THE DIABETES
# Communicator
Spring 2020

EDITORIAL

## Weigh-In For Diabetes

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This Spring 2020 issue of *The Diabetes Communicator* brings us an array of knowledge on a topic that undoubtedly touches every client, family and health-care professional in some way. Both professionally and personally, we are likely to know a person with diabetes who has struggled with not only the stigma of diabetes, but also that of obesity. Of note, Obesity Canada will be releasing the clinical practice guidelines for obesity management later this year. You can sign up for updates on their website www.obesitycanada.ca/guidelines.

As diabetes educators and health-care professionals, we know the burden of the stigma associated with diabetes. This stigma is compounded in those clients who live with both diabetes and obesity. On this note, "Weight Conversations: Are We Harming More Than Helping?" brings up some excellent points of reflection around the idea of recommending weight loss, and how we can move toward minimizing harm while helping our patients. From a psychosocial perspective, Dr. David J. Robinson and Emily Opthof share with us some thoughts about how to motivate change in our clients with diabetes and obesity, gleaning some insight from the life of Thomas Edison.

If you work in the area of gestational diabetes, the article by Erna Snelgrove-Clarke, Jennifer Brenton-Peters and Shannon Grant is a must read. They discuss the topic of weight bias, and challenge us to change our approach to caring that truly embraces person-centred care when it comes to weight and diabetes.

Dr. David C.W. Lau brings us an article that highlights the "double diabetes" phenomenon of those people living with type 1 diabetes and obesity. Dr. Lau provides his experienced insight into this ever-increasing, but not-so-clear-cut diagnosis.

As you can imagine, the research and knowledge on the topic of diabetes and obesity is growing rapidly. Our contributors to this Spring issue of *The Diabetes Communicator* have sought to bring you an up-to-date and practical approach to caring for our clients. Read on! You will find these articles challenging and encouraging.

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A Diabetes Canada Professional Section Publication

FROM THE CHAIR'S DESK

# Spring Is Here

Alice Y.Y. Cheng, MD, FRCPC
Chair, Professional Section National Executive

Spring is always a time of new growth and renewed energy. This year brought a global challenge – COVID-19. At the time of writing this article, the pandemic continues and everyone is struggling with the effects and hoping to flatten the curve of spread. At Diabetes Canada, the rapidly evolving situation is being closely monitored, so that we can try to provide the best care and guidance to the diabetes community. Many resources for health-care providers and people living with diabetes are available at diabetes.ca.

Despite these challenges, the Professional Section continues its work and is busy with its three pillars of activities – Knowledge Leadership, Knowledge Exchange and Health-Care Professional Engagement. Standards of practice for each of the roles and committees have been updated and will soon be housed on the Diabetes Canada website for all members to access. A couple of projects that will be of great interest to you include a document on the importance of language in diabetes as well as a position statement on low-carbohydrate diets (now available!). Both of these important documents were developed because of needs expressed by the professional membership. The needs assessment survey that many of you completed last year is being evaluated to identify topics for education this year. As many of you are aware, Diabetes Canada quickly created a webinar series addressing topics of need to help clinical care during this time and will continue to provide education to serve our community.

In the past few months, the diabetes community has seen the release of several guidelines/consensus statements from organizations around the world, including the European Association for the Study of Diabetes, the American Diabetes Association and the European Society of Cardiology. It is undeniable that there is a paradigm shift in the management of type 2 diabetes to focus on outcome-reducing therapies, while still achieving glycemic and other targets to further reduce outcomes. The Diabetes Canada clinical practice guidelines (CPG) are one of Diabetes Canada's flagship contributions to the diabetes community, not just in Canada, but internationally. Under the leadership of Dr. Peter Senior (Chair) and Dr. Harpreet Bajaj (Vice-Chair), revisions are underway.

The work of the Professional Section requires the energy and motivation of dedicated volunteers – like you! This issue of *The Diabetes Communicator* also includes a call for nominations for a variety of positions within the Professional Section. Please put on your thinking caps and nominate either yourself or a colleague for these important roles to shape the future of our section.

Spring is here. Let's spring forward and continue the mission of Diabetes Canada: to prevent, care and cure (hopefully, in a COVID-19-free environment!).



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# Keto or No Keto…That Is the Question

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As medical professionals, it is important to respect our patients' wishes regarding their preferred diet. However, it is equally important to take into consideration certain medical conditions when advising patients following the ketogenic diet. Several recent publications have addressed potential contraindications, testing that should be done prior to initiation of this diet, medication adjustment that may be required and recommended nutritional supplementation.

## Contraindications

Fatty acid oxidation deficit is an inborn error of metabolism and can easily be diagnosed with three tests: acylcarnitine, plasma amino acids and urine organic acids. Testing for this condition is recommended for anyone born prior to 2006 or who has emigrated from another country. This test is recommended because initiation of a high-fat diet can cause metabolic deterioration with negative consequences (1).

Contraindications of a ketogenic diet (1):

- Renal stones
- Severe dyslipidemia
- Significant liver disease
- Severe gastroesophageal reflux
- Cardiomyopathy
- Chronic metabolic acidosis
- Use of sodium-glucose co-transporter 2 (SGLT2) inhibitors

Patients using SGLT2 medication have been shown to have a higher risk of euglycemic diabetic ketoacidosis, hence the recommended avoidance of this diet (1).

The Italian Society of Endocrinology suggests additional contraindications for people with specific medical conditions. Individuals with the following conditions should not be on a ketogenic diet (2):

- Type 1 diabetes
- Eating disorders
- Infections
- Recent myocardial infarction or stroke
- Alcohol or substance abuse
- Angina
- Cardiac arrhythmia
- Heart failure (New York Heart Association class III to IV)
- Latent adult autoimmune diabetes in adults
- Pregnant or breastfeeding
- The frail elderly

**Table 1: Tests to be performed prior to implementing a ketogenic diet (1)**

| | |
|---|---|
| Albumin | Iron |
| BUN | Lipid profile |
| Calcium | Selenium* |
| Carnitine free/total* | Total protein |
| Electrocardiogram | Vitamin D |
| Electrolytes | Zinc |
| Glucose | |

*May not be covered by provincial health plans. *BUN*, blood urea nitrogen

## Medical Testing

For years, the ketogenic diet has been used for the treatment of refractory seizures in children (3). In 2018, a revised guideline was published that outlines certain tests to be done prior to implementing this diet in this population. A similar guideline was suggested by Gupta et al (1) for people with diabetes, as outlined above. Some of these tests may require the patient to pay as they are not covered by provincial health plans.

Carnitine is a compound comprised of amino acids required to transport fat to the liver to be metabolized. Due to the increased fat intake of the ketogenic diet, the patient may develop a carnitine deficiency (4). Symptoms of the deficiency can range from muscle weakness and fatigue to liver and heart problems, in extreme cases (4).

Case studies have shown that the ketogenic diet can result in a prolonged QT wave with adverse consequences (5). An electrocardiogram is recommended prior to initiation of the diet to rule out pre-existing abnormalities (4).

Selenium should be tested prior to starting this diet since a deficiency has been known to occur. This deficiency can result in cardiomyopathy, cardiac arrhythmias or even ventricular fibrillation (4). The content of selenium within foods varies depending on the soil in which the ingredient is grown. Common sources include seafood and organ meat (6).

## Medication Adjustment

With significant reduction in the intake of carbohydrates, consideration must be given to the adjustment of

hypoglycemic medication. The protocol Westman et al (3) outlined when starting the ketogenic diet begins by stopping all hypoglycemic medications, except metformin, and adjusting insulin the day the diet is initiated. Less than 20 units of insulin can be discontinued on initiation of the diet. Large doses of insulin are cut by 30 to 50 per cent, unless the blood glucose levels are elevated. After this, blood glucose monitoring is suggested once or twice per day. Blood pressure should also be monitored regularly and medication should be adjusted, if necessary, to prevent orthostatic hypotension (5).

### Supplementation

In the ketogenic diet, carbohydrates are limited to 20 to 50 grams/day and, as a result, there is a risk of micronutrient deficiency. A multivitamin, calcium and vitamin D supplements are recommended to combat these deficiencies (1,3). Another supplement to consider is selenium, if not included in the multivitamin. A carnitine supplement should be added if blood levels indicate that a deficiency is present (3).

