance. Increasing lean muscle mass and physical exercise has been shown to improve the decrease in metabolic rates seen with weight loss. Exercise has also repeatedly shown benefit amongst other significant quality of life parameters such as improved mood, sleep, cognition, cardiorespiratory fitness, and metabolic parameters even in the absence of weight loss. These non-weight based outcomes should be emphasized as specific goals in order to help patients continue to be motivated long term. Exercise recommendations of 30–60 minutes of moderate intensity on most days is a target to move toward, however understanding that many patients with obesity may be initially limited in their capacity for physical exercise is important to establish realistic goals and decrease stigma associated with obesity.

The first of the three pillars of obesity treatment is psychological intervention. A fundamental goal of psychological treatment is achieving the ability to comply with the long-term behaviour changes that are needed to manage obesity as a chronic disease. It is important for both the clinician and patient to discuss the average weight loss seen with different treatment options from the outset of treatment in order to promote realistic expectations and decision making. Most patients desire to be a much lower weight than what is realistic with current day treatment options that are safe and effective for long term success with weight loss. We understand that short term, highly restrictive behaviours or treatments are unlikely to be successful at maintaining lower weight long-term. Any treatment of obesity needs to be continued long term, otherwise the risk of weight regain is likely. Behavioural therapy (with CBT) confers a weight loss of 5–10% (but can be easily subject to weight regain after 1 year due to biological processes below), antiobesity pharmacotherapy confers 5–15% weight loss, and bariatric surgery 20–40% weight loss. Of note, the conversation on expectations often needs to be revisited, especially if patients choose a more conservative treatment route like lifestyle changes alone and are met with frustrations regarding lack of progress with weight loss which can ultimately result in negative thinking about their capacity to succeed.

Learned helplessness is a common phenomenon seen in patients living with obesity after enduring several failed attempts of behaviour change with dieting and exercise interventions alone. The subject’s acceptance of their powerlessness often leads them to abandon behaviours that could benefit their health and can result in progressive weight gain or regain and worsened health outcomes. Another key objective of psychological interventions in obesity treatment is to promote patient self-efficacy; a person's innate beliefs that they can achieve their goals. Effective behavioural counselling in obesity management is guided by principles of Motivational Interviewing and Cognitive Behavioural Therapy and has a dedicated chapter and helpful guide for solo practicing MDs in the 2020 Canadian Obesity Clinical Practice Guidelines (Figure 6). Elements of Motivational Interviewing and CBT can be practiced by any healthcare practitioner through the invitation to learn about obesity as a chronic disease to dismantle previously held beliefs rooted in weight bias (“I should be able to do this on my own”), and have patients set achievable goals that are directly tied to their own health values instead of a weight loss goal. Cognitive behavioural therapy is based on the premise that automatic thoughts lead to maladaptive automatic behaviours that become habitual with time. The two key cognitive processes that are being promoted are cognitive restraint and cognitive resilience. Clinicians can use brief cognitive restructuring interventions by inviting patients to consider settings in which they are more susceptible to overeating or being more sedentary and having them recognize and challenge unhelpful thinking processes or beliefs (also known as “permission thoughts”) that precede the automatic behaviour in an effort that results in restraint rather than resignation and giving up. For instance, “Are there times of your day that you’re more likely to be vulnerable to excess calorie intake that isn’t planned... and are there automatic thought processes that drive this behaviour?” Motivational interviewing can help patients establish specific values that are most important to them which guide their decision making on behaviours that they would be willing to engage in in support of their values. For example, having patients answer “what are the reasons that weight loss is important to your health?” and tying values into their counter dialogue in response to automatic thinking is more efficacious than willpower alone at responding to unhelpful urges due to past resignation to these moments of wanting. Clinicians can
Figure 6. Solo MD Model - Effective Psychological and Behavioural Interventions in Obesity Management, 2020 Canadian Adult Obesity Clinical Practice Guidelines.
foster cognitive resilience in patients by listening for internalized weight bias in the face of setbacks such as an overeating episode, a plateau, or body image dissatisfaction (also aptly termed “self-critical thinking”), and education around the biological underpinnings of excess weight and obesity as a chronic medical condition. This serves to displace negative feelings of self-blame which is often a cause of lack of motivation to continue with healthy behaviour long term.

The second pillar of obesity treatment is pharmacological therapy. This is extensively reviewed in the part 2 of this supplement, please refer to question 1 in part 2; Which anti-obesity medication (AOM) should I prescribe for my patient? to review pharmacological therapy in more detail.

