Recommendations

All pregnant women, including those with diabetes or gestational diabetes (GDM), are encouraged to follow a healthy eating pattern such as those outlined in Eating Well with Canada’s Food Guide. For more information on healthy eating during pregnancy refer to Nutrition Guideline: Pregnancy.

Pregnant women with diabetes should be seen by a dietitian when possible.

Nutrition recommendations include:
- Aiming for consistent carbohydrate intake at meals and snacks to help optimize glycemic control.
- For women with pre-existing diabetes, individualizing timing and spacing of meals and snacks based on the stage of pregnancy, lifestyle preference, medications, and treatment goals.
- Encouraging women with GDM to eat 3 meals and 2 or more snacks per day.
- Choosing carbohydrate-containing foods that are low glycemic index and high in fibre most often.
- Vitamin and folic acid supplementation:
  - At least 3 months before conception and during the first 12 weeks of pregnancy, women with pre-existing diabetes is recommended to supplement with 1.0 mg of folic acid per day, either in addition to or as a part of a multivitamin.
  - For the second and third trimester, women with pre-existing diabetes and GDM are recommended to follow vitamin supplementation guidelines similar to pregnant women without GDM.

For more information about nutrition guidelines specific to diabetes management refer to Nutrition Guideline: Adult Diabetes.

Health Benefits

Appropriate nutrition therapy for pregnant women with type 1, type 2, and gestational diabetes (GDM) can help improve perinatal outcomes by:¹
- supporting optimal glycemic control
- achieving appropriate maternal weight gain
- maintaining or improving nutritional health status without ketosis
- supporting a healthy pregnancy and optimal growth and development for the baby.

For women with GDM, nutrition therapy is the first step in treating hyperglycemia, and nutrition counselling from a dietitian during pregnancy is recommended [Grade D, level 4].¹ Postpartum women with GDM should receive counselling about active living and healthy eating to reduce their risk of type 2 diabetes, cardiovascular disease,² and developing GDM in subsequent pregnancies. [Grade C, Level 3]²
For women with type 1 or type 2 diabetes, preconception planning and care during pregnancy from an interprofessional diabetes team, including a dietitian with expertise in diabetes and pregnancy, reduces the risk of adverse health outcomes for both mother and fetus. [Grade C, Level 3].

The term pre-existing diabetes used throughout this document refers to pregnant women with type 1 or type 2 diabetes.

The topics covered in this document are exclusive to diabetes in pregnancy. For general nutrition and pregnancy information, including women at risk of GDM, refer to Nutrition Guideline: Pregnancy.

Key Questions

**Diabetes in Pregnancy**
- What is gestational diabetes and how is it diagnosed?
- What do women with type 1 or type 2 diabetes require for preconception care?
- How can women with diabetes in pregnancy manage their blood glucose levels?

**Healthy Weight Gain**
- Why is a healthy weight gain during pregnancy important for women with diabetes?

**Healthy Eating to Manage Diabetes during Pregnancy**
- Why is healthy eating important for diabetes management during pregnancy?
- Why should pregnant women with diabetes eat regular meals?
- What types of snacks are recommended for pregnant women with diabetes?
- What should a woman just diagnosed with GDM know about the nutrition management of GDM?
- What are the special considerations for multiples in pregnancy for women with diabetes?

**Carbohydrates**
- What is the recommended carbohydrate intake for pregnant women with diabetes?
- Why is it important for pregnant women with diabetes to spread carbohydrate intake over the day?

**Fibre and Glycemic Index**
- Why is a high fibre and low glycemic index (GI) diet recommended for pregnant women with diabetes?

**Sugars and Sugar Substitutes**
- What sweeteners are safe for pregnant women with diabetes to use?

**Vitamins and Mineral Supplementation**
- What is the recommended amount of folic acid supplementation for pregnant women with diabetes prior to and during pregnancy?
- What vitamin and mineral supplements are recommended for pregnant women with diabetes?
- Do women with GDM require higher doses of vitamin D supplementation?
- Who is at higher risk of not meeting vitamin and mineral recommendations?

**Physical Activity**
- What type of physical activity is recommended for pregnant women with diabetes?
- What needs to be considered when recommending physical activity to women with diabetes in pregnancy?

**Breastfeeding and Postpartum Care**
- What are the benefits and risks of breastfeeding for women with diabetes or history of GDM?
- What information do women with GDM require about postpartum care and follow up?

**Resources**
- What information is available to provide to my patients about diabetes and pregnancy?
What is gestational diabetes and how is it diagnosed?

Gestational diabetes mellitus (GDM) refers to glucose intolerance with onset or first recognition during pregnancy. Diabetes Canada recommends all pregnant women not known to have pre-existing diabetes are screened for GDM through oral glucose challenge tests (GCT) between 24 and 28 weeks gestation.