### Summary

It is important to respect the dietary choices of the patient. Medical professionals can play a role in assessing the suitability of this regimen for the patient, discussing risks, offering ongoing medical supervision and recommendations for supplementation.

**Acknowledgment:** Thank you to Tiffany Krahn, RD CDE, Amy Waugh, RD CDE and Laura Wilson, RD CDE for their assistance on this topic.

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# 2020 Call for Nominations

Are you a Professional Section member looking for an opportunity to grow your leadership skills at a national level?

The nomination for the following positions for the Diabetes Canada Professional Section is now open.

- 1 clinician/researcher for Knowledge Leadership subcommittee
- 1 educator for Knowledge Leadership subcommittee
- 1 clinician/researcher for Knowledge Exchange subcommittee
- 1 educator for Knowledge Exchange subcommittee
- 1 clinician/research for HCP Engagement subcommittee
- 1 educator for HCP Engagement subcommittee

Please visit **www.diabetes.ca/health-care-providers/professional-membership** to download the nomination form. Please submit your application or nominate your colleague today!

### Candidate requirements:

- Be an active Professional Section member
- Complete the nomination application and candidate profile form (incomplete applications and forms will not be accepted)
- Submit applications electronically by Friday, July 17, 2020
- Give permission to Diabetes Canada to use candidate profile information for promotions and communications within various communication channels (see consent statement on the application form)

# Should Curbing "Double Diabetes" Become a Priority in the Management of Type 1 Diabetes?

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Over 300,000 Canadians have type 1 diabetes (T1D) (1). The average incidence in Canada has been growing at an estimated rate of 5.1 per cent (%) annually, which is higher than the global average of 2% to 5% (1). The prevalence of T1D among children up to age 19 has increased 21% between 2001 and 2009 (1). In high-income countries, about 10% to 15% of all diabetes is attributable to T1D (2). T1D is an autoimmune disease characterized by progressive destruction of the insulin-producing beta cells in the islets, leading to insulin deficiency and hyperglycemia. Individuals with T1D require lifelong insulin therapy to achieve euglycemia and to prevent the acute and long-term complications associated with chronic hyperglycemia.

Compelling data from the landmark Diabetes Control and Complications Trial (DCCT) have proven that intensive insulin therapy (IIT) has significantly reduced the incidence of micro- as well as macrovascular diabetes complications (3). Achieving and maintaining target glycemic control with IIT have become a mantra in the management of T1D. Unfortunately, IIT is associated with progressive weight gain. This is due, in part, because of its anabolic effect on lipogenesis and inhibition of protein catabolism, coupled with the peripheral route of administration, which further favours lipogenesis. Consequently, IIT can lead to excessive weight gain, especially abdominal obesity, and the subsequent development of insulin resistance, dyslipidemia, hypertension and increased cardiometabolic risk (4). Indeed, the top quartile of participants in the IIT arm of the DCCT who gained excessive weight were found to have had increased obesity-related cardiovascular disease risk factors and required more therapy for dyslipidemia and hypertension. Over a mean of 26 years of follow up, these IIT patients had significantly greater cardiovascular events than those IIT patients who gained less weight, and the event rates were comparable to those who were in the conventional treatment arm (4).

## What is "Double Diabetes"?

While individuals with T1D usually have healthy body weights, the prevalence of overweight and obesity has increased dramatically in people with T1D over the past two decades (5,6). It appears that the rates of overweight and obesity among people with T1D are rising even faster than those of the general population (5). Close to 70% of a cohort of patients with childhood-onset T1D from the Pittsburgh Epidemiology of Diabetes Complications Study had overweight or obesity after 18 years of follow up (5). Excessive body weight has become increasingly common among adolescents and adults with T1D, and this observation is often referred to as "double diabetes." Since individuals with T1D already face an increased risk for metabolic and cardiovascular complications, obesity in this setting can further exaggerate the disease burden by increasing the risk of microvascular complications and cardiovascular disease, morbidity and even mortality.

## Double Diabetes, Cardiovascular Disease Risk and Mortality

The association between weight status and glycemic control among youth and adolescents with T1D have only recently been studied in greater detail. In a cohort study, SEARCH for Diabetes in Youth, individuals diagnosed with T1D before 20 years of age were followed longitudinally for eight years. The patients were grouped according to weight and glycemia status (normal weight and glycemia, hyperglycemia only, elevated weight only or with hyperglycemia). Individuals in the elevated weight and hyperglycemia group, which accounted for 56% of the total sample, had greater odds ratios (range between 2.2 to 5.1) for hypertension, dyslipidemia, nephropathy and retinopathy (7). Another longitudinal, retrospective study from a single clinic centre reported trajectories of glycated hemoglobin (A1C) and body mass index (BMI) z-scores in 7,002 two- to 18-year-old patients with T1D (8). Girls were more likely to be in the A1C trajectory, with the highest starting A1C and significant deterioration during adolescence, and in the highest two BMI z-score trajectories (8).

The relationship between BMI and mortality was investigated in the prospective Finnish diabetic nephropathy study. These investigators followed 5,836 individuals with T1D for a median of 13.7 years, and concluded that achieving a healthy weight was optimal in delaying mortality, whereas obesity was associated with a 25% increase in cardiovascular mortality (9).

With the rapid advances in diabetes technology and glucose monitoring, we should anticipate improvement in diabetes management. Unfortunately, data from a recent longitudinal study on the state of T1D management and outcomes from a United States registry of over 25,000 participants demonstrated that only a minority of adults and youths achieve A1C goals. Only 17% of youths achieve a goal A1C of less than 58 millimoles per mole (mmol/mol) (less than 7.5%), and only 21% of adults achieve a goal A1C of less than 53 mmol/mol (less than 7%) (6).

## Strategies Toward Reducing and Preventing Double Diabetes

A number of strategies have been explored to improve glycemic control in people with T1D by promoting weight loss and reduction of hypoglycemia. One obvious approach is a weight management program aimed at changing health behaviours. A one-year retrospective study provided encouraging results, demonstrating that patients with T1D achieved significant weight loss and reduction in insulin dose, and improved glycemic control at one year after a 12-week intensive interdisciplinary weight intervention program (10). Bariatric surgery has been performed in patients with T1D with severe obesity. A meta-analysis of 13 studies with a total of 86 subjects reported favourable outcomes regarding significant weight loss (reduction of BMI from 42.5 kilogram per meter square [$kg/m^2$] to 29.6 $kg/m^2$) and improvement in glycemic control and insulin dose (11).

The high proportion of people with T1D not achieving glycemic targets, the negative clinical impact of intensive insulin therapy, along with the rise in obesity and cardiovascular disease and mortality, underline the need for individualized clinical care. Adjunct therapies traditionally used in the treatment of T2D have been extensively studied to improve "double diabetes" in patients with T1D (12). The addition of glucagon-like peptide-1 receptor agonists results in weight loss, improved glycemic control and a reduction in insulin dose, but higher rates of hypoglycemia and ketosis (13).

A meta-analysis reported that sodium-glucose co-transporter 2 (SGLT2) inhibitor therapy significantly reduced hypoglycemia, lowered A1C by 0.4%, body weight by 2.7 kg and systolic blood pressure by three millimetres of mercury (mmHg); bolus insulin decreased by 3.6 units/day and basal insulin decreased by four units/day (14). However, SGLT2 inhibitor therapy increased diabetic ketoacidosis and genital tract infection by about threefold each.

Current Canadian, American or European diabetes guidelines do not recommend SGLT2 inhibitors or glucagon-like peptide-1 receptor agonists as adjunct therapy in people with type 1 diabetes.

## Summary

The prevalence of overweight and obesity has dramatically increased in a large proportion of individuals with T1D. Excessive body weight can contribute to suboptimal glycemic control, insulin resistance, increased risk of diabetes complications, cardiometabolic risk and even mortality, a phenomenon often referred to as "double diabetes." Raising awareness and recognition of this condition by diabetes caregivers is an important first step toward its management. Various treatment approaches, ranging from health behaviour changes to innovative pharmacotherapies and bariatric surgery, have been undertaken to address this increasingly common condition. Strategies toward reducing and preventing double diabetes in people with T1D should become a pressing priority. Inaction is no longer an option.

