Introduction

The purpose of this Nutrition Guideline (NG) is to provide care providers with an overview of the evidence-based nutrition recommendations for individuals who are pregnant and provide answers to commonly asked questions (See <u>Key Questions List</u>).

In North America, it is estimated that approximately half of pregnancies are unplanned.¹ It is recommended that all people who could become pregnant maintain good nutrition. Pregnancy is a critical period in a person's life that can influence the short and long-term health of both the parent and infant.

The health benefits of good nutrition intake during pregnancy include reducing the risk of:

- neural tube defects²
- low-birth-weight infants, small for gestational age infants, and preterm births²
- chronic health problems in both the parent and child³

The NG was developed by the Nutrition Services Public Health Provincial Target Population Reproductive Health Working Group and is based on scientific evidence and best practice. It was reviewed by health professionals across the province. If you have questions about this NG, please contact publichealth.nutrition@ahs.ca.

This information is intended as a general resource only and is not meant to replace the medical counsel of a physician or individual consultation with a registered dietitian (RD). It is the responsibility of care providers to evaluate the situation of each client in their care and apply the NG appropriately. Individuals who are at high risk of malnutrition or who have a medical condition that is impacted by nutrition should be referred to an RD.

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Revised January 2024



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Scope of this Guideline

The scope of this guideline covers the following:

- individuals who could become pregnant
- individuals pregnant with singletons
- all ages of people who are pregnant, including adolescents

Additional information for the following specific populations may be found here:

- <u>Nutrition Guideline: Diabetes in Pregnancy</u>
- Nutrition Guideline: Pregnancy: Multiples

Referral to a Registered Dietitian

For more information on referral to an RD and RD services available in Alberta Health Services (AHS), visit Referring Clients for Nutrition Services

Note: For purposes of this Nutrition Guideline, the single term client will be used to refer to clients, patients, and residents.

Inclusive Language

Some expectant parents may not identify as women or as female but as male, non-binary, or gender diverse. In all circumstances, care providers shall utilize client and family-centred care to be responsive to the individual context, self-identified gender, pronouns, and preferred terminology of the families they support.

The language used within this NG is based on the Academy of Breastfeeding Medicine Position Statement⁴ and AHS Best Practices.⁵ A variety of terms are used for accuracy and clarity.

- non-gendered terms (e.g., person, individual) are used, when possible, to be inclusive.
- gendered terms (e.g., female, woman) used in the source being cited, are noted throughout by "α", and replaced with inclusive language, where appropriate, and align with the greater body of scientific evidence.

Recommendations

- Individuals who could become pregnant are encouraged to:
 - eat a variety of food every day and make healthy eating and physical activity part of everyday life.
 - take a multivitamin supplement that contains 0.4 mg (400 mcg) folic acid every day.
 It is recommended to start supplementation at a minimum of three months before conception.
 - maintain a healthy body weight before and between pregnancies.
- During pregnancy, individuals are advised to:
 - eat a variety of foods and follow Canada's food guide.
 - include additional foods every day in the second and third trimesters of pregnancy in amounts appropriate to meet healthy pregnancy weight gain recommendations for their pre-gravid body mass index (BMI) category.
 - take a multivitamin. Health Canada recommends taking a multivitamin with folic acid (0.4 mg), iron (16–20 mg), vitamin D (400 International Units [IU]) and vitamin B₁₂ every day. These exact amounts can be hard to find. When assisting an individual who is pregnant in choosing a multivitamin, look for this information on the label as these levels are safe:
 - Iron: between 16–27 mg
 - Vitamin D: at least 400 IU (10 mcg)
 - Folic acid (folate): between 0.4–1 mg (400–1000 mcg)
 - Vitamin B₁₂: 2.6 mcg
 - follow safe food handling practices and avoid foods that increase the chances of getting a food-borne illness during pregnancy.
 - o limit caffeine intake to 300 mg/day.
 - o drink 10 cups (2.5 L) fluid each day. Water is recommended as the main fluid.
- Care providers are advised to offer individuals who are pregnant nutrition information that will help them make informed choices about:
 - healthy pregnancy weight gain.
 - nutrients of special concern during pregnancy (e.g. folic acid, iron, calcium).
 - nutrient supplements.
 - beverage and fluid choices.
 - general food safety and food items to limit or avoid during pregnancy.
 - managing common discomforts of pregnancy (e.g. nausea and vomiting of pregnancy).

Referral for nutrition assessment/counselling by an RD is appropriate for people who:

- are adolescents.
- are pregnant with twins, triplets, or higher-order multiples.
- previously had a low-birth-weight infant.
- had a low pre-pregnancy BMI.
- have a poor weight gain in the second or third trimester.
- have a nutrition-related health condition, such as inflammatory bowel disease (IBD), post-bariatric surgery, celiac disease, gestational diabetes, and pre-eclampsia.

Definitions

Congenital anomalies: Anomalies, either structural or functional (e.g. metabolic disorders) that occur during gestation. Also known as birth defects, congenital disorders, or congenital malformations.⁶

Cultural competence: The ability of health care systems and practitioners to provide highquality, safe, client-centred care to clients with a wide range of unique values, beliefs and behaviours.⁷

Fortified: Fortification refers to "the addition of one or more vitamins or minerals to a food product".⁸

Gestational hypertension: First onset of hypertension after 20 weeks gestation (diastolic blood pressure greater than 90 mm Hg or systolic blood pressure greater than 140 mm Hg).⁹⁻¹¹

Herbal teas: These are beverages made with fresh or dried flowers, leaves, seeds, or roots from different kinds of plants. Climate, growing conditions, storage conditions, and processing (e.g. extraction and drying) can influence the content and concentration.¹²

Intrauterine growth restriction (IUGR): Fetus with an estimated fetal weight less than the 10th percentile on ultrasound, that, because of a pathological process, has not attained its biologically determined growth potential.¹³

Large for gestational age (LGA): Weight above the 90th percentile for gestational age.¹⁴

Low birth weight (LBW): A baby that weighs less than 2500 g at birth. A baby may weigh less than 2500 g at birth because it is born too soon or because it is small for its gestational age.¹⁵

Miscarriage: Loss of a pregnancy before fetal viability.¹⁶ Fetuses that die in utero before 20 weeks gestation are categorized as miscarriages.¹⁷

Multivitamin supplement: Terminology used to describe a supplement containing multiple vitamins and minerals. The terminology 'prenatal multivitamin' is not used due to the wide variation in supplements available for people who are pregnant.

Natural product number (NPN): An 8-digit numerical code assigned to each natural health product approved to be marketed under the Natural Health Products Regulations.¹⁸

Neonatal death: Infant death within the first 27 days of life.¹⁹

Nutrient-dense: Relatively rich in nutrients for the number of calories the food contains.

Perinatal: The perinatal period commences at 22 completed weeks (154 days) of gestation and ends 7 completed days after birth.¹⁵

Phytates: Antioxidant compounds found in whole grains, legumes, nuts, and seeds. Phytates can bind to dietary minerals iron, zinc, manganese and, to a lesser extent calcium, and slow their absorption.²⁰

Plant-based beverage: A beverage made from plant bases such as soy, rice, almond, etc.²¹

Preterm birth: Defined as birth before 37 weeks of gestation.¹⁶

Pre-eclampsia: Hypertension that develops during gestation with proteinuria and/or one or more adverse conditions or severe complications (e.g. symptoms, signs of end-organ dysfunction, and/or abnormal laboratory testing on a person who is pregnant, fetal morbidity).^{11,22,23}

Pre-existing hypertension: High blood pressure that develops either pre-pregnancy or at less than 20 weeks gestation.⁹⁻¹¹

Probiotics: Live microorganisms (bacteria or yeast) that, when administered in adequate amounts, confer a health benefit on the host.²⁴ Probiotics are labelled by genus, species, and strain.

Regular teas: These are beverages made from the shrub Camellia sinensis. Some examples of teas are: black, white, green, oolong, jasmine, Formosa, Ceylon, India, and Darjeeling.²⁵

Small for gestational age (SGA): Weight below 10th percentile for gestational age.¹

Spontaneous abortion: A clinically recognized pregnancy loss before the 20th week of gestation. Also known as miscarriage.²⁶

Stillbirth: The term used to describe fetal deaths at 20 weeks gestation or more.¹⁷ The World Health Organization defines stillbirth as at or after 28 weeks gestation.²⁷

Very-low birth weight: Birth weight less than 1500 g (up to and including 1499 g), regardless of gestational age.²⁸

Key Questions List

Key nutrition questions related to pregnancy that are addressed in this NG are listed below.

Weight Gain During Pregnancy

- How does weight affect pregnancy outcomes?
- How much weight gain is appropriate during pregnancy?
- Is weight loss ever recommended during pregnancy?