The Diabetes Canada 2018 Clinical Practice Guideline Committee prefers a two-step approach (Table 1) for screening GDM.

Step 1: Use a 50-gram GCT administered in the non-fasting state with blood glucose (BG) measured one hour postprandial.
Step 2: If BG is between 7.8 to 11.0 mmol/L from the 50-gram GCT, then proceed with a 75-gram oral glucose tolerance test (OGTT)

<table>
<thead>
<tr>
<th>Test</th>
<th>Blood Glucose</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 g GCT</td>
<td>7.8 to 11.0 mmol/L at 1 hour postprandial</td>
<td>Considered a positive screen and will be an indication to proceed to the 75 g OGTT</td>
</tr>
<tr>
<td></td>
<td>≥11.1 mmol/L at 1 hour postprandial</td>
<td>Considered diagnostic of GDM and does not require a 75 g OGTT for confirmation</td>
</tr>
<tr>
<td>75 g OGTT</td>
<td>Fasting ≥ 5.3 mmol/L</td>
<td>Considered confirmation of GDM diagnosis if one or more BG values are attained</td>
</tr>
<tr>
<td></td>
<td>1 hour ≥ 10.6 mmol/L</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 hours ≥ 9.0 mmol/L</td>
<td></td>
</tr>
</tbody>
</table>

If multiple risk factors (see list below) for GDM or type 2 diabetes are present, screening should occur early in pregnancy and if negative, rescreening for GDM should occur at 24 to 28 weeks gestation.

Risk factors for GDM or Type 2 Diabetes

- previous diagnosis of GDM
- history of prediabetes
- age ≥35 years (for GDM); ≥40 years (for type 2 diabetes)
- BMI ≥30 kg/m²
- family history of type 2 diabetes
- polycystic ovarian syndrome (PCOS)
- acanthosis nigricans (darkened patches on the skin)
- corticosteroid use
- history of macrosomic infant (large for gestational age; > 4kg)
- member of a high-risk population (e.g. African, Arab, Asian, Hispanic, Indigenous, or South Asian descent)
What do women with type 1 or type 2 diabetes require for preconception care?

In women with pre-existing diabetes, preconception care is associated with better pregnancy outcomes. It is recommended that women with pre-existing diabetes considering pregnancy be referred to an interprofessional diabetes team including a registered dietitian. [Grade C, Level 3] Preconception nutrition care and education includes optimizing glycemic control, achieving a healthy body weight, and ensuring appropriate folic acid supplementation. Discontinuation of potentially harmful medications and screening for diabetes-related complications is also a part of medical care before conception in women with diabetes. 1

How can women with diabetes in pregnancy manage their blood glucose levels?

Frequent blood glucose monitoring is essential for guiding diabetes management therapy decisions to avoid hyper- and hypoglycemia during pregnancy.

Persistent hyperglycemia during pregnancy poses the following risks:

Mother
- Increased need for operative or caesarian birth
- Higher rates of preeclampsia
- Progression of retinopathy (in women with pre-existing diabetes)
- Development of metabolic syndrome and type 2 diabetes later in life (in women with GDM)

Fetus
- Malformation and spontaneous abortion (due to hyperglycemia in the first trimester in pre-existing diabetes)
- Fetal macrosomia and increased risk for infant shoulder dystocia during childbirth
- Neonatal metabolic instabilities including hypoglycemia and hyperbilirubinemia
- Stillbirth (increased risk for pre-existing diabetes and untreated GDM)

For women with GDM following guidelines for healthy eating in pregnancy, keeping active, and gaining an appropriate amount of weight according to their pre-pregnancy body mass index (BMI) will assist with blood glucose control and better pregnancy outcomes. According to the 2018 Diabetes Canada Clinical Practice Guidelines, if women with GDM do not achieve glycemic targets (see Table 2) within 1 to 2 weeks through lifestyle interventions, medication should be initiated. Insulin therapy is recommended as first-line therapy. [Grade A, Level 1] Metformin may also be used for glycemic management; however, women should be informed that metformin crosses the placenta, longer-term studies are not yet available, and the addition of insulin is necessary for approximately 40% of women who use metformin to achieve adequate glycemic control. Glyburide may be considered as a last resort in women whom do not tolerate metformin and refuse to take insulin.

Pregnancy is an opportune time to emphasize healthy eating and lifestyle habits that should persist after delivery to reduce the risk of developing type 2 diabetes later in life. If a woman with GDM requires medication, healthy eating to manage blood glucose and support a healthy pregnancy should continue to be reinforced.
For women with pre-existing type 1 or type 2 diabetes, it is very important prior to conception to obtain optimal glycemic control. A registered dietitian, as a part of an interprofessional team, can assist women with pre-existing diabetes to refine their carbohydrate counting skills, ensure the diet is supporting appropriate weight gain and fetal development, and assess for vitamin and mineral deficiencies, prior to and during pregnancy.