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# Weight to Well-Being

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The 2015 Health Status of Manitobans Report states that 21 per cent (%) of Manitobans over 18 years old fit into the obesity category, based on self-reported height and weight (1). Prairie Mountain Health (PMH) is one of five regional health authorities in Manitoba covering a geographically large area of around 67,000 square kilometers and about 12.9% of the Manitoban population (2). In PMH, 25.4% of the population over 18 years are classified as having obesity, and 32.7% having overweight (3). Weight management is the most common referral type for community dietitians in this health region, both as a primary referral reason and secondary to a chronic disease diagnosis (i.e. diabetes or heart disease). With obesity rates above provincial percentages, PMH is taking action to determine why obesity is on the rise in this area of Manitoba, what current messaging and practice approaches exist throughout the region, and developing a framework that provides approaches to weight management with a goal of overall well-being.

A multidisciplinary committee was formed to establish a body weight management strategy for PMH. The committee is currently comprised of professionals in mental health, dietetics, rehabilitation and nursing. The primary goal has been to work toward a framework for PMH, which incorporates best practices for talking to clients about weight; minimizing weight stigma and bias; providing supportive recommendations to clients, while coordinating services and initiatives in PMH. In March 2017, a survey was circulated to understand current views, approaches, messaging of weight management and to determine requirements needed for PMH staff to provide a whole-health approach to weight management. Three hundred fifty-four respondents from 39 professions underlined the importance of an interdisciplinary approach to this strategy. About 79% of respondents reported that they do initiate a conversation about a client's weight, but over 45% do not ask permission first to talk about weight before giving advice. Eighty-three per cent were not using a particular framework when addressing weight management, and 58% felt awkward or neutral when discussing weight with clients with obesity. The majority (90%) recommended *Canada's Food Guide* and sent a referral to a registered dietitian (93%). It is reassuring that clients are referred to consistent sources; however, is it enough? About 78% of respondents did admit they focus on the whole person, not just their weight when counselling, while only 14% felt effective and confident in helping clients manage their weight. This survey showed that, overall, PMH staff are aware of weight stigma and the importance of a client-centred, whole-health approach to body weight management, but also eluded to the need for staff education, support (i.e. framework) and resources to provide this important work in the region.

While the PMH body weight management framework will continue to develop, current resources that have already been established by the committee are available to PMH staff. These include a shared intranet page with helpful links and resources, educational opportunities, clinical practice guideline links and the current framework document. One of the first initiatives that members of the PMH weight management working group will pilot is a comprehensive lifestyle intervention program, developed by the team, entitled "Weight to Wellbeing." Using a multidisciplinary, whole-health approach, the seven-session (relatively intensive) program aims to reduce overall delay of service for weight management referrals and provide a supportive network of practitioners and peers for clients. Clients are referred to the program by their primary care provider or they can self-register. Each session is 60 to 90 minutes long, and includes a mix of theory and activities. Themes of the seven sessions include weight stigma; health at every size; eating for joy and mindfulness; SMART (Specific, Measurable, Attainable, Relevant and Time bound) goals; physical activity; sleep and stress management. Presenting practitioners include dietitians, pharmacists, mental health workers, physiotherapists, health promotion professionals and physicians. Clients have take-home assignments, such as food journaling, tracking steps and goal setting. Three months after completion, clients are contacted by a registered dietitian for support and assessment. Pre- and postsurveys are completed by attendees that include measures of nutrition, quality of life, activity frequency/intensity/duration and mental wellbeing. The primary goal is that 80% of clients improve their survey scores. Clients are not weighed at any point of the program, taking the focus off the scale and toward overall well-being.

The future of body weight management in PMH has exciting potential, with the goal of a multidisciplinary, whole-health approach to body weight management that is sure to promote health and wellness for people at every size.

For more information, contact Amy Noto, RD at ANoto@pmh-mb.ca or Jennie Cowan, RD, CDE, CBE at jcowan@pmh-mb.ca.

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# Putting Weight Management Into Perspective in Type 2 Diabetes

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The topic of obesity is not an easy one to tackle. There are a multitude of perspectives on the causes of overweight and obesity in the world, differing viewpoints on classification of obesity in medicine, and significant weight bias and discrimination that occurs. Our weight-centric society continues to fuel the diet industry and encourages individuals to deprive themselves through the latest fad diet in an effort to shed pounds, which usually leads to more weight gain and poorer mental health in the long term. In addition, social media and advertising continue to shame and promote unrealistic body images for individuals. So, in this complex world with unbalanced priorities, how can we as health-care providers support people with diabetes to achieve success with their health and an optimal quality of life?

Chapter 17 of the *Diabetes Canada 2018 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada* is devoted to weight management, with recommendations graded according to level of evidence (1). There is an emphasis on weight management that is sustainable and an understanding that the risk and protective factors are multifactorial: sleep, time management, socioeconomics, poverty, trauma, racism, parenting and food insecurity, just to name a few. It should go without saying that this is far beyond calories in and calories out.

Within the weight management chapter, there is also emphasis to individualize. There is no "one size fits all" (no pun intended) approach to weight management and diabetes self-management. When people feel successful at achieving steps toward their goals, they are far more hopeful and likely to continue this progression. The success comes from a strengths-based approach, where people with diabetes are empowered through gaining skill and mastery, where action results in a specific outcome, rather than a general improvement in health.

As we work and learn alongside people with diabetes, we find the best approach is to begin with the concept of "don't change a thing…let's figure out what's working." In this statement alone, there is a message of hope and empowerment. As a starting point, this places the emphasis on blood glucose as a component of blood vessel health, and on quality of life as the person with type 2 diabetes (T2D) and their health-care team further develop skills in diabetes self-management. Through the use of blood glucose or flash monitoring and coaching, the person with diabetes identifies their individual responses to the foods they enjoy and the other aspects of their day-to-day life reflected through the results. With an emphasis on time in range or checking blood glucose readings in pairs (before and after meals, before bed and after waking up), the person develops an understanding about what is working. Often a natural response to this approach is a shift in the types, timing and amounts in food choices, which also may result in a shift in body weight.

After the initial phase of this approach, which is best over a short period of time, such as one to two weeks, the next critical step is adjustment of the pharmacological treatments to continue to move toward the blood glucose management goals. Consideration for classes of medications, which will not trigger weight gain and/or hypoglycemia, is paramount. This approach means that there is a greater emphasis and intensification in a short period early on, which often results in long-term benefit and independence for the person with diabetes.

When people with T2D arrive with a weight management goal, we ask permission to first focus on the blood glucose management and then agree to return to their goal. Once things are moving toward time in range and glycated hemoglobin goals through self-management mastery, and timely and effective pharmacological management, often weight management has been positively affected and the person is well-positioned for further intervention associated with their weight management goals. There is a relationship of trust established and there is hope for the next goal, which may be further health behaviour interventions related to weight management.

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# Thomas Edison and Weight Loss

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Thomas Edison, the revered American inventor, defined genius as 98 per cent (%) to 99% perspiration and 1% to 2% inspiration (1). A tireless investigator, Edison considered sleep to be "a waste of time" (2). Edison took naps on a cot in his laboratory and reportedly didn't sleep for more than four hours per night. He passed away from complications of type 2 diabetes in 1931 at the age of 84, having limited himself at that point in his life to a diet of milk and cigars. Whether Edison's sleep habits were a factor in his diabetes is unknown, but his legacy is an inspiration for many, and his inventions brought sweeping changes to North American society in the 20th century. His development of the incandescent light bulb into a safe and reliable means of household illumination has, however, been blamed for permanently altering our biological clocks and interfering with sleep (2). Sleep deprivation is one of many potential factors leading to weight gain. Edison would have been intrigued that one of his inventions might have had deleterious effects and would have been inspired to find a solution. Can we use similar scientific curiosity to investigate potential ways that he might have found to help manage diabetes with weight loss?

## What is the Biology of Weight Loss?

Edison might have considered looking first at the subject of the weight loss: the human body. Our bodies have powerful hormones in the hypothalamus that regulate appetite; ghrelin stimulates eating and leptin signals satiety. The hypothalamus attempts to maintain our "natural" weight, and rallies against weight loss, actually treating restriction of food intake like it is an illness (3). Weight loss is difficult to achieve but is even harder to maintain, with 95% of all diets failing within two to five years (4). If we return to our usual eating habits, weight regain occurs with additional pounds added as protection against future food restriction. If we continue with ongoing episodes of restricting food intake, our "natural" weight (set point) becomes even higher (4).