Healthy Eating During Pregnancy

- Do people need to eat more during pregnancy?
- What nutrients are important during pregnancy?
 - Folic acid
 - Calcium and vitamin D
 - \circ Iron
 - Omega-3 fatty acids
 - Choline and iodine

Vegetarian Eating Patterns During Pregnancy

• Are there any extra considerations for vegetarian eating patterns?

Nutrient Supplements During Pregnancy

- What are the recommendations for a multivitamin supplement for pregnancy?
- What is the difference between a multivitamin and a 'prenatal vitamin'?
- Are there benefits of taking a multivitamin compared to single-nutrient supplements?
- What if an individual who is pregnant requires higher amounts of iron or folic acid?

Other Nutrient Supplements

- Is the use of Lucky Iron Fish[™] recommended to improve iron status during pregnancy?
- What advice can be given about omega-3 fatty acid supplements during pregnancy?
- Are protein supplements required during pregnancy?
- What is the concern with vitamin A supplements in pregnancy?
- What about the use of other supplements during pregnancy?

Beverage and Fluid Intake During Pregnancy

- How much fluid is needed during pregnancy?
- What are plant-based beverages and are they a nutritious choice during pregnancy?
- What is considered a safe intake of caffeine during pregnancy?
- What is the recommendation for caffeinated energy drinks during pregnancy?
- Are sugary drinks recommended during pregnancy?
- What herbal teas are considered safe to consume during pregnancy?
- Are nutrition supplement drinks needed during pregnancy?

Food Safety During Pregnancy

- Why is foodborne illness a concern during pregnancy?
- What is the best way to reduce the risk of foodborne illness during pregnancy?
- What foods are people advised to avoid during pregnancy and are there safer alternatives?
- Is it safe to consume fish during pregnancy?
- What are the food safety concerns with cheese and what are safe cheese choices?
- What are other food-related safety considerations?

Common Discomforts of Pregnancy Considerations

- Nausea and vomiting what can be done during pregnancy?
- Constipation what can be done during pregnancy?
- Heartburn what can be done during pregnancy?

Health Condition Considerations in Pregnancy

- Are there special nutrition considerations regarding diabetes in pregnancy?
- Are there nutrition considerations for hypertensive disorders of pregnancy?
- Are there recommended foods to avoid or eat during pregnancy to prevent infant allergies?

Adolescent Pregnancy

- What are the nutrients of concern for pregnancy during adolescence?
- What are the recommendations for gestational weight gain in adolescents?

Substance Use During Pregnancy

- Is it safe to consume alcohol during pregnancy?
- Is it safe to consume cannabis during pregnancy?

Physical Activity During Pregnancy

• What needs to be considered when discussing physical activity during pregnancy?

Other Special Considerations

- Are there special considerations when working with individuals with culturally diverse backgrounds?
- What are other important considerations when working with any individual?

Referral to a Registered Dietitian

• When is a referral to a registered dietitian recommended?

Resources

- What resources are available for professionals?
- What resources are available for the public?

Answers to Key Questions

Weight Gain During Pregnancy

Return to Key Questions

How does weight affect pregnancy outcomes?

Weight gain is a normal and important part of a healthy pregnancy.²⁹ Appropriate weight gain during pregnancy reduces the risk of complications while pregnant and at delivery and promotes the long-term health of both parent and child.¹

An individual who does not gain enough weight during pregnancy is at greater risk of having a low birth weight baby and is also at increased risk of preterm delivery.¹ Dieting and weight loss are not recommended during pregnancy.^{29,30}

Studies conducted in Alberta on individuals^{\alpha} who are pregnant have documented that approximately half (49%) of the study participants gained weight above guidelines.³¹ Excessive weight gain can be concerning in pregnancy. People who gain excessive amounts of weight are at increased risk for pre-eclampsia, gestational diabetes, preterm delivery, cesarean section delivery, and retaining extra weight after delivery.¹ Parental obesity and excessive weight gain during pregnancy are also associated with large-for-gestational-age infants.¹ These infants are at increased risk for childhood obesity.¹

How much weight gain is appropriate during pregnancy?

As early in pregnancy as possible, assess pre-pregnancy body mass index (BMI) and provide an individualized weight gain recommendation based on Health Canada guidelines.¹ Appropriate range of weight gain differs between categories of pre-pregnancy BMI, as outlined in <u>Table 1</u>.¹ Minimal weight gain is required in the first trimester of pregnancy for singleton pregnancies, only 0.5–2.2 kg (1.1–4.4 lbs). The average weekly rate of weight gain for the second and third trimesters ranges from 0.2–0.5 kg/week (0.5–1.1 lbs/week) depending on the individual's pre-pregnancy BMI category.

Monitor weight gain and review progress with clients regularly to help them gain within their target range.^{1,32} AHS has <u>pregnancy weight gain graphs for singletons</u> that can be used for monitoring weight gain.

Pre-pregnancy BMI	Recommended Range of Total Weight Gain During Pregnancy		Average Weekly Rate of Weight Gain in Second	
	Kilograms (kg)	Pounds (lbs)	and Third Trimesters	
Underweight BMI less than 18.5 kg/m²	12.5-18	28-40	0.5 kg (1.1 lbs)	
Normal weight BMI 18.5–24.9 kg/m²	11.5–16	25-35	0.4 kg (0.9 lbs)	
Overweight BMI 25.0–29.9 kg/m²	7-11.5	15-25	0.3 kg (0.6 lbs)	
Obese BMI greater than or equal to 30 kg/m²	5-9	11–20	0.2 kg (0.5 lbs)	

Table 1. Canadian Gestational Weight Gain Recommendations for Singletons

Source: Table S 1, New Recommendations for Total and Rate of Weight Gain during Pregnancy, by Pre-pregnancy BMI, Weight Gain During Pregnancy: Re-examining the Guidelines. Institute of Medicine (US) and National Research Council (US) Committee to Reexamine IOM Pregnancy Weight Guidelines; Rasmussen KM, Yaktine AL, 2009³²

Further assessment and follow-up is warranted for individuals who are gaining weight outside of the recommendations.¹ Encourage clients to identify and implement practical, sustainable healthy behaviours to meet weight gain recommendations.¹ Consider the social determinants of health when counselling clients as these can impact weight gain in pregnancy.¹ Individuals who have already surpassed the recommended weight gain can be encouraged to continue gaining weight at the appropriate rate of gain according to their pre-pregnancy BMI.²⁹ Individuals who are gaining too much or not enough weight in pregnancy can be referred to an RD for assessment and counselling.²⁹

See also: <u>When is a referral to a registered dietitian recommended?</u> What resources are available for healthcare providers?

For related Nutrition Guidelines see: Nutrition Guideline: Pregnancy: Multiples

Is weight loss ever recommended during pregnancy?

Weight loss during pregnancy is not recommended for people in any pre-pregnancy BMI category, including individuals who have a high pre-pregnancy BMI. Individuals in the BMI category greater than or equal to 30 before pregnancy who experience weight loss during pregnancy are at increased odds of delivering small-for-gestational-age (SGA) infants.¹ It is recommended that people follow a weekly rate of weight gain according to their pre-pregnancy BMI.²⁹

Healthy Eating During Pregnancy

Return to Key Questions

Do people need to eat more food during pregnancy?

People only need modest increases in calories during pregnancy to support their baby's growth and development. In the first trimester, no additional calories are required for most individuals.

Additional food is recommended for individuals of any pre-pregnancy BMI category in the second and third trimesters. Individuals with a pre-pregnancy BMI between 18.5–24.9 kg/m² will require additional energy requirements of approximately 350 calories for the second trimester and 450 calories for the third trimester.³³ Advise clients that this is a small amount of additional food, equivalent to a large snack or a small meal. The examples below demonstrate 350–450 calories from a variety of healthy food choices.

Example 1:

fruit parfait containing yogurt (175 g or ³/₄ cup) with chopped walnuts (30 mL or 2 Tbsp.) and sliced banana (125 mL or ¹/₂ cup) will provide about 350 calories

Example 2:

salmon salad containing canned salmon (75 g or 2.5 oz) with mayonnaise (15 mL or 1 Tbsp.) on whole grain crackers (6 crackers) and 2% milk (250 mL or 1 cup) and a pear (one medium) will provide about 450 calories

Additional examples of appropriate snacks to meet additional food requirements are available from <u>Healthy Parents, Healthy Children.</u>

Note that individual energy requirements will vary based on age, pre-pregnancy BMI, and activity level. Individuals with a pre-pregnancy BMI less than 18.5 kg/m² may require additional food to meet weight gain recommendations. Individuals with a pre-pregnancy BMI less than or equal to 25 kg/m² may require less additional food to meet their recommended weekly and total weight gain targets. Consider recommending individual consultation with an RD if there is concern about caloric intake and food choices.

See also:

How much weight gain is appropriate during pregnancy? When is a referral to a registered dietitian recommended?

Nutrition Guideline

What nutrients are important during pregnancy?