Blood glucose management is individualized in women with pre-existing diabetes, often through the use of intensive insulin therapy, to safely achieve blood glucose and A1C targets indicated in Table 2 and Table 3.1

Table 2. Recommended Target Blood Glucose Values during Pregnancy*¹

<table>
<thead>
<tr>
<th>Testing Time</th>
<th>Blood Glucose Targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fasting BG</td>
<td>&lt;5.3 mmol/L</td>
</tr>
<tr>
<td>1 hr postprandial</td>
<td>&lt;7.8 mmol/L</td>
</tr>
<tr>
<td>2 hrs postprandial</td>
<td>&lt;6.7mmol/L</td>
</tr>
</tbody>
</table>

*In some cases blood glucose targets may need to be increased due to the risk of severe hypoglycemia. [Grade D, consensus]³

Table 3. Recommended Target A1C for Women with Pre-existing Diabetes*¹

<table>
<thead>
<tr>
<th>Time</th>
<th>A1C Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-conception</td>
<td>≤ 7.0% (≤ 6.5% if possible⁴)</td>
</tr>
<tr>
<td>During pregnancy</td>
<td>≤ 6.5% (≤ 6.1% if possible ⁵)</td>
</tr>
</tbody>
</table>

*In some cases blood glucose targets may need to be increased due to the risk of severe hypoglycemia. [Grade D, consensus]³

⁴ Ideally lower A1C targets should be aimed for, especially during pregnancy, to reduce the risk of congenital malformations and stillbirth, but benefit must be weighed against the risk of hypoglycemia.

Healthy Weight Gain

Why is a healthy weight gain during pregnancy important for women with diabetes?

A healthy rate of weight gain during pregnancy is recommended for women with diabetes and is the same recommendation as for the general pregnant population.¹,¹⁸-²⁰ Excessive weight gain increases the risk of adverse neonatal outcomes, caesarean sections, large-for-gestational-age (LGA) babies, and retention of extra maternal weight after childbirth.¹⁹,²¹,²²

The recommended weight gain during pregnancy is based on the pre-pregnancy BMI. Table 4 provides the recommended weight gain during pregnancy for a singleton pregnancy.

For information about weight gain for women carrying multiples refer to Nutrition Guideline: Pregnancy: Multiples.
Table 5. Recommendations for Weight Gain During (singleton) Pregnancy

<table>
<thead>
<tr>
<th>Preconception BMI</th>
<th>Total Recommended Weight Gain Range During Pregnancy kg (lbs)</th>
<th>Recommended Weekly Rate Of Weight Gain In The 2nd And 3rd Trimesters* kg (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI &lt;18.5 Underweight</td>
<td>12.5 – 18 (28 – 40)</td>
<td>0.5 (1.1)</td>
</tr>
<tr>
<td>BMI 18.5 – 24.9 Normal</td>
<td>11.5 – 16 (25 – 35)</td>
<td>0.4 (0.9)</td>
</tr>
<tr>
<td>BMI 25.0 – 29.9 Overweight</td>
<td>7 – 11.5 (15 – 25)</td>
<td>0.3 (0.6)</td>
</tr>
<tr>
<td>BMI ≥30 Obese</td>
<td>5 – 9 (11 – 20)</td>
<td>0.2 (0.5)</td>
</tr>
</tbody>
</table>

* The above table assumes 1.1 – 4.4 lbs (0.5 – 2.0 kg) weight gain in the first trimester.

Weight loss during pregnancy is associated with babies born small for gestational age (SGA), and therefore, is not recommended. For women with both GDM and overweight or obesity, under the guidance of a registered dietitian, individualized nutrition care plans aimed to slow the rate of weight gain during pregnancy and achieve the low end of weight gain guidelines may reduce the risk of poor maternal and fetal outcomes.

Healthy Eating to Manage Diabetes during Pregnancy

Why is healthy eating important for diabetes management during pregnancy?

A primary goal of nutrition therapy for pregnant women with diabetes is optimal blood glucose management while encouraging adequate nutrition and weight gain and minimizing the risk of developing ketosis or hypoglycemia. No specific healthy dietary pattern has been identified as superior regarding maternal or newborn outcomes in women with GDM. A low glycemic index (GI) diet appears to provide some benefits compared to conventional nutrition therapy for maternal glycemic control. Best practice nutrition therapy for GDM promotes a high-quality diet through following a healthy eating pattern such as Canada’s Food Guide while emphasizing lower GI foods. Refer to the Fibre and Glycemic Index section for more information.

Nutrition therapy during pregnancy is an opportunity to encourage improved eating habits that should persist after delivery. Teaching positive lifestyle behaviours can potentially instill lifelong changes that may reduce the risk of future health problems associated with having GDM, type 1 or type 2 diabetes, and have the potential to positively influence off-springs’ eating habits and activity levels.