## What Societal Changes Impede Weight Loss?

Changes to societal practices since Edison's time increasingly run counter to our evolutionary biology, and are collectively referred to as "diseases of civilization." Sleep deprivation, prolonged exposure to stress and energy-sparing conveniences are just some of the multiple contributors to increasing obesity, cardiovascular disease and type 2 diabetes. The current eating patterns of Canadians also has an impact on overall health. Food availability studies in Canada show that while access to fresh fruit has been maintained, so has

that of soft drinks (5). Edison would likely have agreed with the observation that in an environment in which energy-dense food is abundant and physical activity is largely unnecessary, maintaining weight loss after a diet is nearly impossible (6).

## Start Doing Some Math!

Since 2017, restaurants in Ontario with 20 or more locations have been required to post the caloric content of their menus, and other restaurants in the province have done so voluntarily (7). With this information, there is a statement indicating the caloric requirements for an average adult with the provision that "calorie requirements vary among individuals." While posted caloric guidelines provide a baseline intake, individuals pursuing weight loss may try to reduce their own intake by consuming 500 to 600 calories less each day. Some adults use calorie-tracking apps to count their caloric intake, but this should be undertaken with caution; some studies suggest that app use may be associated with eating disorder symptomology (8). To help individuals achieve a healthy weight, an appointment with a registered dietitian can provide individuals with evidence-based guidance on making dietary changes for healthy weight loss to achieve and maintain a healthy weight.

## Make Simple Changes to Eating Behaviour

Eating is a rich experience that ideally will involve all five senses. If we distract ourselves with electronics or work while we eat, our bodies can't discern satiety messages effectively. By eating more slowly and with a mindful approach, we give leptin a chance to circulate and trigger the "I am full" signal. Eating with others can often influence our food choices and

experience as well. Seeking support from our family and circles of friends to make lifestyle changes together is more likely to promote motivation and accountability.

### Portion Control and Hara Hachi Bu

Edison was never deterred by something that didn't work; he just kept trying different strategies. Trying to institute radical changes to one's eating behaviour is likely to backfire. Instead, an eating change to support a healthy diet is to use portion control strategies, which may reduce the total amounts of foods we may consume. Practising portion control by using smaller plates and bowls may help give the visual cue of having eaten a full meal.

Inhabitants of Okinawa, Japan, are known for lower rates of obesity, as well as longer and healthier lives than many other industrialized nations (9). One of their practices is called Hara Hachi Bu, or eating until one is 80% full (9). This food management strategy may help with recognizing fullness sooner and contributing to the reduction of food waste.

### Are You Eating Food or Chemicals?

Humans are drawn to sweet and fat flavours, as our early ancestors knew these tastes to be "safe" (10). Salt, which is an acquired taste, is introduced to us increasingly earlier in life, creating a preference trifecta for the food industry (10). Food scientists have made our taste buds the target of clever chemical manipulations, so that virtually any taste can be imitated for commercial purposes. Many compounds added to commercially prepared foods make them last longer, taste better or assist in the manufacturing process. Here are two helpful questions to ask:

1. Does the food item grow directly from a plant?
2. How many processing steps are there between the original food and what you hold in your hands?

Choosing minimally processed foods is the most effective way to maintain a healthy body weight. By way of a comparison, turning a potato into potato chips increases the caloric content by a factor of seven (11)!

### Which Diet is Best?

Any diet can help an individual achieve short-term weight loss: low fat, low carbohydrate, high protein, keto, paleo and more. If you choose to make dietary changes, aim for a balanced intake of nutrients and a calorie-reduction figure that is realistic for you. While medications are increasingly promoted as a tool for weight loss, they are more effective when combined with modifying food intake and other lifestyle choices. Having a support system of family, friends, your primary-care provider and a registered dietitian can also help support an individual to maintain long-term weight-loss changes that won't end when the fad diet does.

Despite his many physical ailments, Thomas Edison kept a great sense of humour in addition to his relentless optimism. He would have woken up every day looking for ways to choose better foods, be more physically active and would not have been deterred by the lack of short-term results. Edison was above all a practical person who spared no effort in finding a solution to a problem, which can serve as an inspiration to us all!

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# Metabolic Surgery and Obesity

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Obesity increases the risk for cardiovascular disease, hypertension, dyslipidemia, diabetes mellitus, sleep apnea, gallbladder disease, increased prevalence and mortality of various cancers, and can result in socioeconomic and psychosocial issues (1-4).

Bariatric surgery is the most effective and durable treatment for obesity (5). Indications for bariatric surgery are based on the 1991 National Institutes of Health consensus statement (6) and includes patients with a body mass index (BMI) of 40 or greater, or a BMI between 35 and 40 with high-risk comorbid conditions, such as severe sleep apnea, Pickwickian syndrome, obesity-related cardiomyopathy, diabetes mellitus and obesity-related physical problems interfering with lifestyle, employment, family function (polycystic ovary syndrome and infertility) and ambulation. Patients proceeding with bariatric surgery should be enrolled/assessed at a multidisciplinary bariatric surgical program. In Ontario, patients are referred through the Ontario Bariatric Network (OBN). They are informed about the surgical procedure, and assessed for surgical risks, comorbidities and nutritional status. Patients need to be motivated and be made aware of the need for postsurgical monitoring (particularly during the first two years postsurgery) and should be committed to lifelong monitoring of their nutritional status. Since bariatric surgery has shown benefits not only with regards to weight loss, but also improvements in metabolic status, resolution or improvement in the control and complications of type 2 diabetes (T2D), and improvement in cardiovascular risk and mortality, there is a move to shift the focus from a BMI-centred approach to an end organ health criteria and a lower BMI (7,8).

Weight loss surgery, listed in order of increasing weight loss potential, includes gastric banding, vertical sleeve gastrectomy (VSG), Roux-en-Y gastric bypass (RNYGB) and biliopancreatic diversion (BPD) with or without duodenal switch (9).

Gastric banding (quite popular at one time) has lost favour due to the frequency of complications (10). In a long-term study, nearly 50 per cent (%) of patients required removal of the band, and 60% required reoperation within 12 years of the initial surgery. Of those requiring a second operation, 17% were converted to a laparoscopic RNYGB procedure (11). Perioperative and postoperative complications are greatest with the BPD; this surgery is reserved for extreme cases. BPD should only be done at specialized bariatric surgical centres.

The RNYGB surgery is considered the gold standard, and is the preferred procedure offered by the OBN. Patients who require long-term use of nonsteroidal anti-inflammatory agents or glucocorticosteroid therapy may be at increased risk for developing marginal ulcers, and these patients may have less risk with a VSG. Smoking may also increase the risk for ulcers and perforation in patients having had RNYGB (12,13). The VSG is a simpler surgical procedure compared to the RNYGB and may be considered in patients with higher surgical risk in whom weight loss is essential, such as patients having obesity on dialysis requiring weight loss before being considered for renal transplant (14). The VSG, however, does increase the risk for gastroesophageal reflux (15) and, in some cases, this may be severe enough to require conversion to a RNYGB procedure, which generally has less problems with reflux.

Bariatric surgery should also be deferred in patients with alcohol or substance abuse, untreated or active depression, major psychological problems and suicidal tendencies as these problems may be made worse after surgery (16).

In a Swedish study, the average weight change at 15 years was ±2% in the control group, 13±14% for banding, 18±11% for VSG and 25±11% for RNYGB. Maximum weight loss generally occurs one to two years after surgery, with 20±10% for banding, 25±9% for VSG and 32±8% for RNYGB. Weight regain may be seen in some patients two to three years postsurgery, with plateauing of weight regain eight to 10 years postsurgery (5).