Pregnancy is a period of accretion of certain tissues including the uterus, breast or chest, blood, extravascular fluids, and fat stores, as well as the development of the fetus and placenta.¹ The recommendations for many nutrients are higher during pregnancy.¹

The following table summarizes key nutrients of special concern during pregnancy. These nutrients include calcium, vitamin D, iron, vitamin A, vitamin B₁₂, folate, omega-3 fatty acids, choline, iodine, and fibre.

Nutrient	Recommended Amount Per Day for Adult Pregnancy (19–50 years)	Upper Limit (UL)
Calcium	1000 mg ^a	Total daily intake not to exceed 2500 mg ^a
Choline	450 mg ^a	Total daily intake not to exceed 3.5 gª
Folate/Folic Acid	0.6 mg (600 mcg) with 0.4 mg (400 mcg) to come from a supplement ^a	1 mg (1000 mcg ^a) The UL for folate applies only to synthetic forms obtained from supplements, fortified foods, or a combination of these ^a
lodine	0.22 mg (220 mcg)ª	Total daily intake not to exceed 1.1 mg (1100 mcg)ª
Iron	27 mg ^a	Total daily intake not to exceed 45 mg ^b
Omega-3 Fatty Acids (DHA and EPA)	Include at least 150 g (5 oz) cooked fish rich in omega-3 fatty acids and low in mercury each week during pregnancy ^c	Safe UL not defined ^c
Vitamin A	770 mcg ^a (2567 IU)	3000 mcg/day (10,000 IU/day). UL is for preformed vitamin A onlyª
Vitamin B ₁₂	2.6 mcg ^a	Safe UL not defined ^a
Vitamin D	600 IU ^b	Total daily intake not to exceed 4000 IU ^b

Table 2. Nutrient Amounts Recommended for Pregnancy from All Sources(food, multivitamin supplement, single-source supplement)

Sources:

^a Health Canada, 2010. Dietary Reference Intake Tables³⁴

^b IOM 2010³⁵

° Health Canada, 2009. Prenatal Nutrition Guidelines for Health Professionals: Fish and Omega-3 Fatty Acids³⁶

Consider recommending individual consultation with an RD if there is concern about adequate nutrient intake during pregnancy.

See also:

When is a referral to a registered dietitian recommended?

Folate (Folic Acid)

Folate is a B vitamin essential for the development of the spine, brain, and skull of the fetus during the first four weeks of pregnancy.³⁷ Adequate folate has been shown to reduce the risk of neural tube defects (NTD).^{38,39} Folic acid, folacin, and folate are all forms of the same B vitamin. Folate refers to what is naturally found in foods. Folic acid refers to supplements and fortified sources.²¹

Due to the high prevalence of unintended pregnancies, folic acid supplementation is recommended for all people who could become pregnant. The benefits of folic acid are highest in the very early weeks of pregnancy when people often do not know they are pregnant.^{37,39,40} People of reproductive age who could become pregnant are recommended to consume folate-rich foods and take a multivitamin supplement that provides 0.4 mg (400 mcg) folic acid in it every day.

People who are considering or planning for pregnancy and not taking a multivitamin supplement containing folic acid are recommended to take a multivitamin supplement with 0.4 mg (400 mcg) folic acid in it every day, starting at least three months before conception.^{1,37,40} Folic acid supplementation is recommended throughout pregnancy, as part of a multivitamin supplement that contains iron, vitamin D, and vitamin B₁₂.¹

More than 1 mg (1000 mcg) folic acid/day or more than one daily dose of a multivitamin supplement is not recommended for individuals at low risk of NTDs.¹

See also: When Higher Folic Acid Supplementation may be Recommended

Table 3. Food Sources of Folate (Folic Acid)

Very high source (greater than or equal to 55 mcg/serving)	High source (greater than 33 mcg/serving)	Source (greater than 11 mcg/serving)
Vegetables and Fruits	Vegetables and Fruits	Vegetables and Fruits
Asparagus	Canned beets	Arugula
Avocado	Bok choy	Bananas
Beets	Butterhead lettuce	Broccoli (raw)
Broccoli (cooked)	Green peas	Cabbage
Brussels sprouts	Okra	Carrots
Collards	Oranges	Cauliflower
Endive	Orange juice	Dandelion greens (raw)
French beans	Parsnips	Kale (raw)
Green snap peas		Leeks
Рарауа		Lettuce (iceberg, loose-leaf,
Romaine lettuce		radicchio, red leaf)
Seaweed		Pineapple
Spinach	Enriched bread (look for 15% DV	Potatoes
		Rutabaga
Grains		Snap beans
Enriched pasta	Enfiched crackers	Snow peas
Wheat germ	Protein Foods	Strawberries
	Eggs	Tomatoes
Protein Foods	Eggs	
Black beans		Grains
Chickpeas		Wild rice
Kidney beans		
Lentils		Protein foods
Navy beans		Cottage cheese
Pinto beans		Lima beans
Peanuts		Milk
Soybeans		Tofu
Sunflower seeds		Pistachio nuts
White beans		Sesame seeds
		Walnut
		Yogurt

Source: Health Canada. Canadian Nutrient File, Version 2015⁴¹ nutrient claims using the 2016 Daily Values⁴² and 2007 CFG serving sizes⁴³

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All people who could become pregnant are advised:

- to choose folate-rich food choices
- to take a multivitamin supplement with 0.4 mg (400 mcg) folic acid in it

All individuals who are considering or planning a pregnancy are advised:

- to choose folate-rich food choices
- to take a multivitamin supplement with 0.4 mg (400 mcg) folic acid in it starting at least two to three months before conception
- to talk to their care provider about the amount of folic acid that is right for them before they start trying to become pregnant as some individuals may need more

All individuals who are pregnant and at low risk of NTDs are advised to:

- choose folate-rich food choices
- take a multivitamin supplement with 0.4 mg* (400 mcg) folic acid in it during their entire pregnancy and for as long as lactation continues

* Note, some common prenatal vitamins contain more folic acid, advise individuals to choose a product with a dosage close to 0.4 (400 mcg) folic acid and not more than 1.0 mg (1000 mcg) folic acid.

When Higher Folic Acid Supplementation may be Recommended

Everyone is encouraged to talk to their care provider about the amount of folic acid that is right for them before they start trying to become pregnant.

Individuals with a previous fetus or neonate with another folic acid-sensitive congenital anomaly or those with other medical-surgical conditions associated with a risk of folate deficiency require two separate periods of supplementation.⁴⁰ From preconception to 12 weeks gestation, the supplement dose recommended is 1 mg (1000 mcg) in a multivitamin containing iron and vitamin B12.⁴⁰ After 12 weeks gestation, the folic acid dosage can return to the low-dosage regime of 0.4 mg (400 mcg) folic acid in a multivitamin supplement.⁴⁰

Folic acid-sensitive anomalies can include but are not limited to:40

- congenital heart defects
- oral facial clefts
- limb-reduction defects
- urinary-tract defects

Medical-surgical conditions include but are not limited to:40

- pre-gestational diabetes (type 1 or 2)
- gastrointestinal conditions such as inflammatory bowel disease, Crohn's disease, celiac disease, surgical gastric bypass, advanced liver disease
- use of medications with anti-folate physiological effects (methotrexate, phenytoin, carbamazepine, valproate, sulfasalazine) alcohol use disorder

Individuals who have a high risk of a pregnancy affected by NTD need to discuss with their physician the adequate dosage of folic acid as they may require doses of folic acid higher than 1.0 mg (1000 mcg) before and during their first trimester.⁴⁰ This may include those with a larger body size pre-conceptionally (BMI greater than 30 kg/m²).

At high risk for NTDs include individuals with a:40

- previous pregnancy affected with an NTD
- personal or reproductive partner family history of NTD (had an NTD themselves)
- first-degree relative with an NTD

Individuals with a higher risk of a pregnancy affected by NTDs are advised:

- to choose folate-rich food choices such as ready-to-eat cereals, enriched breads and pasta, dark green vegetables (peas, spinach, Brussels sprouts, and broccoli), beans and lentils, and citrus fruits (oranges)
- to discuss with their physician about the adequate dosage of folic acid supplementation if they have additional health risks or have a higher risk of a pregnancy affected by NTD

Calcium and Vitamin D

Calcium is a mineral that has a key role as a structural component of bones and teeth. It is also important for muscle function, nerve activity, and hormone secretion.³⁵ Vitamin D is a fatsoluble vitamin that has important roles in many body functions, including facilitating intestinal absorption of calcium and supporting the delivery and utilization of calcium in bone and teeth formation and nerve and muscle activity.³⁵ In people who are pregnant, calcium, and vitamin D are also needed for the growth and development of the skeletal tissue of the fetus.⁴⁴ During pregnancy, intestinal absorption of calcium is increased and bone calcium mobilization is optimized.^{9,44}

Due to physiological changes occurring during pregnancy, requirements for calcium and vitamin D remain the same as for individuals^{\alpha} who are not pregnant.⁴⁴ Adults need a total of 1000 mg calcium and 600 IU vitamin D daily to meet their requirements during pregnancy (See <u>Table 2</u>).³⁵ Evidence of calcium and vitamin D supplementation above these levels during pregnancy to improve parental and neonatal outcomes has been inconclusive.^{38,39,44}

Calcium

Adequate calcium intake during pregnancy can be achieved by eating a variety of foods as recommended by Canada's food guide, including calcium-rich foods. Dairy foods, including cow's milk, yogurt, and cheese are some of the best food sources of calcium.⁴¹ Some calcium is provided in most multivitamin supplements.