Restriction of dietary intake in an attempt to achieve blood glucose targets is not recommended in women with GDM. Over restriction can lead to starvation ketosis and potentially lead to negative consequences for the baby.

Why should pregnant women with diabetes eat regular meals?

It is recommended that timing and spacing of meals be individualized based on lifestyle preferences and treatment goals. Consuming meals that are consistent in carbohydrate and appropriately spaced over the day may help control blood glucose levels in people with GDM and type 2 diabetes.

In women with pre-existing diabetes taking mealtime insulin, matching insulin to carbohydrate intake (i.e. using insulin to carbohydrate ratio) or maintain consistency in carbohydrate intake to match mealtime insulin dose is best practice.
**What types of snacks are recommended for pregnant women with diabetes?**

For women with **GDM** consuming 2 or more snacks a day, that may include a bedtime snack, is recommended.\(^1\)\(^2\)\(^5\) This helps to distribute carbohydrate intake over the day. Examples of smaller and larger healthy snacks for pregnant women with diabetes are provided in Tables 5 and 6 respectively.

For women with **pre-existing diabetes** recommendations for snacking depends on insulin regime, glycemic control, and weight gain. Increased snacking compared to pre-pregnancy eating patterns may be required between meals and/or at bedtime to spread carbohydrate over the day and prevent hypoglycemia and development of overnight ketosis.

**Table 5 Examples of Healthy Snacks for Pregnant Women with Diabetes – Smaller Snacks**

<table>
<thead>
<tr>
<th>Smaller Snacks</th>
<th>15 g available* carbohydrate and 100 – 200 calories</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1 piece of fruit [e.g. apple, pear, orange, ½ banana, 1 cup (250 mL) blueberries, or 2 cups (500 mL) raspberries, blackberries or strawberries]</td>
<td>• ½ whole wheat pita, with 1 ounce (30 g cheese, vegetable sticks</td>
</tr>
<tr>
<td>• 3 cups (750 mL) of plain popcorn with 1 tsp (5 mL) non-hydrogenated margarine</td>
<td>• ¼ cup (60 mL) cottage cheese with ½ cup (125 ml) canned fruit, in water or own juice</td>
</tr>
<tr>
<td>• ¼ cup (60 mL) hummus with vegetable sticks; 2 to 3 whole grain crackers</td>
<td>• 1 slice whole grain bread, 1 boiled egg</td>
</tr>
</tbody>
</table>

* Available carbohydrate is calculated by subtracting the fibre and sugar alcohol content of a food portion from the total carbohydrate amount in the food portion.

For more information about snacking, carbohydrate counting and calculating available carbohydrate refer to **Nutrition Guideline: Adult Diabetes**.

**What should a woman just diagnosed with GDM know about the nutrition management of GDM?**

The diagnosis of GDM can be overwhelming for a woman. Ideally, women diagnosed with GDM are seen by a dietitian within one week of diagnosis and followed throughout the duration of their pregnancy.\(^1\)

As part of the initial education, it is recommended to encourage 3 moderate sized meals and 2 or more snacks daily.\(^1\) Balanced meals can be demonstrated using the Diabetes Healthy Plate Model shown in Figure 1 and used in Alberta Health Services diabetes nutrition education resource (refer to **Resources** section). Avoiding sugar-sweetened beverages and limiting or avoiding juice is also suggested. Hypocaloric or carbohydrate restriction below 175 grams per day is not recommended due to concerns regarding starvation ketosis and unknown effects to the baby.\(^1\)
What are the special considerations for pregnant women with diabetes carrying multiples?

Considerations for all women with multiples in pregnancy include appropriate weight gain and greater amounts of calories and nutrition to support fetal growth and development. These nutrition recommendations are the same for pregnant women with diabetes. Considerations for folic acid supplementation and carbohydrate distribution are still needed for pregnant women with diabetes as outlined in this nutrition guideline.

For more information about nutrition for women carrying multiples refer to Nutrition Guideline: Pregnancy: Multiples.

Carbohydrates

What is the recommended carbohydrate intake for pregnant women with diabetes?

Dietary carbohydrate includes sugar, starch, and fibre. Both sugar and starch are digested and absorbed into the body as glucose, which provides energy to the brain, muscles, and cells. In pregnancy, carbohydrates are important for fetal development and to prevent maternal ketosis. Major sources of carbohydrate include starchy vegetables, fruits, grain products, milk, yogurt, beans, lentils, and sugar (e.g. molasses, honey, and table sugar). Fibre is not digested and absorbed into the body, therefore, does not contribute to the glycemic load of the diet.