Improvement in diabetes control with gastric bypass surgery was initially assumed to be the result of restriction of caloric intake due to the small gastric pouch, and malabsorption of nutrients due to bypassing the duodenum and proximal jejunum. The fact that diabetes improves immediately after surgery and before any weight loss occurs, and the disproportional degree of diabetes improvement after RNYGB compared with the weight loss from other interventions suggests that other mechanisms are likely the cause of the improvement (17). There is enhanced release of glucagon-like peptide-1 (GLP-1) from the L-cells of the distal gut, which suppresses glucagon secretion, increases glucose-dependent insulin secretion from the beta cells, increases beta cell mass, improves insulin sensitivity and inhibits gastric emptying (17,18). Bypassing the duodenum and proximal jejunum may cause improvement of diabetes by some unknown mechanism (19). Ghrelin, a hormone produced predominately in the stomach, is reduced in patients with VSG and RNYGB surgery (20). Reducing ghrelin levels reduces appetite and has an antihyperglycemic effect. There are changes in the gut microbiota after bariatric surgery that also facilitate weight loss (21,22).

Bariatric surgery plus medical therapy was more effective than medical therapy alone in controlling patients having obesity with uncontrolled T2D (23,24). While 68.7% of RNYGB patients with diabetes were in remission at three years postsurgery, and with 62% of the insulin-requiring patients with T2D able to come off insulin and remain off insulin at one year postsurgery, it is

surprising that more patients with diabetes mellitus and obesity are not being referred for bariatric surgery. Improvement in cardiovascular disease and mortality and reduction in the risk of microvascular disease in these patients should make this therapeutic option a high priority for patients with diabetes mellitus and obesity. The American Diabetes Association 2020 guidelines (25) now states that bariatric surgery should be considered for patients with a BMI of 35 and greater and may be considered for patients with a BMI of 30 or greater. Metabolic surgery is cost-effective compared to conventional therapy for treating patients having obesity with diabetes, albeit the upfront cost for metabolic surgery is greater initially. It is estimated that the 10-year cost savings in the United States would be approximately US$8.2 billion (26). Concerns about the safety of bariatric surgery by the patient and primary care physicians may also be a barrier. Laparoscopic bariatric surgery risk is no greater than that of laparoscopic cholecystectomy, yet we do not see the same concerns regarding the latter procedure (27).

Bariatric surgery in patients with type 1 diabetes is much more challenging. Weight loss can be achieved and some metabolic improvement occurs; however, the risk for diabetic ketoacidosis is increased, and glycemic control may remain variable afterwards (28). Patients with type 1 diabetes should only be considered for bariatric surgery with close supervision by an endocrinologist before and after the surgery.

Educating patients, diabetes educators, physicians and policymakers about bariatric surgery, its safety, efficacy, and long-term benefits is extremely important and urgently needed.

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# Addressing Weight and Diabetes With a National Diabetes Strategy

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Obesity is a chronic health problem prevalent in Canada, often progressive and difficult to treat. According to Diabetes Canada's clinical practice guidelines, an estimated 80 per cent (%) to 90% of people with type 2 diabetes (T2D) have overweight or obesity. The relationship between body fat increase and negative health outcomes exists throughout the range of overweight and obesity. Weight loss has been shown to improve glycemic control by increasing insulin sensitivity and glucose uptake and diminishing hepatic glucose output (1). Research from around the world has shown that intensive intervention to change the diet, physical activity and body weight of those at risk can prevent or delay as many as 58% of those individuals from developing T2D (2). Benefits to their glycemic and cardiovascular outcomes are anticipated to last for 10 to 20 years, halting or significantly delaying the development of diabetes.

Given its increasing incidence and prevalence, the development of safe and cost-effective interventions to reduce the risk of developing diabetes is urgently needed to decrease the burden on individuals and the health-care system. Ideal strategies for prevention and management of T2D should range from efforts focused on individuals with or at risk for developing diabetes to broader group- and population-based strategies.

Diabetes Canada is spearheading Diabetes 360° (D360), a nation-wide approach that helps all Canadians know their risks of diabetes, reduces individual risk factors for both diabetes and its complications, promotes healthier environments and creates measurable, attainable health outcomes.

Within D360, there are several proposed strategies that address weight-related issues in the context of social, physical and food environments. These factors must be addressed to prevent and manage the millions of cases of diabetes in Canada.

## Canada's Healthy Eating Strategy

Canada's Healthy Eating Strategy recognizes that "healthy eating can be challenging due to several factors, some beyond the control of the consumer" (2). To help prevent millions of Canadians from developing T2D, Canada should implement its planned measures to:

- restrict the marketing of unhealthy foods and beverages to children
- limit the consumption of saturated fat, salt and sugar
- help Canadian consumers make healthy choices through *Canada's Food Guide* and food labelling amendments


## Health Inequities and Food Insecurity Must Be Eliminated

Poverty and food insecurity are major contributors to the risk of people developing T2D. In Canada, one in eight households, or more than four million Canadians, including 1.15 million children, are food insecure (2). People living in food-insecure households report poorer physical health and are more vulnerable to a wide range of chronic conditions, including diabetes, heart disease, hypertension and arthritis (2). Household food insecurity is significantly more common among Canadians with diabetes (9.3%) compared to Canadians without diabetes (6.8%) (2). Individuals living with diabetes who are food insecure also face many challenges that greatly impact their ability to self-care (2). For these reasons, addressing poverty, food insecurity and other key health inequities must form a core part of any Canadian approach to the primary prevention of T2D. Proposed strategies include:

- subsidizing healthy foods
- supporting basic income to make healthy foods more affordable and/or

- subsidizing community greenhouses, gardens or hydroponic facilities to make fresh produce more readily available

### Healthy Options Should Always Be Available

Governments, at all levels, should prioritize the availability of healthy foods and beverages in all municipal facilities (e.g. schools, hospitals, gyms) and limit the availability of unhealthy foods. As part of ongoing policy measures to improve Canada's healthy eating environment, the government should closely consider implementing a manufacturer's levy on sugar-sweetened beverages to reduce consumption and subsidize healthy living programming.

### Regular Physical Activity Should Be Facilitated For All Canadians

Regular physical activity is extremely important for the prevention of diabetes and its complications. That's why Diabetes Canada's clinical practice guidelines recommend that regular physical activity of a minimum of 150 minutes per week over five days should be implemented to reduce the risk of T2D (1). To maximize every Canadian's ability to achieve this goal, government should partner with nongovernmental organizations, communities and the private sector to encourage regular movement by:

- making urban environments more walkable
- resourcing physical education in schools
- incentivizing workplace fitness programs
- preserving natural environments
- taking measures to reduce screen and sedentary time for children, youth and adults

### Healthy Living Education for Families and Children Begins at Birth

According to the World Health Organization, the global disease burden due to noncommunicable diseases (such as diabetes) affecting children is rapidly increasing, even though many of the risk factors are preventable (2). The number of five to 19 year olds living with obesity rose more than 10-fold globally, from 11 million (1975) to 124 million (2016) (2). Wellness education programs that improve awareness of diabetes and its prevention through lifestyle measures should be implemented in schools and community programs across Canada to prevent the development of chronic diseases, such as diabetes.

Positive lifestyle interventions that include healthy eating and physical activity and other components (e.g. counselling, smoking cessation, stress reduction, group therapy, behaviour modification) have been shown to prevent or delay the onset of T2D by more than 50%, with the benefits extending beyond the active intervention stage (2). A proven approach to preventing those with prediabetes from developing T2D is the Diabetes Prevention Program (DPP). In both the Finnish National DPP (2) and the United States DPP trial, participants who received intensive education on weight reduction, healthy diet and physical activity experienced a 58% reduction in the incidence of diabetes relative to control participants. This outcome was achieved despite only modest weight loss among participants (5% to 10% of baseline weight).

Studies of the experience of participants also demonstrate positive results (2):

- 94% of study participants felt the program helped them to reduce their portion sizes
- 88% said the program helped them increase their level of physical activity
- 84% reported an increase in energy
- 91% stated the program helped improve their overall health

Participants detailed the ways in which group support, counsellor phone calls, tips from facilitators and organized exercise activities helped them make healthy lifestyle changes.

Canada's diabetes strategy should include the broader roll out of DPP-style integrated approaches to promote healthy living and weights and prevent T2D. Multisectoral collaborations offer promising opportunities to make such programs broadly available. Work on this is already underway as DPP programs are currently running through LMC Diabetes & Endocrinology (with the support of the Public Health Agency of Canada). This pilot uses a digital DPP-based program that can be applied more broadly. The government and private sector should partner with Diabetes Canada in rolling out these programs, so that all Canadians can benefit from this evidence-based program.