About 300 mg or more	About 200 mg	About 100 mg	About 50 mg
 Cow's milk, fluid (e.g. skim, 1%, 2%, lactose-free), 1 cup (250 mL) Cow's milk, powder, 24 g, amount to make 250 mL Fortified plant-based beverage (e.g. fortified soy beverage), 1 cup (250 mL) 	 Blackstrap molasses, 1 Tbsp (20 g) Cheese, hard (e.g. cheddar, Colby, Swiss), 1 oz (30 g) Cheese, Parmesan (hard, shredded, grated), 1/2 oz (15 g) Kefir, 3/4 cup (188 mL) Sardines, canned with bones, 2 oz (55 g) Soup made with cow's milk, 1 cup (250 mL) Tofu, made with calcium, 2/3 cup (85 g) Yogurt, 1/2 cup (115 g) 	 Almonds, shelled, 3 Tbsp (50 g) Brazil nuts, shelled, 3 Tbsp (50 g) Cottage cheese, ½ cup (125 g) Milk pudding, ½ cup (130 g) Salmon, canned with bones, 2 oz (55 g) Soybeans, ½ cup (125 mL) White beans, ½ cup (125 mL) 	 Almond butter, 1 Tbsp (15 g) Navy beans, cooked, 1/2 cup (125 mL) Sesame butter (tahini), 1 Tbsp (15 g)

Table 4. Food Sources of Calcium

Source:

Health Canada. Canadian Nutrient File, Version 2015⁴¹ using Health Canada's Nutrition Labelling – Table of Reference Amounts for⁴⁵

People who do not consume milk, yogurt, cheese, or calcium-fortified plant-based beverages, such as fortified soy beverages, are at risk of not meeting calcium requirements; an additional calcium supplement may be required. Individuals^{\alpha} who are taking single-dose calcium supplements are advised to take them in amounts that do not exceed 500 mg at a time.^{1,9,46,47} Calcium supplements are best taken separately from multivitamin supplements containing iron (at least 2 hours between) due to the potential of calcium and iron competing for absorption.⁴⁸ Single nutrient supplementation is best advised by an RD, who will base recommendations on individual client assessments. Calcium intake from food, supplements, and medication (calcium-based antacids) is not to exceed the upper limit (UL) of 2500 mg/day.⁴⁷

 $^{\alpha}$ Language in the original articles

See also:

What are the food safety concerns with cheese and what are safe cheese choices? What are plant-based beverages and are they a nutritious choice during pregnancy?

Vitamin D

Vitamin D occurs naturally in very few foods (e.g., fatty fish and egg yolks).³⁵ Most foods that are a source of vitamin D have been fortified. This includes cow's milk, fortified goat's milk, fortified plant-based beverages, and margarine.⁴⁹ Health Canada is undertaking several actions to increase the amount of vitamin D in the food supply. This includes approximately doubling the mandatory amount of vitamin D in cow's milk and margarine.⁴⁹ Fortification of goat's milk remains voluntary, but if fortified, the amount of vitamin D is mandated to match the levels in cow's milk.⁵⁰ Currently, there are no regulations that require plant-based beverages to be fortified. If manufacturers choose to meet the specified conditions to fortify their plant-based beverage product, they are permitted to match the level of vitamin D in cow's milk.²¹ During the vitamin D fortification strategy transition period from December 2022 until December 31, 2025, manufacturers may fortify at either pre-strategy (original) or strategy (new) levels (See Table 5).⁵⁰

During pregnancy, food sources of vitamin D are recommended in addition to a daily multivitamin dose of at least 400 IU (10 mcg) vitamin D to meet the recommended daily amount of 600 IU.³⁵ The UL for vitamin D intake from food and supplement sources is 4000 IU/day.³⁵

Table 5.	Food	Sources of	i Vitamin D

About 200 IU (5 mcg) or more		About 100 IU (2 ½ mcg)	About 50 IU (1 ¼ mcg)	
•	 Fish, 3 ½ oz (100 g) cooked Herring Rainbow trout Salmon (farmed and wild) 	 Fish, 3 ½ oz (100 g) cooked Atlantic mackerel Hake 	 Eggs, around 2 large (100 g) Fish, canned, 2 oz (55 g) Anchovies Sardines Yogurt, if fortified with vitamin D, 1/2 cup (115 g) 	
 Milk, 1 cup (250 mL) Cow's milk, all forms* and all types** Goat's milk, if fortified with vitamin D, all forms* and all types** * forms – liquid, powdered, evaporated ** types – skim, 1%, 2%, 3.25% (homogenized), lactose-free Fortified plant-based beverages (e.g. fortified soy beverage), 				
	Margarine, 2 tsp (10 g)			
Vitamin D Fortification Strategy Transition Period:				
•	 During the transition period (until 2026), cow's milk, fortified goat's milk, and fortified plant-based beverages will contain 100–200 IU per 1 cup (250 mL), and margarine will contain 50–100 IU per 2 tsp (10 g).^{49,50} To be fortified with vitamin D levels that match cow's milk, plant-based beverages must meet specified requirements for protein and fat.²¹ 			
 Margarine, 2 tsp (10 g) Vitamin D Fortification Strategy Transition Period: During the transition period (until 2026), cow's milk, fortified goat's milk, and fortified plant-based beverages will contain 100–200 IU per 1 cup (250 mL), and margarine will contain 50–100 IU per 2 tsp (10 g).^{49,50} To be fortified with vitamin D levels that match cow's milk, plant-based beverages must meet specified requirements for protein and fat.²¹ The fortification strategy indicates an intention to permit the direct addition of vitamin D to vegurt ^{50,51} Vitamin 				

D in yogurt is currently only via the optional use of fortified milk in the production of yogurt.

Source: Health Canada. Canadian Nutrient File, Version 2015⁴¹ and Government of Canada, Canada Gazette, Part II, Vol 156, No.15⁵⁰ using Health Canada's Nutrition Labelling – Table of Reference Amounts for Food⁴⁵

In summary, the IOM recommends adults who are pregnant (19–50 years of age) obtain the following daily amounts of calcium and vitamin D from all sources (food and supplements):³⁵

- 1000 mg/day calcium
- 600 IU/day vitamin D

To help meet calcium and vitamin D requirements, all adults who are pregnant are advised to:

- consume food sources of calcium and vitamin D
- consume around 2 cups (500 mL) milk or a fortified plant-based beverage each day
- take a multivitamin supplement each day that contains at least 400 IU vitamin D

Individuals May Be At Risk For Inadequate Intake or Have Higher Requirements for Calcium and Vitamin D

Individuals following vegan diets, with highly pigmented skin, who have limited sun exposure, or those who live in northern latitudes are at higher risk of vitamin D deficiency.^{1,9,38,39} In addition, individuals with obesity, inflammatory disease, or who have undergone gastric bypass surgery, may have impaired absorption and screening for vitamin D deficiency may be necessary.¹ People, including both adolescents and adults, who have undergone gastric bypass surgery have higher calcium requirements during pregnancy.¹

See also:

What are the nutrients of concern for pregnancy during adolescence?

Iron

Iron is a mineral that has many roles in the body, including functioning as a component of several proteins, notably hemoglobin.⁵² Low hemoglobin levels in pregnancy are associated with increased risks of preterm birth,⁵³ low birth weight,^{53,54} and small for gestational age infants.⁵³ Additional iron is needed during pregnancy to increase the maternal red blood cell mass and to supply the growing fetus and placenta.⁵⁵

The recommended daily allowance (RDA) for iron during pregnancy is 27 mg/day, an increase of 9 mg/day over requirements for individuals^{\alpha} aged 19–50 who are not pregnant.⁵² The UL for iron is 45 mg/day.⁴⁸ Individuals who are being treated for iron-deficiency anemia during pregnancy may be treated with higher doses of iron above the UL.¹

During pregnancy, individuals are advised to meet recommended iron requirements by choosing iron-rich foods from Canada's food guide and taking a multivitamin supplement containing iron every day.⁵⁵ Health Canada dosage recommendation for iron supplementation is 16-20 mg per day in a daily multivitamin supplement. Many common multivitamin supplements available for pregnancy contain up to 27 mg iron. These doses are considered safe during pregnancy. Practical guidance is to advise clients to look for a multivitamin that contains between 16–27 mg iron/dose.