Carbohydrate intake is a major focus of nutrition therapy for diabetes in pregnancy due to the effect it has on postprandial blood glucose levels. Carbohydrate amount and distribution should be individualized based on clinical measurements such as weight gain and blood glucose levels. Although women can safely consume 45 to 60% of daily energy from carbohydrate, intake of carbohydrate at the upper end of this range may make postprandial blood glucose targets more difficult to achieve. A minimum of 175 g of carbohydrate per day is recommended for all pregnant women. This amount helps ensure adequate overall nutrition and prevention of ketosis. Very low carbohydrate diets with the purpose of inducing ketosis are neither recommended nor safe in pregnancy.
Why is it important for pregnant women to spread carbohydrate intake over the day?

A variety of carbohydrate foods need to be eaten daily to get enough calories (energy), fibre, vitamins and minerals in the diet. Due to the effect that carbohydrate-rich foods have on blood glucose levels, it is important to distribute carbohydrate foods evenly throughout the day in meals and snacks.

For women with GDM distributing carbohydrate into 3 small-to-moderate sized meals and 2 or more snacks is encouraged and should be individualized to treatment goals (see example pattern in Table 7). If a woman observes elevated breakfast postprandial blood glucose, she may benefit from consuming less carbohydrate or choosing lower glycemic index and higher fibre carbohydrate-containing foods at breakfast.

Table 7. Example Meal Pattern Providing at Least 175 g Carbohydrate Distributed Over the Day as 3 Meals and 2 or More Snacks Per Day.

<table>
<thead>
<tr>
<th>Meal</th>
<th>Breakfast</th>
<th>Snack*</th>
<th>Lunch</th>
<th>Snack*</th>
<th>Supper</th>
<th>Snack*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrate Choice</td>
<td>3</td>
<td>0–2</td>
<td>3–4</td>
<td>0–2</td>
<td>3–4</td>
<td>0–2</td>
</tr>
<tr>
<td>(15 g per choice)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbohydrate Grams</td>
<td>45 g</td>
<td>0–30 g</td>
<td>45–60 g</td>
<td>0–30 g</td>
<td>45–60 g</td>
<td>0–30 g</td>
</tr>
</tbody>
</table>

*Include 2 or more snacks per day based on individualized treatment goals. See Tables 5 and 6 for snack examples.

For more information about counting carbohydrates and carbohydrate choices refer to Nutrition Guideline: Adult Diabetes.

Fibre and Glycemic Index

Why is a high fibre and low glycemic index (GI) diet recommended for pregnant women with diabetes?

A high fibre diet of 30 to 50 grams per day is recommended for all adults with diabetes to assist with blood glucose control and reduce the risk of cardiovascular disease. This is higher than the general population and the 28 grams recommended for pregnant women. A high fibre diet (e.g. 30 grams per day) and drinking adequate fluid (approximately 9 cups) can help prevent and manage constipation that is typically experienced during pregnancy.

For more information, refer to Nutrition Guideline: Pregnancy.

The glycemic index (GI) is an evaluation of a carbohydrate-containing foods ability to raise blood glucose. Choosing low GI foods (55 or less) over high GI foods (70 or more) most often is recommended for all people with diabetes.

For more information, refer to Nutrition Guideline: Adult Diabetes.

In women with GDM choosing high fibre and low GI carbohydrate-containing foods most often may have beneficial effects on postprandial blood glucose, delay the need to initiate insulin, and reduce the risk of macrosomia and babies that are large for gestational age. Table 8 provides examples of carbohydrate-containing foods that are higher fibre and lower GI. These foods can be offered as alternatives to lower fibre and higher GI foods such as refined and white grain products (breads, cereals, etc.), fruit juices, and high sugar snack foods.
Table 8. Examples of High Fibre*, Low, and Medium Glycemic Index Foods\textsuperscript{36}

<table>
<thead>
<tr>
<th>Low Glycemic Index (55 or less)</th>
<th>Medium Glycemic Index (56 to 69)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grains, Breads and Cereals</strong></td>
<td><strong>Starchy Vegetables</strong></td>
</tr>
<tr>
<td>bread: spelt, heavy mixed grain</td>
<td>peas</td>
</tr>
<tr>
<td>barley</td>
<td>chickpeas</td>
</tr>
<tr>
<td>bulgur</td>
<td>kidney beans</td>
</tr>
<tr>
<td>oat bran</td>
<td>lentils</td>
</tr>
<tr>
<td>oats: steel cut</td>
<td>split peas</td>
</tr>
<tr>
<td>pasta: whole wheat, al dente/firm</td>
<td>soybeans/edamame</td>
</tr>
<tr>
<td>quinoa</td>
<td>sweet potato</td>
</tr>
<tr>
<td>tortilla: whole grain</td>
<td></td>
</tr>
</tbody>
</table>

*Bread: pumpernickel, rye, whole grain, stone ground whole wheat oats: large flake, quick, instant rice: brown or wild rye crisp crackers

All foods listed have at least 2 grams of fibre per carbohydrate food choice (15 g available carbohydrate)

For more information, refer to Nutrition Guidelines: Adult Diabetes, Fibre

What sweeteners are safe for pregnant women with diabetes to use?