### Canada Needs A National Diabetes Strategy Now!

A national diabetes strategy can address the social, physical and food environment issues related to overweight and obesity by ensuring that:

- people are living with food security
- Canadians eat a healthy diet and are at a healthy bodyweight
- Canadians achieve 150 minutes of physical activity per week
- school children receive enhanced health education

Canadians from across the country are speaking up, calling on our federal government to make a national diabetes strategy a priority in the next federal budget. We need a national strategy now to address this epidemic that is costing millions of Canadians their lives and bankrupting our health-care system. If you agree, send a letter to your member of parliament today!

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TECH WATCH

# Healthy Lifestyle App for Canadian Families Available Later This Year

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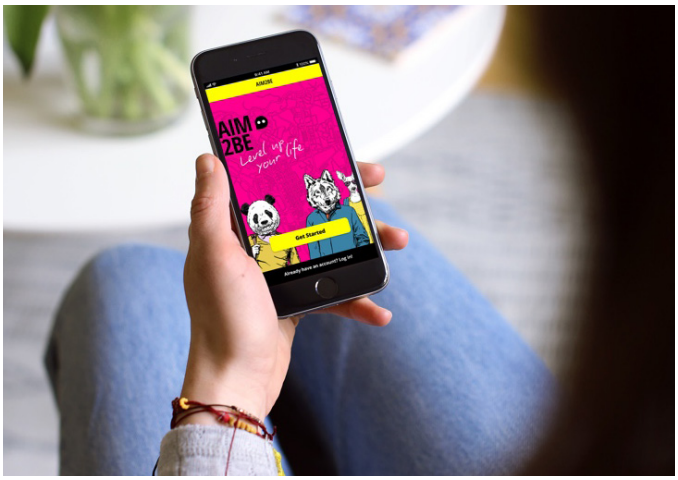
Finally, an app you can feel confident recommending to help families adopt healthy behaviours related to eating, physical activity, screen time and sleep. Aim2Be integrates living green principles and behaviour change techniques, and aligns with Canadian health recommendations. It's engaging, gamified and social. There's an app for parents and one for youth (10+ years).

Parents and youth shaped the design, functionality and content of Aim2Be. Dietitians, physical activity experts and psychologists developed and reviewed the content, including national health organization partners, such as Diabetes Canada.

Aim2Be is being independently evaluated with Canadian families by the University of British Columbia (BC) and BC Children's Hospital Research Institute. The results from a pilot study (1) with almost 300 families with teens are promising. Parents and youth, who used Aim2Be over a 4.5 month period for 30 to 60+ minutes in total, reported increasing their fruit and vegetable intake. Teens reported drinking less fruit juice and parents fewer sugary drinks. Teens significantly decreased their screen time as well. A randomized control trial (1) with 200 families with children with a body mass index above the 85$^{th}$ percentile will provide further evidence of the impact of Aim2Be on health behaviours.

The development and evaluation of Aim2Be are being funded, in part, by the Public Health Agency of Canada, with matched funds from Ayogo Health (the software developer),




Merck Canada, Heart & Stroke, Diabetes Canada, Obesity Canada, Dietitians of Canada, Canadian Society for Exercise Physiology, Craving Change and the David Suzuki Foundation.

Aim2Be will be available in the app stores in English this summer, and in French by fall 2020. Visit the website (aim2be.ca) for details or contact the project director (janice@childhoodobesityfoundation.ca).

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# Weight Conversations: Are We Harming More Than Helping?

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In a recent eye-opening training with Lucy Aphramor, RD, Ph.D. that encouraged critical thinking and conversations about health and social justice, attendees were asked what percentage of health was determined by personal choices, such as exercise and nutrition (1). Where would you stand on that question? Has that number changed over your time spent practising as a health-care professional?

### A Personal Reflection on Receiving a Diagnosis of Diabetes

"Since my early 20's I was encouraged to lose weight by family members who would cite that diabetes runs in our family. I repeatedly attempted dieting and exercising to intentionally lose weight; however, each time, I would initially lose weight and then eventually gain the weight back plus about 20 pounds more. Therefore, my weight has continued to increase over the last 20 years. By dieting, I also developed an eating disorder, sometimes restricting my food intake and then later binge eating. Six years ago, a doctor informed me that my blood sugar had reached the prediabetes range and they told me to diet and exercise to bring it down. I tried to change my diet again, and then noticed that I felt guilt and shame whenever I ate. I started going to a therapist who practised from a "Health at Every Size" lens, and I was able to improve my relationship with food and my body, and no longer binged or restricted my eating. My weight has also remained stable since then. Four years ago, I started working with a new doctor's office and went in for a physical; I told them that I have a history of an eating disorder and requested they not prescribe weight loss to me because that is triggering. At my second appointment, the practitioner informed me that I now have diabetes, which was scary; when she told me that, at this point, half of my pancreas was dead. I felt ashamed and started to self-blame. She then handed me an eating plan containing mainly vegetables and lean meats, with an expectation of only eating 1,300 calories a day. I tried the food plan initially; however, having to count calories and restrict my food intake led to a relapse into my eating disorder behaviour, including binge eating."

Annahita Ghaboussi, personal reflection, Jan. 18, 2020

## The Complexities of Weight

There is no debate that weight and health are complex. We know that we cannot look at someone's body mass index (BMI) and know the complete story of their health. Weight does not follow the simple equation of calories in equals calories out. The common myth that a weight loss of one pound requires an energy deficit of 3,500 calories remains quoted in practice, yet has largely been disproven in the literature (2).

## Influences on Health and Weight

A focus on body size and individual behaviours, such as diet and exercise, entirely misses the need to address structural social determinants of wellness, like early childhood development, trauma and income that can influence an individual's ability to partake in "health behaviours" (3). Globally, the root causes of rising BMIs are far more complex than energy balance. These factors include, but are not limited to:

- Food environment and unregulated food marketing (3)
- Widening wealth disparities: globally, this has dramatically changed family dynamics and food settings in homes (4)
- Physical environments we live in, and access to safe places to be physically active, such as sidewalks in rural neighbourhoods (4)
- Trauma: prolonged exposure to developmental, historical or intergenerational trauma can lead to a dysregulated stress response, deficits in coping skills and increased heart rate, abnormal blood pressure and a weakened immune system (5)
- Weight cycling: intentionally losing weight through dieting is often not sustainable; people often lose weight initially and then gain most, if not all, of it back in long-term follow up (6,7)

When we begin to unfold some of the influences on weight and health, we see that there is so much more than personal choices involved.

## The Harms of Recommending Weight Loss

As both this personal reflection and research shows, focusing on weight loss can cause harm and worsen previous exposure to trauma. Some of these harms include, but are not limited to, exacerbating or developing eating disorders, weight cycling, mental health issues and social stigmatization (3). The ethics of encouraging patients to "work on losing weight" has received little focus in health-care practice. In contrast, the long-term harms of dieting are well-documented in the literature. A large review of randomized controlled trials with follow ups of two years or longer found that one-third to two-thirds of dieters not only gain all the weight lost, they gain more than their original weight (6,7). Most studies about weight loss end long before long-term outcomes from weight loss efforts can be assessed. The psychological harms of trying to lose weight or being told to lose weight are vast (7). Studies have shown that it is not excess weight, but weight stigma itself that contributes to negative mental, physical and social health outcomes (3). For example, adolescents who report trying to lose weight or wanting to lose weight are at an increased risk of eating disorders (8). Eating disorders, such as anorexia nervosa, have an 18-fold increase in mortality (9).

## How Can We Help Without Harming?

- Focus on holistic health instead of weight: strong data cite the health benefits of exercise, including lowered blood pressure and improved lipids and blood glucose; however, exercise does not reduce weight in a significant manner for most people (10). Also, we need to discuss people's fears of gaining weight from smoking cessation. Many people report not wanting to quit smoking for fear of gaining weight (11).