If single-dose calcium supplements are being used, these are best taken separately from multivitamin supplements containing iron (at least two hours between) due to the potential of calcium and iron competing for absorption.⁴⁸ Multivitamin supplements containing iron are usually a once-daily dose. It is advised to take them as recommended on the product package.

Nutrition Guideline

Dietary iron is found in foods in both heme iron and non-heme iron forms. Heme iron is better absorbed than non-heme iron.⁵⁵ Only meat (beef, pork, lamb, elk, deer, etc.), poultry (chicken, turkey), fish, and seafood contain heme iron. Non-heme iron is found in meat, poultry, and fish, as well as in eggs and plant-based foods such as tofu (medium or firm), legumes (such as kidney beans, lentils, and chickpeas), nuts and seeds, and grains products. Some food products, including ready-to-eat cold cereal, are enriched with iron.

Very high source (greater than or equal to 3.5 mg/serving)	High source (greater than or equal to 2.1 mg/serving)	Source (greater than or equal to 0.7 mg/serving)
Grains	Protein Foods	Grains
Cold cereal, enriched	Beef	Pasta, enriched
Instant hot cereal, enriched,	Clams	Oatmeal
cooked	Elk	
Protein Foods	Kidney beans	Protein Foods
Chickpeas	Soybeans	Almond, cashew, peanut butter
Lentils	Tofu	Canned light tuna
Liver	Venison	Chicken
Moose		Eggs
Mussels or Oysters		Lamb
Pumpkin seeds		Pork
Wild duck		Sardines
Other Foods		
Blackstrap molasses		

Table 6. Food Sources of Iron

Source: Health Canada. Canadian Nutrient File, Version 2015⁴¹ nutrient claims using the 2016 Daily Values⁴² and 2007 CFG serving sizes^{43*} May also include almond, cashew or rice – if fortified

The absorption of non-heme iron from foods is improved when foods rich in vitamin C are consumed at the same time.⁴⁸ In addition, absorption of non-heme iron from food high in phytates (e.g. soybeans, black beans, lentils, split peas) improves when these foods are soaked overnight in water or sprouted.⁵⁶

Fo	Food Sources of Vitamin C		
•	Broccoli	•	Oranges
•	Cantaloupe	•	Potatoes
•	Grapefruit	•	Strawberries
•	Kiwi	•	Sweet peppers
•	Mango	•	Tomatoes

Table 7. Food Sources of Vitamin C

Source: Health Canada. Canadian Nutrient File, Version 2015.41

All individuals who are pregnant are advised to:

- follow Canada's food guide
- consume foods rich in both heme and non-heme iron
- consume foods rich in non-heme iron together with foods with vitamin C
- consider the iron daily dose when choosing a multivitamin supplement; look for one that provides 16–27 mg of iron/daily.

Consider recommending individual consultation with an RD if there is concern about iron intake from food choices.

See also: What resources are available for the public?

Individuals Who May Require Higher Doses Of Supplemental Iron

People who have an increased risk of iron deficiency during pregnancy need to discuss with their doctor the adequate dosage of supplemental iron as they may require doses of iron higher than the amounts found in a multivitamin supplement or prenatal vitamin. Therapeutic doses of iron may be required for people demonstrating biochemical evidence of iron deficiency (low hemoglobin levels; low serum ferritin levels).¹ Individualization of treatment with a physician is recommended for people who require therapeutic doses of iron. Treatment typically includes decisions regarding the type (e.g. liquid, pill), mode of administration (e.g. oral, intravenous), and formulation (e.g. sulphate, fumarate or gluconate) of iron.⁵⁷

Individuals at higher risk for iron deficiency during pregnancy include adolescents and refugees or immigrants from low-income countries, as well as people with:¹

- low or no intake of meat (beef, pork, wild game), fish, and poultry
- significant blood loss due to menstruation before pregnancy
- low socioeconomic status

Review recommendations for fluid and fibre intakes for individuals taking therapeutic doses of supplemental iron to minimize risks of constipation.⁹

People with a higher risk of iron deficiency during pregnancy are advised to:

- choose iron-rich food choices from Canada's food guide
- discuss the adequate dosage of iron supplementation with their physician

See also:

When is a referral to a registered dietitian recommended?

What are the nutrients of concern for pregnancy during adolescence?

Constipation – what can be done during pregnancy?

Omega-3 Fatty Acids

Omega-3 fatty acids are polyunsaturated fatty acids. Scientific research has focused on the association between higher intakes of these nutrients and several health outcomes. Current research is investigating the relationship between DHA intake during pregnancy and early infancy and the early neurodevelopment of the infant.^{58,59} Omega-3 fatty acids include:

- alpha-linolenic acid (ALA)
- eicosapentaenoic acid (EPA)
- docosahexaenoic acid (DHA)

EPA and DHA are primarily found in fish, shellfish, fish oil supplements, and omega-3enriched eggs.⁶⁰ ALA is found in plant sources such as walnuts, flaxseed, canola, and soybean oils.⁶⁰ ALA is converted to EPA and DHA in humans, but the amount of ALA converted is very low.^{1,60} The majority of the documented health benefits of omega-3 fatty acids are from research conducted on EPA and DHA rather than from plant-derived ALA.^{60,61}

The IOM has not set a recommendation for DHA or EPA intake.⁶¹ Dietitians of Canada and the Academy of Nutrition and Dietetics recommend 500 mg/day of DHA and EPA for healthy individuals.⁶² DHA is difficult to get from foods other than fish or DHA-supplemented food.¹ People who are pregnant are advised to choose fish that are high in EPA and DHA and low in mercury.³⁶ These fish include herring, Atlantic hake, salmon, sardines, and rainbow trout.³⁶

High Source	DHA and EPA	ALA	Sources:
Ground flaxseeds		\checkmark	^a Health Canada. Canadian Nutrient File, Version 2015 ⁴¹
Herring	~		^b Burnbrae Farms ^{63,64}
Mackerel, Atlantic	~		Note: Farmed and wild fish
Rainbow Trout	~		may have different amounts
Salmon, Atlantic	~		OI DHA/EFA.
Walnuts		\checkmark	
Source	DHA and EPA	ALA	
Canola oilª		\checkmark	
Clams	~		
Naturegg™ Omega-3–1 large egg (53 g) ^b	~	\checkmark	
Naturegg™ Omega Plus™–¼ cup (63 g)⁵	~	\checkmark	
Sardines	~		
Shrimp	~		
Tuna, light	\checkmark		

Table 8. Low Mercury Food Sources of Omega-3 Fatty Acids

All people who are pregnant are advised to:

- consume cooked fish rich in omega-3 fatty acids and low in mercury
- aim to include at least 150 g (5 oz) fish weekly

See also:

<u>Is it safe to consume fish during pregnancy?</u> <u>What advice can be given about omega-3 fatty acid supplements during pregnancy?</u> <u>Other Food-related Safety Considerations: Flaxseed and Flaxseed Supplements</u>

Choline

Choline is a nutrient involved in functions essential to fetal brain development and tissue expansion.¹ Choline availability during embryogenesis and perinatal development may be especially important.⁶⁵ Recent research is also exploring a potential relationship between low serum choline levels during pregnancy and NTD risk.⁶⁶

Choline needs in pregnancy are believed to be greater than choline requirements during the non-pregnant state.⁶⁵ Individuals^{\alpha} who are pregnant are recommended to obtain 450 mg/day choline, an increase of 25 mg/day over the non-pregnant state to cover the amount needed for the fetus and placenta.⁶⁵ UL values for choline are set at 3.5 g/day for individuals^{\alpha} 19 years and older who are pregnant, and 3.0 g/day for those 18 years and under who are pregnant. The UL refers to total choline intakes from food, fortified food, and nutrient supplements.⁶⁵

Choline is found in both plant and animal food sources with the greatest concentrations in eggs, beef, and milk. An Alberta study with individuals^{\alpha} who were pregnant found that those who reported regular egg and milk consumption were more likely to meet choline intake recommendations.⁶⁷ Choline may or may not be included in multivitamin supplements, including those marketed for pregnancy in Canada.⁶⁸ Healthcare providers can promote regular consumption of choline-rich foods.⁴⁰

Protein Foods	Vegetables and Fruits	Source: Health Canada.
Beef	Broccoli	Canadian Nutrient File, Version
Chicken	Brussels sprouts	2013.
Cow's milk	Cauliflower	
Eggs	Salad greens	
Fortified soy beverage	(such as endive and romaine lettuce)	
Kidney beans	Spinach	
Navy Beans		
Pork	Grains	
Salmon	Wheat germ	

Table 9. Food Sources of Choline

All individuals who are pregnant are advised to:

- follow Canada's food guide; it describes a healthy eating pattern that includes dietary choline and will guide them in meeting their needs for other nutrients
- regularly consume foods rich in choline, such as wheat germ, eggs, salmon, beef, chicken, navy or kidney beans, and cow's milk

Consider recommending individual consultation with an RD if there is concern about choline intake from food choices.