Moderation is encouraged when consuming or recommending products sweetened with added sugars or sugar substitutes.\textsuperscript{40}

**Added sugar** recommendations for pregnant women with diabetes are the same as with other types of diabetes and should be limited, especially in the form of sugar-sweetened beverages such as regular pop and speciality coffees.\textsuperscript{32}

**Sugar substitutes** may be present in beverages, tabletop sweeteners, “diet” products, baking, desserts, spreads, salad dressings, and chewing gums. Sugar substitutes may help women with GDM or pre-existing diabetes maintain glycemic control while still enjoying other foods that could otherwise be high in added sugar. Moderate use of sugar substitutes (Table 9) during pregnancy is considered safe.\textsuperscript{40} Excessive consumption of products containing sugar substitutes should be avoided since such foods could replace nutrient dense, energy-yielding foods.\textsuperscript{40}

Table 9. Sugar Substitutes and Common Brands\textsuperscript{41}

<table>
<thead>
<tr>
<th>Safe in Moderate Amounts</th>
<th>Not Recommended in Pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspartame (Nutrasweet\textsuperscript{a}, Equal\textsuperscript{a})</td>
<td>*Cyclamates (Sucaryl\textsuperscript{a}, Sugar Twin\textsuperscript{a}, Sweet N’Low\textsuperscript{a}, Weight Watchers\textsuperscript{a} Table-Top Sweetener)</td>
</tr>
<tr>
<td>Sucralose (Splenda\textsuperscript{a})</td>
<td></td>
</tr>
<tr>
<td>Acesulfame Potassium (Ace-K or Sunett\textsuperscript{a})</td>
<td></td>
</tr>
<tr>
<td>Saccharin (Hermesetas\textsuperscript{a})</td>
<td></td>
</tr>
<tr>
<td>Stevia</td>
<td></td>
</tr>
</tbody>
</table>
*Cyclamates:

- Alberta Health Services Nutrition Services does not recommend the use of cyclamates for pregnant or lactating women due to unknown risks associated with consumption above moderate levels (more than about 2 to 3 packages per day). The Canadian Food Inspection Agency requires a statement that the sweetener should be used only on the advice of a physician.\(^4\)

- Diabetes Canada’s resource *Sugars and Sweeteners* indicates cyclamates are “safe in pregnancy” but recommend caution in exceeding the acceptable daily intake (ADI). As an example, a woman needs to limit her intake to 2 packages of Sugar Twin\(^®\) containing cyclamate per day to remain within this recommendation.\(^4\)

Sugar alcohols (polyols) have little to no effect on blood glucose. Dosing rapid insulin to sugar alcohol content of food is not recommended. For women who are carbohydrate counting and dosing their insulin accordingly, sugar alcohols should be subtracted from the total carbohydrate amount.\(^3\)

Refer to *Nutrition Guidelines: Adult Diabetes, Pregnancy, Food and Drinks High in Calories, Fat, Sugar or Salt*

### Vitamins and Mineral Supplementation

**What is the recommended amount of folic acid supplementation for pregnant women with diabetes prior to and during pregnancy?**

The amount of folic acid consumed prior to pregnancy and in the early stages of pregnancy plays a role in preventing neural tube defects (NTD) and is associated with preventing other congenital abnormalities.\(^4\)

**Women with pre-existing diabetes** are at moderate risk of having a pregnancy complicated by NTD.\(^4\) Table 10 provides recommendations for folic acid supplementation doses for women with pre-existing diabetes prior to, during, and after pregnancy.

**Table 10. Folic acid supplementation doses for women with pre-existing diabetes.\(^1,4\)**

<table>
<thead>
<tr>
<th>For women with Pre-existing Diabetes (Type 1 and Type 2)</th>
<th>Daily Folic Acid Supplementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>At least 3 months before pregnancy, and for the first 3 months of pregnancy</td>
<td>1.0 mg (1000 mcg) in a multivitamin</td>
</tr>
<tr>
<td>For the last 6 months of pregnancy and as long as breastfeeding continues</td>
<td>0.4 – 1.0 mg (400 – 1000 mcg) in a multivitamin</td>
</tr>
</tbody>
</table>

**Women with GDM** can follow the same folic acid supplementation recommendations for women without diabetes, which is 0.4 mg daily as a part of a multivitamin before, during, and after pregnancy.\(^4\)

Larger doses of folic acid supplementation are generally not recommended due to lack of studies to support this and concerns about risks associated with higher doses of folic acid.\(^4\) Women with pre-existing diabetes and obesity, or previous bariatric surgery may require higher folic acid supplementation due to poor dietary intake and lower serum folate levels.\(^1\)
What vitamin and mineral supplements are recommended for pregnant women with diabetes?