- Point out the benefits of eating beyond nutrients, such as connecting with others and coping (1).
- Notice our own internalized weight stigma (12): we can consciously notice our assumptions about a person's lifestyle choices based on their body size. We can recognize that although we all have some agency over our lives, a person's present and past health situation is not entirely a personal choice.
- Be trauma informed: health-care professionals can approach all clients with a trauma-informed lens and recognize that many of our most at-risk patients have experienced trauma. For example, in the landmark adverse childhood event (ACE) study, 61 per cent of Americans surveyed across 25 states had experienced at least one ACE. ACEs are linked to chronic disease, mental health issues and substance abuse in adulthood (13). Diabetes Canada's clinical practice guidelines 2018 chapter for working with Indigenous people suggests a historical trauma lens (14); trauma can be considered in other populations with diabetes as well. We encourage readers to seek out training in trauma-informed care (trauma-informed.ca). With trauma sensitivity, we can adjust our approach so that our clients feel safe and secure.
- Ask permission to talk about weight: if a weight discussion feels necessary, ask permission to discuss weight and honour a patient's request to not discuss it. Ask patients about their weight loss journey and if it is still serving them.
- Equip patients with tools for having conversations with health-care professionals that are weight focused.
- For patients who express an interest in weight loss, we can ethically discuss the pros and cons of the pursuit to lose weight, and prepare them for the high chance of weight loss not being sustainable. Setting aside the goal for weight loss does not mean one needs to stop working on healthy behaviours that are accessible to them.
- Use language that is not shaming: there is a growing movement among health-care professionals and activists to no longer use the word "obesity" or "overweight" at all because it leads to patients feeling shamed (1). A common term that is more comfortable is "people in larger bodies." Most importantly, be sensitive to the language your patient uses when they talk about weight.

Even with the evidence that encouraging weight loss may be harmful, it remains common practice when counselling people with diabetes. We all have our own personal journeys of discovery and self-reflection as health-care professionals. As we learn and grow, we are able to let go of old beliefs to make space for new ways of working with our patients. We all want to help, not harm.

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# Weight Management Guidelines for Patients With Gestational or Type 2 Diabetes During Pregnancy: Are the Current Guidelines Reflective of Shared Decision Making?

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Collectively, the 2018 Diabetes Canada clinical practice guidelines (CPG) and the 2019 Society of Obstetricians and Gynaecologists of Canada (SOGC) guidelines summarize decades of evidence-based research, including weight management recommendations relevant to patients at risk of or living with diabetes in pregnancy (1-4). In these CPG, weight is discussed in terms of risk for diabetes and/or complications (to mother and child). Weight, in this context, is used to calculate prepregnancy body mass index (BMI) and gestational weight gain. Weight is also often discussed in terms of how it impacts clinical outcomes and intervention effectiveness (1-4). Current evidence supports that anesthetic time increases with increasing maternal BMI, women with higher weights are at higher risk for postsurgical complication (e.g. wound dehiscence, infection) and excess gestational weight gain has been associated with a higher risk for caesarean section and stillbirth (1-4). Although ample, these data are collected using primarily observational and retrospective designs and methods; relevant considerations given the CPG approach to evidence evaluation. Perhaps more relevant to interventionists, the CPG also include high-quality randomized control trials and systematic reviews (with meta-analysis), reporting effectiveness of interventions tailored to women with higher weights/larger bodies (3-4). For instance, one systematic review and meta-analysis, conducted by Brand-Miller et al (5), showed that prepregnancy/baseline body mass index, study design, dietary methodology and changes in energy intake were not significantly correlated to gestational weight gain. Two other examples include: 1) Grant et al showed that low glycemic index dietary interventions disrupt the direct association between prepregnancy BMI and self-monitored blood glucose, and 2) Chelmow et al showed that adapting wound closure procedures to accommodate bigger bodies (reapproximation) can significantly reduce wound disruption and seroma formation in patients with higher weights receiving caesarean section (1,2,6,7). Our goal for this commentary is to inspire critical examination of the current weight rhetoric that exists in, and is generated by, our community of practice. We would like to motivate research and intervention(s) tailored to increasing options for a diversity of bodies, improving maternal and infant outcomes, and reducing weight bias among health-care providers and patients. That is, we hope to stimulate discussion on how we can more effectively engage in shared decision making and reduce weight bias for our patients (8).

The Diabetes Canada 2018 CPG lists and explores weight management along with other "healthy behaviours" in relation to various pre, peri- and postnatal outcomes. The inclusion of weight management as a behaviour is problematic, as weight is a highly complex outcome that is not often under a patient's or health-care provider's control (9,10). The current guidelines acknowledge weight loss is not recommended during pregnancy; however, evidence shows that patients and clinicians engage in weight loss conversations and restrictive eating behaviours when patients have diabetes in pregnancy (11-15). These contradictions between evidence and practice may be attributed to confusion regarding how to apply the current guidelines. For instance, a statement like "start weight loss before pregnancy", with reference to current weight gain recommendations, is made in the CPG (1,2). Current weight gain recommendations were last updated by the Institute of Medicine in 2009 (16,17). These recommendations aimed to address the increasing rates of obesity and maternal obesity; however, they were not developed for women with diabetes and they do not consider any pre-existing conditions (1,4). Acknowledging this, the 2019 SOGC guidelines note that any form of energy restriction be done with the facilitation of a registered dietitian, who is familiar with the unique needs of pregnancy and lactation. These unique needs include energy, macronutrient and micronutrient requirements, and prevention of disordered eating. Pregnancy is a short and busy period for patients to engage in behaviour change. It is clear that weight, especially gestational weight gain, has a significant role to play in prevention and treatment of diabetes during pregnancy. Yet, we are unsure if "weight management" is the approach we should be taking in prenatal care. Our

current Canadian Institutes of Health Research-funded study (unpublished) tells us that patients and clinicians are calling for improved care, aimed at behaviours they can modify effectively. Ambivalence exists within and between health professions with regards to the utility of weight as an outcome. In fact, some health-care providers and end users think weight management is at odds with patient-focused care and current evidence (18,19).

Patient-focused care can be described as approaching medical diagnoses-related care with the feelings, mental health, perceptions and expectations of the patient in mind (20,21). Commonly used in nursing literature, person-centred care takes this concept a step further, keeping the patient at the centre of care, but recognizing all persons involved as people working within organizations and communities, with their own needs, bias strengths and limitations. This approach to language also aims to actively avoid victimization and hierarchical patient-provider dynamics (21,22). All are supported within a shared decision-making model of research and care (8). A recent review by Gilbert et al showed that psychosocial well-being (i.e. social support, self-efficacy) in women diagnosed with gestational diabetes is positively associated with improved eating behaviours and physical activity (23). However, women's fear of judgement and shame may deter them from receiving the support and information they need during pregnancy (18-20). Labels and stereotyping, based on body weight, shape or size, are received by larger bodied women from family, friends, the public and health-care professionals (21). These messages can increase psychological stress and disordered eating behaviour in patients (21), as well as, under- or overmedicalization of patients, the pregnancy and the offspring. Therefore, optimizing care among women that live with higher weight(s) during pregnancy, birthing and postpartum, means providing a person-focused approach that is mindful of body diversity, the needs and wants of the person receiving the care, and the inherent and perceived weight bias among health professionals. As Canadian health centres provide service to an increasing number of pregnant women living with higher weights, researchers and clinicians must focus on the best ways to understand and support these women and implement this evidence in a timely manner.

This brings us to the important question we would like to pose to our readers: how can we provide excellent care for women who live with higher weight(s) and at the same time challenge harmful norms? There are many examples of Canadian researchers' and clinicians' efforts. For instance, the Edmonton Obesity Staging System is an evidence-based clinical assessment tool that has revolutionized the way many clinicians approach weight in their practice (tackling weight bias head on, while not compromising comprehensive assessment) (28). Moreover, Obesity Canada is in the process of revising their guidelines, offering strategies that shift the focus from weight management to modifiable behaviours, noting that not all larger bodies require "management" (29).

Weight is not simply a dependent variable. Researchers have consistently demonstrated that making possible changes during pregnancy can be taxing, and that achieving changes for medically relevant outcomes is even more difficult (30-34). The Canadian Atlantic provinces have the highest rates of diabetes, obesity and some of the most noteworthy income disparities (35,36). As female clinicians, researchers and mothers, we have a deep interest in this topic. It is time for our community of practice to commit to person-centred care when it comes to weight, which includes challenging unjustified norms and bias within and outside of our professions.