See also: When is a referral to a registered dietitian recommended?

lodine

lodine is a mineral that is an essential component of the thyroid hormones thyroxine (T4) and triiodothyronine (T3), which are involved in the regulation of various enzymes and metabolic processes, particularly protein synthesis⁵² and required for proper skeletal and central nervous system development.⁹ Iodine deficiency can lead to goiter, stunted physical and intellectual development, spontaneous abortion, and stillbirth.⁶⁹

lodine requirements during pregnancy increase from 150 mcg/day before conception to 220 mcg/day during pregnancy.⁵² The UL for iodine is 1100 mcg/day.⁵² Although iodine deficiency is a major public health concern in many countries, including the United States, Australia, and New Zealand,^{1,38} Canada's mandatory iodization of salt in 1949 has resulted in adequate intake levels of iodine for most Canadians.⁶⁹ The most recent information for the Canadian population, based on 2009–2011 urinary iodine concentration, indicates iodine intake adequacy.⁶⁹

Food production and consumption patterns attributed to mild or moderate deficiencies in iodine intake include the use of non-iodized salt, such as sea salt, reduction of salt in the diet, and reduction of iodine supplementation in commercial dairy products.⁶⁹ Examples of dietary sources of iodine include iodized salt, seafood, eggs, milk, and grain products. Analysis of dietary consumption data in the United States indicates that dairy product consumption was an important contributor to iodine status among all individuals (pregnant and non-pregnant).⁷⁰ Currently available multivitamin supplements marketed for pregnancy in Canada contain iodine in sufficient amounts to meet needs during pregnancy.¹

All individuals who are pregnant are advised:

- to consume a varied diet as recommended by Canada's food guide, including cow's milk and other dairy products such as yogurt and cheese
- when choosing salt, choose an iodized salt
- when choosing a multivitamin supplement, choose one containing iodine

Vegetarian Eating Patterns during Pregnancy

Return to Key Questions

Are there any extra considerations for vegetarian eating patterns?

Well-planned vegetarian eating patterns are appropriate for all stages of the life cycle, including pregnancy and lactation.^{1,71} Vegetarian eating patterns support good nutrition status and health. However, ensuring nutritional adequacy becomes more challenging when foods are avoided and when nutrient needs are higher, such as during pregnancy.

Individuals may identify themselves as vegetarian, or primarily vegetarian, although they eat some fish or chicken, milk or dairy products, eggs, or animal by-products. Lacto-ovo vegetarians avoid all animal flesh but eat eggs (ovo) and dairy products (lacto). Vegans generally avoid all foods of animal origin.⁷¹

To optimize nutrition, care providers are advised to:

- identify the type of vegetarian diet followed (e.g. lacto-ovo, vegan).⁷¹
- encourage individuals following a vegetarian eating pattern to plan their diet well, by including a variety of protein choices offered in Canada's food guide.
- advise individuals who are following a vegan eating pattern to ensure their multivitamin supplement contains 2.6 mcg vitamin B₁₂ to meet the RDA during pregnancy.⁷²
- refer individuals following a vegan eating pattern who are pregnant or planning a pregnancy to an RD for nutrition assessment and counselling.

Energy

The energy recommendations for individuals who are pregnant following a vegetarian eating pattern do not differ from those following a non-vegetarian eating pattern.⁷³

Iron

Individuals who are pregnant and are following a vegetarian eating pattern are at higher risk for iron deficiency.⁴⁸ Screening, by measuring hemoglobin and serum ferritin by their primary care provider, is recommended.¹ Well-chosen vegetarian diets can provide adequate iron; however, the iron needs of vegetarians are 1.8 times higher than non-vegetarians due to the reduced bioavailability of vegetarian sources of iron.¹ Individuals following vegetarian diets while pregnant are recommended to choose a multivitamin supplement with at least 27 mg iron, an amount commonly found in prenatal branded supplements.^{1,71} Additional iron supplements may be needed to prevent or treat iron-deficiency anemia.^{1,71}

Calcium and Vitamin D

Individuals following a vegan eating pattern face the greatest risk of inadequate calcium intake and are advised to include a wide variety of non-dairy sources of calcium in their diet.⁷¹ Calcium requirements can be met by including around 2 cups (500 mL) fortified plant-based beverages and by eating a variety of other calcium-containing foods such as calcium-set tofu and leafy green vegetables.^{1,71} The need for calcium supplementation can be assessed by an RD.⁷¹

Nutrition Services, Alberta Health Services recommends all individuals who are pregnant ensure their multivitamin supplement contains at least 400 IU vitamin D. A higher dose supplement may be needed for those individuals at risk for vitamin D deficiency.⁷⁴

Vitamin B₁₂

Individuals following a vegan eating pattern are at high risk of inadequate intake of vitamin B_{12} , a micronutrient which is only available from animal sources.^{71,72} Those who exclude all animal products from their diet will require vitamin B_{12} from a combination of supplements, fortified food, or a reliable plant source modified to contain a bio-available source of vitamin B_{12} to meet the daily requirement of 2.6 mcg. Individuals who are pregnant and following a vegan diet are recommended to choose a multivitamin supplement containing at least the daily requirement of 2.6 mcg vitamin B_{12} .⁴⁰ Examples of dietary sources of vitamin B_{12} appropriate for a vegan diet include fortified plant-based beverages and fortified meat analogues such as 'veggie burgers'.⁷²

Zinc

In general, zinc status among individuals following a vegetarian eating pattern is adequate, although lower than the zinc status of non-vegetarians.⁷¹ However, as with iron, a high intake of phytates may interfere with absorption and are potentially detrimental to zinc status.⁷¹ Individuals following a vegetarian eating pattern are advised to consume zinc-rich foods such as nuts, legumes, cheese, soy, whole grains, milk, and egg yolk often.

Omega-3 Fatty Acids

Individuals following a vegetarian eating pattern who avoid fish may not be consuming adequate DHA. Vegetarians can consume ALA from plant sources that are converted into DHA in the body; however, this process is inefficient. Vegetarians may have higher requirements for ALA and are encouraged to consume foods rich in ALA such as walnuts, canola oil, and soybean-based foods such as tofu and edamame.^{71,75} In addition to ALA, individuals following a vegetarian eating pattern are advised to choose food sources of DHA that are appropriate for them, such as fortified foods, omega-3 eggs, and seaweed, or use a microalgae-derived DHA supplement.⁷¹

Other Nutrients of Concern

Choline and iodine may be low in the diets of individuals following a vegetarian eating pattern, particularly a vegan diet.^{1,71} During pregnancy encourage individuals to consume sources of choline and iodine that are appropriate for them, such as eggs, dairy products, and sea vegetables. Choosing iodized salt over sea salt or other non-iodized varieties will also contribute to iodine requirements.⁷¹

See also: When is a referral to a registered dietitian recommended?

For related Nutrition Guidelines see Nutrition Guideline: Vegetarian Eating

Nutrient Supplements During Pregnancy Return to Key Questions

Consider recommending individual consultation with an RD if there is concern about supplement intakes during pregnancy. Individuals are advised to look for a Natural Product Number (NPN) when choosing a supplement.³⁶

See also: When is a referral to a registered dietitian recommended?

What are the recommendations for a multivitamin supplement for pregnancy?

A multivitamin is recommended to provide folic acid, iron, vitamin B₁₂, and vitamin D every day.¹ Initiation of folic acid supplementation is recommended at least three months before pregnancy to ensure adequate folic acid intake. Supplementation is recommended to continue throughout pregnancy and after birth, throughout the reproductive years.³⁷ Note that some commonly available multivitamin supplements (e.g. adult gummy multivitamins) may not contain adequate amounts of nutrients important for pregnancy, such as iron. It is recommended a multivitamin includes 2.6 mcg vitamin B₁₂.⁴⁰ Available multivitamin supplements that meet iron, vitamin D and folic acid recommendations have adequate B₁₂, and therefore, are not included in practical guidance information.

For individuals who have difficulty taking a multivitamin supplement, strategies that may help include:

- Taking the supplement in the evening.
- Working with their physician or pharmacist who can recommend alternatives (e.g. smaller pill size, different formulation).

Health Canada recommends taking a multivitamin with folic acid (0.4 mg), iron (16–20 mg), vitamin D (400 IU) and vitamin B_{12} every day. These exact amounts can be hard to find. When assisting an individual who is pregnant in choosing a multivitamin, look for this information on the label as these levels are safe:

- Iron: between 16–27 mg
- Vitamin D: at least 400 IU (10 mcg)
- Folic acid (folate): between 0.4–1 mg (400–1000 mcg)
- Vitamin B₁₂: 2.6 mcg

What is the difference between a multivitamin and a prenatal vitamin?