The last pillar of obesity treatment is metabolic surgery. Metabolic Surgery is still the most effective intervention for sustained weight loss that we have to date to treat severe obesity. The clinical criteria for consideration of surgery is based on a BMI > 40 kg/m² or BMI > 35 kg/m² with obesity related comorbidities. The Roux en Y gastric bypass remains the gold standard intervention, other surgeries currently offered are and the Sleeve gastrectomy and the duodenal switch (Figure 7). These surgeries modify the direction of nutrient passage through the gut and alter neuroendocrine gut-brain signalling that regulates energy intake and glycemic control. They are considered to be both malabsorptive and/or restrictive procedures with the gastric bypass having a higher rate of both. As a result, patients can expect a reduction in appetite post operatively and significant improvement/resolution of comorbid conditions including type 2 diabetes, hypertension, dyslipidemia, reduction in risk of heart failure, non alcoholic fatty liver, obstructive sleep apnea, infertility, and ultimately improved quality of life. Note that weight regain can still happen after bariatric surgery which highlights the complexity of obesity as a chronic disease state and warrants regular monitoring of patients’ appetite and feeding behaviour post operatively.

9. WHAT IS MEDICAL NUTRITION THERAPY AND WHO SHOULD BE REFERRED TO A DIETITIAN?

(Objective: clarifying the role of the RD, understanding MNT and the role of different diets)

Medical nutrition therapy (MNT) for obesity management is an evidence-based approach to dietary counselling that individualizes a patient’s eating plan according to “preferences and goals that are culturally acceptable, affordable and sustainable”, in an effort to enable weight loss and improve medical conditions and reduce the risk of complications. There is a comprehensive guide on the use of MNT in the 2020 Adult Obesity Clinical Practice Guidelines. Recall that obesity is defined as a chronic disease in which excess adipose

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Figure 7. Different types of bariatric surgeries, Bariatric Surgery: Surgical Options and Outcomes - Canadian Adult Obesity Clinical Practice Guidelines. From left to right: Adjustable gastric banding, Roux-en-Y gastric bypass, sleeve gastrectomy and biliopancreatic diversion with duodenal switch. Copyright: Graphic department, Quebec Heart and Lung Institute, Laval University. Reprinted with permission.
tissue impairs health. Therefore, dietary recommendations given to patients should focus on how to improve a patient’s overall health, with reducing weight and BMI being one of the many desired outcomes that also includes reducing waist circumference, glycemic control, lipids and blood pressure. Figure 8 outlines the various different dietary approaches and their clinical benefits. Having a broad understanding of the multiple dietary patterns that can improve specific metabolic targets can help patients choose food-based approaches that will support long-term adherence. For instance, the Mediterranean dietary pattern improves glycemic control, HDL, and hypertriglyceridemia, reduce cardiovascular events and risk of developing type 2 diabetes, but has little effect on weight unless a sustained calorie deficit is achieved. More recently there has been a higher turbulence of diet wars relating to various macronutrient composition of diets, and the evidence supports that weight loss is similar between low fat versus low carbohydrate dietary plans, however, consideration for the patients comorbidities and preferences should be taken into account when emphasizing one dietary plan over the other. Patients may be able to achieve weight loss if the dietary approach achieves a calorie deficit, however there is a significant amount of heterogeneity in the response from person to person, which emphasizes the importance of a personalized plan that is sustainable.

More broadly speaking, a movement away from prescribing calorie restriction alone is substantiated by studies demonstrating that restrictive diets ubiquitously display short term effectiveness and most patients will regain their weight due to metabolic adaptation and alterations in appetite hormones. The psychological toll that patients face with weight regain can also generate negative feelings around their capacity to maintain motivation in weight related behaviour change and can produce a sense of learned helplessness. This internalized weight bias is an independent risk factor for weight regain and worsening health outcomes later in life which illustrates the importance of proficient counselling around nutrition and realistic expectations around outcomes with behavioural interventions.