Aside from the above mentioned folic acid supplementation, pregnant women with diabetes have the same vitamin and mineral requirements as pregnant women without diabetes. All pregnant women are encouraged to eat a well-balanced diet as recommended by Canada’s Food Guide to meet their nutrition needs. A daily multivitamin is recommended to provide 16 – 20 mg of iron, 0.4 mg (400 mcg) folic acid, some vitamin B12, and a minimum of 400 international units (IU) of vitamin D daily. Ideally, vitamin supplementation is initiated at least 3 months prior to pregnancy to ensure adequate amount of folic acid intake and continues throughout pregnancy and as long as the women is breastfeeding.

Refer to Nutrition Guideline: Pregnancy

Do women with GDM require higher doses of vitamin D supplementation?

An association between GDM and low vitamin D status has been observed; however, the causality of this relationship is unclear. Until further research is established, the general pregnancy recommendations from the Institute of Medicine (IOM) and Alberta Health Services – Nutrition Services are:

- The IOM’s recommended daily allowance (RDA) of vitamin D is 600 IU/day for all pregnant and lactating women.
- The 2004 Canadian Consumer Health Survey estimates a mean vitamin D intake from food alone to be 156 IU/day for people aged 19 – 30 and 208 IU/day for people aged 31 – 50. Therefore, dietary intake is not usually adequate to meet the RDA.
- All women in their childbearing years, including pregnant and lactating women, should take a multivitamin containing a minimum of 400 IU/day of vitamin D.
- Total vitamin D intake from food and supplements should not exceed the upper limit of 4,000 IU/day without medical supervision.

Who is at higher risk of not meeting vitamin and mineral recommendations?

Supplementation recommendations may be especially important in women who:
- do not typically consume a nutritionally adequate diet.
- are vegetarian and/or vegan.
- suffer from a prolonged period of severe nausea or vomiting.
- are at high risk for nutritional deficiencies: women carrying multiples, heavy cigarette smokers, or abuse alcohol and/or drugs.

Some women may not tolerate vitamin and mineral supplementation. Individual advice regarding nutrients of risk may be required. A registered dietitian may assist with these concerns.

Refer to Nutrition Guideline: Pregnancy
Physical Activity

What physical activity is recommended for pregnant women with diabetes?

The 2018 Diabetes Canada Clinical Practice Guidelines acknowledge that physical activity, in addition to a healthy diet, can improve blood glucose levels and assist with appropriate weight gain, and may result in lower rates of large-for-gestational-age births and pre-eclampsia in women with GDM.\(^{28,29,50}\)

Unless there is a contraindication to activity, pregnant women with diabetes can be encouraged to participate in physical activity most days of the week to support glycemic control.\(^{29,51}\) Physical activity should be individualized to the person’s activity tolerance and preferences and balanced with considerations of the obstetric risks.\(^{28,51}\)

Refer to Nutrition Guideline: Physical Activity and the Healthy Parents Healthy Children website for more information about physical activity during pregnancy. [http://www.healthyparentshealthychildren.ca](http://www.healthyparentshealthychildren.ca)

What needs to be considered when recommending physical activity to women with diabetes in pregnancy?

Physical activity can lower blood glucose, and therefore, provides both benefits and risks.

- **In women with GDM**, physical activity may be helpful in managing the hyperglycemic effects of the meal.\(^ {52}\)
- **In women treated with insulin**, there is a higher risk of hypoglycemia due to exercise.\(^ {53}\) Strategies to reduce hypoglycemia risk, such as reducing insulin dose(s) or increasing carbohydrate intake, should be discussed with the patient. Frequent blood glucose monitoring is important to determine required adjustments based on blood glucose variations.

Absolute contraindications to physical activity may include:\(^{51,54}\)

- Uncontrolled type 1 diabetes
- Pregnancy-induced hypertension
- Premature rupture of the membranes
- Intrauterine growth retardation
- Avoidance after 28 weeks gestation if preterm labour or history of preterm labour
- Incompetent cervix/cervical cerclage
- Persistent 2nd and 3rd trimester bleeding
- Carrying three or more fetuses
- Serious cardiovascular, respiratory, or systemic disorders

Other contraindications to physical activity may include:\(^{51,54}\)

- Previous spontaneous abortion
- Previous preterm birth
- Mild/moderate cardiovascular disorder
- Mild/moderate respiratory disorder
- Anemia
- Malnutrition or eating disorder
- Avoid after 28 weeks gestation with multiples
- Other significant medical conditions
The PARmed-X for Pregnancy is a screening tool developed by the Canadian Society for Exercise Physiology and endorsed by the Society of Obstetricians and Gynaecologists of Canada and Health Canada. It is available at http://www.csep.ca/CMFiles/publications/parg/parmed-xpreg.pdf.