**Note:** The authors would like to note that this commentary was a collaborative effort and all authors contributed equally.

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ASK THE EXPERT

# Does a Higher Body Mass Index Require a Longer Needle for Injectable Therapy?

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Despite the improved understanding of the injection technique over the past 10 years driven by the Forum for Injection Technique (FIT) recommendations (1), a misperception remains regarding people with higher body mass index (BMI). For many years, it was believed that these individuals should use the longest subcutaneous needle available to deliver insulin deep into the subcutaneous tissue. However, this belief was not accurate. First of all, skin thickness is not affected by age, BMI, gender or race and averages 2 millimetres (mm) (2). The goal of subcutaneous injection is to deliver medication into the subcutaneous tissue through the skin. There is no evidence that going deeper into the subcutaneous space provides additional benefit. After a review of all available evidence, the FIT recommendations state: 4 mm, 5 mm and 6 mm needles are suitable for all people with diabetes, regardless of BMI. An 8 mm needle may be preferred by some patients.

The other concern is that shorter needles do not deliver insulin effectively in people with higher BMI, and leakage is more prevalent in this population with short needles. In the study by Hirsch et al (3), it was clearly demonstrated that glycemic control was not adversely affected with shorter needles. Leakage, which is more common in people with higher BMI, was the same, regardless of needle length.

Higher BMI does not require a longer needle for injection. All patients should be offered the shortest needle possible. It is their choice!

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# Overview of Medications for Weight Management

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Obesity and the associated risk factors of diabetes, hypertension and dyslipidemia have reached global epidemic proportions. These metabolic disturbances and diabetes, in particular, have major implications in health-care spending (1). In fact, overweight and obesity have globally increased substantially, with projections estimated to be 1.35 billion and 573 million individuals, respectively, by 2030 (2). It is well-established that lifestyle changes, including weight loss and exercise, can delay the progression from prediabetes to type 2 diabetes (T2D) (3).

In individuals with T2D who have overweight or obesity, weight loss has been associated with improvements in glycemic control and a reduction in cardiovascular (CV) risk. Sustained weight loss with lifestyle changes is difficult to maintain. Clinically, a weight reduction of five per cent (5%) to 10% can improve obesity-related comorbidities and quality of life; however, average weight loss from lifestyle interventions is 3%, thereby providing minimal improvements in CV risk factors (4). Pharmacotherapy for weight loss offer tools to facilitate and achieve long-term sustained weight loss.

Pharmacotherapy is recommended in patients with a body mass index (BMI) greater than or equal to 30 kg/m$^2$ or a BMI greater than or equal to 27 kg/m$^2$, with at least one obesity-related comorbidity (5).

Antihyperglycemic medications, such as insulin, insulin secretagogues and thiazolidinediones, can lead to four to nine kilogram (kg) weight gain, with insulin causing the most weight gain (6). Weight neutral medications include metformin, dipeptidyl peptidase-4 inhibitors and alpha glucosidase inhibitors. Glucose-lowering agents associated with weight loss include sodium-glucose transporter 2 (SGLT2) inhibitors, with an average weight loss of 2 kg to 3 kg (7), and glucagon-like peptide 1 (GLP-1) receptor agonists with an average weight loss of 3 kg (8).

Approved medications for weight loss include orlistat (Xenical, F. Hoffmann-La Roche Ltd, United States), wellbutrin/naltrexone (Contrave, Bausch Health, Canada), and liraglutide (Saxenda, Novo Nordisk Canada Inc.). When used to treat individuals with T2D who have overweight or obesity, all have been demonstrated to improve glycemic control and to reduce the doses of antihyperglycemic agents (9).

If a patient's response to weight-loss medications is less than 5% of their body weight after three months of therapy, or if there are significant safety or tolerability issues at any time, the medication should be discontinued and alternative medications or treatment approaches should be considered.

Orlistat has been shown to improve glycemic control in T2D and reduce the risk of developing diabetes in individuals with overweight and obesity with impaired glucose tolerance (9). Furthermore, it improved CV risk factors, such as blood pressure and cholesterol. Orlistat may also be useful in the management of nonalcoholic fatty liver disease, menstrual dysfunction related to obesity, and adolescents with overweight or obesity (10). Mean weight loss with orlistat is 3.4 kg (12). Potential adverse effects include steatorrhoea, bloating, oily fecal spotting, fecal urgency and fecal incontinence (12). Patients should be advised to take fat soluble vitamins at least two hours before or after the administration of Orlistat as it reduces the absorption of fat-soluble (14).

Liraglutide 1.8 milligrams (mg) (Victoza, Novo Nordisk Canada Inc.) is a GLP-1 receptor agonist used for glycemic control in T2D, but also functions as a physiological regulator of appetite. Liraglutide 3.0 mg (Saxenda) was approved for use in Canada in 2015 for weight management in conjunction with a reduced-calorie diet and increased physical activity (13). In individuals with T2D, liraglutide 3.0 mg improved glycemic control and reduced CV risk factors, including waist circumference, blood pressure and inflammatory markers (14). In individuals with prediabetes, liraglutide 3.0 mg delayed the progression to T2D (14). Recently, a real-world clinical effectiveness study was performed and the results were similar to that of clinic trials; liraglutide 3.0 mg, in addition to recommended diet and exercise, was associated with a mean weight loss of 7 kg and 8 kg and with a 6.5% and 7.1% decrease in body weight respectively, four and six months postinitiation (4).

Consequently, GLP-1 receptor agonists are increasingly recognized as potential agents for treating nonalcoholic fatty liver disease in patients with and without diabetes (15). Gastrointestinal side effects, including nausea, are generally transient in nature. Gallbladder disease and acute pancreatitis are rare complications of treatment (16).

Contrave combines low doses of bupropion and naltrexone. Bupropion is a dopamine and norepinephrine reuptake inhibitor approved for use as an antidepressant and smoking cessation agent, while naltrexone is an opioid receptor antagonist approved for use in the management of alcohol and opioid dependence (17). This medication works on the areas of the brain involved in controlling hunger. It is taken orally in tablet form and is used for weight management and can improve glycemic control. Contrave treatment also shows improvements in several markers of CV risk, such as waist circumference, triglycerides and high-density lipoprotein cholesterol. The most common side effect is nausea (17).

Obesity and diabetes are chronic diseases, and their increasing prevalence has resulted in a global epidemic and may be associated with significant CV risks. Treatment of obesity is paramount to reducing the risk of developing T2D and for the management of patients with T2D.

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# Novel Coronavirus (COVID-19) and Diabetes

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Since diabetes is a chronic disease, questions and concerns about the impact of the novel coronavirus (COVID-19) are expected and appropriate.

Due to the rapidly emerging information related to COVID-19, Diabetes Canada is closely monitoring the situation and taking guidance from public health agencies. We have instituted an internal organization task force to keep us updated on breaking news and information pertaining to this disease. We also released a public statement and outlined frequently asked questions on our homepage (**www.diabetes.ca**) to provide our stakeholders with resources and tips to prevent infection, and will continue to communicate via our social channels.

## Be prepared

Everyone should have a plan in case of illness. For people living with diabetes, this is very important.

Your patient's plan may include:

- Gathering the contact information for their doctors, clinic, pharmacy and insurance.
- Writing down the names and doses of their medications.
- Having enough medication for one to two weeks in case they cannot get to the pharmacy to refill their prescriptions.
- Ensuring all their medications have refills available, so they do not have to leave the house if they become ill.
- Having extra supplies like rubbing alcohol, hand sanitizers and soap to wash their hands.
- Keeping simple sugars (i.e. glucose tablets) on hand in case they need to treat low blood glucose, which may occur more frequently with illness due to changes in eating patterns.
- Having glucagon available in case of a significant low blood glucose (if taking insulin or medications that can cause low blood glucose).
- Having ketone strips available in case of illness (if the individual has type 1 diabetes).
- Reviewing the Diabetes Canada sick day management tips (**guidelines.diabetes.ca/docs/patient-resources/stay-safe-when-you-have-diabetes-and-sick-or-at-risk-of-dehydration.pdf**)

Health-care providers are encouraged to check online information from the Public Health Agency of Canada: **www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/health-professionals.html**.


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