'Prenatal vitamins' are multivitamin supplements marketed for people during pregnancy. Typically, they contain higher doses of folic acid and iron. Some prenatal vitamins contain 0.8–1 mg (800–1000 mcg) folic acid. Individuals who are pregnant are recommended to not consume more than 1 mg (1000 mcg) folic acid/day without a care provider's advice. Iron amounts of 27 mg are also common in prenatal vitamins. These amounts are considered safe during pregnancy. Many common multivitamin brands contain adequate amounts of vitamins and minerals to meet the increased needs of pregnancy, except for iron. Since the amounts of various vitamins and minerals included in multivitamin brands and prenatal vitamins vary across brands/types, individuals are encouraged to review supplement labels and discuss amounts with their care provider.

Are there benefits of taking a multivitamin compared to single-nutrient supplements?

Taking a multivitamin supplement containing iron and folic acid has been shown to reduce the number of LBW⁷⁶⁻⁷⁸ and SGA infants⁷⁷⁻⁷⁹ compared to taking single iron supplements with or without folic acid. A multivitamin supplement can support individuals, particularly those most vulnerable to poor nutrient intakes, in meeting the higher nutrient needs of pregnancy.³³ In addition to containing iron and folic acid, multivitamin supplements contain other nutrients that can be difficult to get enough of from food alone such as zinc, magnesium, and vitamin B₆.³³ Individuals vulnerable to poor nutrient intakes include those with social, economic, or geographic at-risk circumstances (e.g., those living in poverty),¹ as well as individuals experiencing substance dependency, household food insecurity, anemia, strict vegetarian (vegan) diet, or poor eating habits.⁹

What if an individual who is pregnant requires higher amounts of iron or folic acid?

Most multivitamin supplements will not provide adequate doses of iron or folic acid for individuals identified as needing higher amounts. Additional single-dose supplementation may be required for at-risk individuals during pregnancy.

See also:

People who may require higher folic acid supplementation People who may require higher doses of supplemental iron

Other Nutrient Supplements

Return to Key Questions

Is the use of Lucky Iron Fish[™] recommended to improve iron status during pregnancy?

Most people without iron deficiency can meet their additional iron needs during pregnancy by choosing a variety of iron-rich foods from Canada's food guide and taking a multivitamin supplement containing 16–27 mg iron. Lucky Iron FishTM is not recommended as an alternative to supplements for the prevention or treatment of iron deficiency in the Canadian pregnant population.

There is insufficient evidence on the effectiveness of the Lucky Iron Fishtm in improving iron status.⁸⁰⁻⁸² The studies were only conducted in low-income countries with a high prevalence of anemia, therefore, the limited research may lack applicability to the Canadian population. If a client chooses to use the Lucky Iron Fishtm, advise them to use it according to the manufacturer's directions.

What advice can be given about omega-3 fatty acid supplements during pregnancy?

Individuals are advised to consult a physician before taking an omega-3 fatty acid supplement. Supplements are not considered equivalent to eating fish.^{60,83} Evidence suggests DHA and EPA supplements may increase gestation duration between 1–3 days in both lowrisk and high-risk pregnancies.^{61,84} EPA and DHA may increase birth weight by approximately 45 g and 100 g in low-risk and high-risk pregnancies, respectively.^{61,85,86} No benefits on preeclampsia, reducing the risk of preterm delivery, or other neonatal outcomes such as the reduced risk of intrauterine growth restriction (IUGR) have been found.^{61,84–88}

Fish Oil Supplements

Fish oil supplements vary in the levels of EPA and DHA they contain.⁶⁰ Doses of fish oil (EPA + DHA) of less than 3 g/day can be safely used by most individuals.⁸⁹ However, fish liver oil supplements (e.g. cod liver oil) contain high levels of vitamin A. Therefore, fish liver oil supplements are not recommended for individuals who are pregnant, breastfeeding, or chestfeeding.^{36,61} Fish oil supplements are contraindicated for individuals with intra-uterine bleeding and other bleeding disorders or those taking blood thinners.⁶¹ People are advised to look for an NPN when choosing a supplement.³⁶ Those who dislike the "fishy" taste of fish oil supplements may be advised to store them in the freezer or look for an enteric-coated supplement.

See also: What is the concern with vitamin A supplements in pregnancy?

Algal Supplements

Supplements containing EPA and/or DHA made from algae are also available.⁹⁰ These would be suitable for vegetarians and individuals who are allergic to fish.

Flaxseed and Flaxseed Supplements

Hypotheses exist that the mild estrogenic effects of flaxseed may have adverse effects on pregnancies. However, there is insufficient reliable clinical evidence about the effects of flaxseed on pregnancy outcomes.⁹¹ There is some evidence from observational studies that flaxseed oil is associated with an increased risk of preterm birth.⁹² Because of the insufficient evidence regarding the safety of flaxseed in pregnancy and potential negative outcomes,^{91,92} it may be safest during pregnancy to consume flaxseed in the amounts commonly found in foods or 1 Tbsp (15 mL)/day and to avoid flaxseed oil.⁹²

Krill Oil Supplements

Krill oil is currently not recommended as safe during pregnancy. More evidence is needed on the safety and efficacy of krill oil supplements in order to recommend krill oil supplements in pregnancy.⁹³

Are protein supplements required during pregnancy?

Protein supplements are not required during pregnancy. In the first half of pregnancy, protein requirements (about 46 g/day) are the same as for the non-pregnant state.⁷³ Although individuals who are pregnant need an additional 25 g/day protein in the second half of pregnancy (about 71 g/day), they can continue to meet their protein needs by following a healthy eating pattern and including a protein source at each meal and snack.⁷³ The consumption of high protein supplements in pregnancy is not required and may contribute to a diet unbalanced in protein and carbohydrate; limited evidence demonstrates a lack of beneficial effects and possible risks to the fetus.⁹⁴ Soy protein supplements or isoflavone supplements are not recommended during pregnancy as high intakes are mildly estrogenic and potentially could adversely affect fetal development.^{1,95}

See also: When is a referral to a registered dietitian recommended?

What is the concern with Vitamin A supplements in pregnancy?

Multivitamin supplements marketed for pregnancy may contain either preformed vitamin A or beta-carotene or both forms of vitamin A. Beta-carotene is not associated with any adverse effects during pregnancy.⁵² Too much preformed vitamin A is associated with birth defects, particularly during the first trimester.⁹⁶ The UL for vitamin A for adults is 3000 mcg/day (10,000 IU/day) and is based on preformed vitamin A (retinyl esters and retinol).⁵²

The risk of exceeding the UL from a multivitamin supplement is minimal. Commonly used terms for preformed vitamin A in the ingredient list include retinyl acetate, retinyl succinate, or retinyl palmitate. People who are taking multiple supplements (e.g. multivitamin supplements, single supplements, fish liver oil supplements, or nutrition supplement drinks) and foods high in preformed vitamin A, especially the liver, may be at risk of exceeding the UL.

See also: Other Food-Safety Related Considerations – Liver

What about the use of other supplements during pregnancy?

People are encouraged to inform their care provider about the supplements they are taking and learn about the safety of their use during pregnancy. For example, advise those taking probiotic supplements that limited evidence exists on the safety of their use during pregnancy and it is best to avoid probiotic supplement use.

See also:

Other Food-related Safety Considerations - Probiotic-containing Foods

Beverage and Fluid Intake during Pregnancy

Return to Key Questions

How much fluid is needed during pregnancy?

Adequate hydration is essential as a person accumulates 6–9 L of water during gestation.⁹ During pregnancy, people are recommended to consume about 10 cups (~2.5 L) fluids/day for adequate hydration.⁹ One cup is equivalent to 250 mL (8 oz). This total amount of fluids includes all beverages, including drinking water.⁹ Note that sugar-sweetened beverages such as iced tea, fruit juice, sports drinks, specialty coffees and teas, flavoured waters with added sugars, and fruit-flavoured drinks like fruit punch, add little nutritional value. Water is recommended as the main source of fluids.

Individuals who are pregnant are advised:

- to drink water throughout the day
- that healthy drink options other than water include milk and fortified plant-based beverages
- to consume 10 cups (~2.5 L) fluids/day and possibly more if they are experiencing constipation
- that if they are experiencing nausea and vomiting during pregnancy, additional actions may be needed to prevent dehydration

Advise people who are pregnant and are experiencing signs of dehydration to contact their physician or Health Link at 811.

See also:

<u>Constipation – what can be done during pregnancy?</u> Nausea and vomiting – what can be done during pregnancy?

What are plant-based beverages and are they a nutritious choice during pregnancy?

Plant-based beverages include soy, almond, coconut, cashew, oat, and other beverages derived from legumes, nuts, seeds, or grains.²¹ Plant-based beverages do not contain many of the vitamins and minerals that are naturally present in cow's milk such as vitamin B₁₂, riboflavin, and zinc.⁹⁷ Currently, there are no mandatory regulations that plant-based beverages must be fortified.²¹ If fortified, these beverages are required to be fortified with vitamin A, vitamin D, vitamin B₁₂, riboflavin, calcium, and zinc.²¹

Individuals who are pregnant and choose to drink plant-based beverages are advised to:

- consume around 2 cups (500 mL) fortified plant-based beverages each day
- choose a fortified plant-based beverage that, per 1 cup (250 mL):
 - provides at least 6 g of protein²¹
 - o provides at least 23% daily value of calcium; and
 - provides at least 10% daily value of vitamin D

Individualized assessment and counselling by an RD may be considered.