If contraindications for exercise are unclear, consult with the patient’s physician, obstetrician, or another prenatal provider (nurse practitioner or midwife) regarding advice about what physical activity type, intensity, frequency, and duration is safe for the patient.

Refer to Nutrition Guideline: Pregnancy

Breastfeeding and Postpartum Care

What are the benefits and risks of breastfeeding for women with diabetes or history of GDM?

There are many well-established benefits of breastfeeding, and for women with diabetes or a history of GDM, breastfeeding provides additional benefits:\(^5^5\)

- Breastfeeding immediately after birth can prevent neonatal hypoglycemia [Grade D, Consensus for GDM; Grade C, Level 3 for pre-existing].\(^1\)
- Longer term benefits of breastfeeding include reducing the infant's risk for developing obesity [Grade C, Level 3] and diabetes later in life [Grade D, Level 4 for GDM; Grade C, Level 3 for pre-existing].\(^1\)
- For women with GDM, breastfeeding can reduce the risk of hypertension and future development of type 2 diabetes [Grade C, Level 3].\(^1\)

Health Canada recommends that women be encouraged to breastfeed their baby exclusively for at least six months after birth and for 2 years or longer.\(^5^5\) Diabetes Canada encourages women with GDM to breastfeed “immediately after delivery and for at least 4 months postpartum”.\(^1\) It is important that healthcare providers be sensitive to women who may not be able to breastfeed and provide support when possible.

The mother’s consumption of adequate protein, carbohydrates and fluid is important to support breastfeeding, as these requirements are higher than during pregnancy and compared to the needs of women who are not breastfeeding.\(^3^5\)

Women with diabetes who take insulin post-pregnancy are at risk of hypoglycemia due to breastfeeding and sudden drop in insulin requirements postpartum. These women require education regarding this risk and guidance about insulin dose adjustments and/or additional carbohydrate intake that may be needed.\(^5^6,5^7\)

What information do women with GDM require about postpartum care and follow up?

Having GDM increases a woman’s risk of developing pre-diabetes or type 2 diabetes later in life;\(^1\) therefore, these women should be encouraged and supported to adopt lifelong healthy eating and active living behaviours to reduce their long-term health risks.

A 75-gram oral glucose tolerance screening test (OGTT) between 6 weeks and 6 months postpartum is recommended for all women with GDM. [Grade D, consensus].\(^3^6\) The uptake of postpartum screening and follow-up are poor, and healthcare providers can play an important role in endorsing appropriate screening and timely treatment of metabolic abnormalities.\(^5^8\)
Women with a history of GDM have a high risk of developing GDM in future pregnancies, therefore, they should be advised to obtain preconception care prior to future pregnancies. Diabetes Canada recommends lifelong glucose screening for metabolic abnormalities at intervals of at least every 3 years for all people at risk of developing type 2 diabetes, including women with a history of GDM.

Refer to Nutrition Guidelines: Prediabetes, Adult Diabetes, Adult Weight Management, Breastfeeding

Options to obtain more information about nutrition and diabetes in pregnancy include:
1. Consult with a dietitian in your area.
2. Refer to approved provincial Alberta Health Services diabetes nutrition handouts to support patient education. Information on Alberta Health Services website can be found here [https://www.albertahealthservices.ca/nutrition/Page11115.aspx](https://www.albertahealthservices.ca/nutrition/Page11115.aspx)
   For more information, contact Nutrition.Resources@albertahealthservices.ca
3. Refer to the Diabetes Canada website at [www.diabetes.ca](http://www.diabetes.ca)

Nutrition Guidelines

Access to referenced Nutrition Guidelines can be found at: [https://www.albertahealthservices.ca/info/Page3505.aspx](https://www.albertahealthservices.ca/info/Page3505.aspx)

Online Resources

- Diabetes Canada: [www.diabetes.ca](http://www.diabetes.ca)
- Healthy Eating Starts Here: Healthy Eating Resources [https://www.albertahealthservices.ca/nutrition/Page11115.aspx](https://www.albertahealthservices.ca/nutrition/Page11115.aspx)
- Healthy Parents Healthy Children: [http://www.healthyparentshealthychildren.ca/](http://www.healthyparentshealthychildren.ca/)
- Glycemic Index: [www.glycemicindex.com](http://www.glycemicindex.com)
- Canadian Physical Activity Guidelines: [www.csep.ca/guidelines](http://www.csep.ca/guidelines)
References


Nutrition Guideline
Diabetes in Pregnancy
Applicable to: Nurses, Physicians and Other Health Professionals