There is considerable value in referring patients to a Registered Dietitian for MNT. People living with obesity are at higher risk of nutrient deficiencies including Vitamin D, Vitamin B12 and iron deficiencies amongst others. The recommendations we provide to treat weight excess can result in malnutrition and micronutrient deficiencies (for instance, medications that dampen appetite and greatly reduce calorie intake, and bariatric surgery which is both a malabsorptive and restrictive). Lastly, individuals undergoing weight loss are at risk of concomitant loss of lean muscle mass which is associated with lower metabolism and a reduction in overall strength and function. This is particularly concerning in the elderly populations who are already at risk of malnutrition and sarcopenia. Therefore, all patients with obesity can benefit from MNT through the promotion of nutritional literacy, and regular monitoring of dietary quality. Higher needs patients who would benefit from referral include patients with disorganized eating behaviour, patients with obesity related comorbidities (ex. conditions such as individuals with insulin-dependent type 2 diabetes when taking anti obesity pharmacotherapy), patients who report insufficient calorie intake (<1200 calories daily), individuals at risk of eating disorders, and those who demonstrate low nutritional literacy or have never participated in a structured weight management program. Of note, MNT is not regulated in Canada and should be provided by Registered Dietitians to reduce
the risk of nutrition misinformation and harm to physical or mental health.

10. WHEN SHOULD I REFER TO A SPECIALIST?

(Objective: when and who to refer to)

The prevalence of overweight and obesity in Canada is roughly 60% of the adult population, so it stands to reason that most physicians in medicine will work with patients who have excess weight. Therefore, it is important for most physicians to be familiar with the availability of treatment for obesity and to treat or make a referral to an obesity specialist when deemed appropriate. Obesity has historically been seen as a risk factor for other chronic conditions which may overshadow the fact that it itself is a disease state that warrants evidence-based treatment. Lifestyle counselling is often the cornerstone to treating obesity, but research has shown that only 23% of patients with behavioural counselling alone will lose 10% of their body weight in 3 years. It could be argued that a success rate of 23%, or alternatively a failure rate of 77%, is an intervention with low efficacy. Lifestyle counselling has its place, and when done appropriately - free of judgement, bias and stigma, is an important part of treatment. But similar to other chronic disease states, such as congestive heart failure or type 2 diabetes, we rarely stop treatment after lifestyle counselling alone and will often initiate or intensify treatment appropriately.

Primary care providers and internal medicine physicians are in a unique position to treat obesity based on the myriad of presentations they may see related to this chronic disease. Treating obesity earlier in the disease course is better for long-term health outcomes, similar to most other chronic diseases, so there should be a low threshold to introduce the discussion on available treatment options. Research has shown that only 24% of people with obesity get follow up care after an initial appointment which highlights the need and call for action. The same study found that the commonly cited reasons for inability to provide obesity care to patients in practice include lack of time and more important issues and concerns. Anecdotally, physicians have also voiced the lack of comfort level in use of pharmacotherapy, lack of access to resources, or cost barriers to treatment for patients.

Although there are currently no formal guidelines to direct physicians on when to refer to an obesity specialist, most experts would agree that The EOSS is a clinical tool that could be a helpful guide. Given the high degree of obesity in our patient population it is important to triage the appropriate patient for referral. In order for patients to be seen in a timely matter and reduce wait lists for specialists, patients who are at lower risk should ideally be seen in the primary care setting. The EOSS evaluates a patients’ health risk associated with weight and accounts for the individuals’ weight related comorbidities; this offers a targeted and evidenced based approach to treating the impairment that a patient has with excess weight rather than treating weight and BMI alone. The EOSS accounts for all clinical parameters of person’s health including psychological, mechanical and medical health and can broadly be used as a tool to deciding which patients may benefit from a referral. Patients with an EOSS stage 1–2 sit on the lower end of severity, while patients with a stages 3–4 exhibit severe disease and may highly benefit with a referral to an obesity specialist if the patient were open to the option.

Obesity specialists may work in various settings ranging from a solo practice, to a multidisciplinary setting which might include but is not limited to dietitians, bariatric educators, psychologists, social workers, exercise trainers, other specialists (such as psychiatry, bariatric surgeons). When a patient is referred to an obesity specialist, the physician will determine the appropriate treatment option which can include behavioural therapy, medication, surgery or more likely a combination of the available interventions. Rather than focusing on weight loss alone, the underlying objective for ethical weight management programs will be to support patients in improving their health by helping them achieve their best weight, this is the weight their body will naturally settle at while living a healthy lifestyle that is sustainable.

Although there is no single factor to determine when a patient should be referred to a specialist, these are some unique circumstances to consider:

- If obesity treatment is beyond one’s comfort level
- If patients have newly diagnosed obesity or rapid weight gain
- If patients are refractory to initially offered interventions including lifestyle counselling or medication
- If the patient exhibits complexity or severity in loss of control overeating
- In patients who are actively gaining or has acute weight gain
- In patients who are considering bariatric surgery
- In patients who are post-operative from bariatric surgery and regaining weight
- The patient has complications from obesity
- Weight loss is a requirement for surgical intervention or medical procedures such as IVF

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