See also:

What nutrients are important during pregnancy: calcium and vitamin D When is a referral to a registered dietitian recommended?

What is considered a safe intake of caffeine during pregnancy?

Health Canada's recommendation for safe intake of caffeine in pregnancy is to limit consumption to 300 mg or less/day.^{98,99} Evidence suggests a dose-response association between caffeine intake during pregnancy and an increased risk of adverse birth outcomes, including low birth weight,^{100,101} spontaneous abortion, stillbirth, and small-for-gestational-age.¹⁰¹ However, evidence of causal effects of caffeine intake on birth outcomes during preconception and pregnancy is lacking and inconclusive.¹⁰²

Beverages with between 100–200 mg/1 cup (250 mL) serving	Beverages and foods with less than 100 mg/1 cup (250 mL) (or standard serving size)
Coffee, brewed	Baking chocolate (unsweetened) (28 g)
Coffee, roasted and ground, filter drip	Candy chocolate (milk, sweet) (28 g)
Coffee, roasted and ground, percolated	Chocolate milk
	Coffee, espresso (30 mL single shot)
	Coffee, instant
	Coffee, instant, decaffeinated
	Coffee, roasted and ground, decaffeinated
	Cola beverage, regular (355 mL can)
	Cola beverage, diet (355 mL can)
	Hot cocoa mix (prepared)
	Iced tea
	Tea, regular (average blend, leaf, or bag)

Table 10. Beverage and Food Sources of Caffeine

Sources: Health Canada. Canadian Nutrient File, Version 2015; Health Canada, Caffeine in Food^{41,98} Note: caffeine content of coffee and tea can vary depending on the plant variety and growing conditions, brewing method and time, the proportion of coffee or tea to water, roasting method, particle size ('grind') and serving size.

Advise individuals who are pregnant:

- to limit caffeine intake to 300 mg/day, from all sources
- common sources of caffeine for most people are:
 - Coffee: about 150 mg caffeine/250 mL (1 cup)
 - Tea, green and black: about 30–50 mg caffeine/250 mL (1 cup)
 - Cola beverages: about 23–40 mg caffeine/250 mL (1 cup)
 - Chocolate: about 3–50 mg caffeine in 1 chocolate bar

See also:

What is the recommendation for caffeinated energy drinks during pregnancy?

What is the recommendation for caffeinated energy drinks during pregnancy?

Individuals are advised to avoid all energy drinks during pregnancy. An energy drink is any beverage that contains some form of legal stimulant and/or vitamin added to provide a short-term boost in energy. These drinks may contain substantial and varying amounts of sugar and caffeine as well as other substances including taurine, carnitine, inositol, ginkgo, and milk thistle.⁹ Many of these have not been studied for safety during pregnancy.^{9,103} These drinks provide a caffeine content similar to or exceeding the amount of caffeine in the same volume of coffee: 75–85 mg in 1 cup (250 mL) and 70–240 mg in 1 can (473 mL).^{104–108}

See also:

What is considered a safe intake of caffeine during pregnancy?

Are sugary drinks recommended during pregnancy?

Sugary drinks or sugar-sweetened beverages include regular sodas, sports drinks, energy drinks, fruit juice, fruit drinks, fruit punch, fruit cocktails, flavoured waters with added sugars, iced tea, and specialty coffee and teas.^{9,109,110} These drinks are similar in that they contain a large amount of sugar and a low nutrient and high-calorie content. An additional concern with sugary beverages is the possibility of their intake displacing nutrient-dense choices. It is healthiest to limit or avoid these products.¹⁰⁹

What herbal teas are considered safe to consume during pregnancy?

Evidence is limited regarding the safety of herbal teas in pregnancy. The following herbs are generally considered safe if limited to the amount commonly found in foods or consumed in moderation as an herbal tea:¹¹¹

- orange peel¹¹¹
- bitter orange¹¹¹
- ginger root^{112,113}
- peppermint leaf^{114,115}
- rose hip¹¹⁶

It is best to follow the preparation instructions on the label. General guidance is to limit intake of teas made from these herbs to no more than 3 cups daily during pregnancy and to steep the tea for a short period (e.g. 3–5 minutes).

Other herbal teas may be safe to consume during pregnancy; however, due to insufficient or conflicting messaging of their safety during pregnancy, they are not listed in this guideline as safe, e.g. red raspberry leaf, fennel, chamomile, lemon balm, red bush (rooibos), and valerian.
Since many teas are often a mixture of herbs, it is best to check the ingredient labels to make sure all ingredients in the tea are safe.¹¹¹ Even 'safe' herbs are not recommended in pregnancy if used in large or concentrated doses.^{115,116} Advise individuals who are pregnant to check the ingredients of all other beverages including chai and herbal teas marketed for pregnancy. Chai is made by blending black tea with various spices, herbs, and steamed milk. As chai products often contain multiple ingredients, the ingredients in the product need to be carefully examined before use to ensure that all the ingredients are safe for consumption during pregnancy.

Many herbs are not considered safe in pregnancy due to a lack of evidence. Clients who have questions about an herbal ingredient or product can be encouraged to check with a healthcare provider educated about herbal products (e.g. pharmacist, RD) or call 811 to ask a Health Link RD.

Are nutrition supplement drinks needed during pregnancy?

Nutrition supplement drinks (e.g. Similac Mom[™], Ensure[™], Boost[™]) are not required for a healthy diet during pregnancy. They have no nutrition benefit over a healthy food snack (e.g. whole grain toast, peanut butter, and milk) and are low in fibre.^{41,117} Many nutrients aren't found in supplement drinks that can only be found in real food. People are encouraged to eat a variety of foods from Canada's food guide daily.⁴³ Nutrition supplement drinks are not recommended as a multivitamin supplement replacement as they do not contain the right amount of nutrients included in recommended multivitamin supplements such as folic acid, vitamin D, and iron. If people are using these products regularly while pregnant, they may be at risk of both inadequate and/or excessive intake of certain nutrients.

Consider recommending individual consultation with an RD if there is concern about a person's nutrient intake from food or supplement intakes during pregnancy.

See also: When is a referral to a registered dietitian recommended?

Food Safety During Pregnancy

Return to Key Questions

Why is foodborne illness a concern during pregnancy?

Both the individual who is pregnant and their fetus are at higher risk for foodborne illness compared to a person who is not pregnant. Foodborne illness is caused by eating foods that have been contaminated by toxins or harmful organisms such as bacteria, parasites, and viruses.¹¹⁸ During pregnancy, the higher production of progesterone can cause the immune system to become suppressed, making it more difficult to fight off infections.¹¹⁹ Some bacteria can pass through the placenta and this can be problematic for the unborn baby.^{118,120} The consequences of foodborne illness during pregnancy can result in miscarriage, stillbirth, or a baby born premature or ill.^{118,119}

What is the best way to reduce the risk of foodborne illness during pregnancy?

Safe food handling is the best way to reduce the risk of foodborne illness. People can reduce their risk of foodborne illness by properly cooking, cleaning, chilling, storing, and separating foods.¹²¹ Advise individuals who are pregnant to follow basic food safety practices:¹¹⁸

- Wash hands (with warm, soapy water for at least 20 seconds):
 - Before handling any food.
 - After handling food such as raw meat, poultry, and fish.
 - After handling animals or pets.
- Wash all raw fruit and vegetables thoroughly. Wash food with potable water.
- Keep raw foods and cooked foods separate.
- Wash and disinfect (with diluted household bleach) food preparation surfaces and utensils that have been in contact with raw meat, poultry, fish, and seafood.
- Use refrigerated raw meat, poultry, fish, and seafood by the "best before" date, or no more than 2–4 days after buying it.
- Make sure hot foods are hot (above 60°C/140°F), cold foods are cold (below 4°C/39°F), and all meats are well-cooked. Cook eggs until the yolk is firm.
- Cook meats, poultry, fish, and seafood to their safe internal temperature (refer to the <u>Safe</u> <u>Internal Cooking Temperatures Chart</u>).
- Cool cooked foods quickly. Bacteria can grow if left out for more than 1 hour during summer outdoor activities or 2 hours at room temperature.
- Reheat any cooked food to at least 74°C/165°F.^{118,121} Reheat leftovers only once.^{118,121}
- Eat refrigerated leftovers as soon as possible (within 2–4 days).

See also:

What resources are available for the public?

What foods are people advised to avoid during pregnancy and are there safer alternatives?

People who are planning to become pregnant and those who are pregnant are advised to avoid many raw and undercooked foods. Table 11 provides a summary of foods to avoid and safer alternatives during pregnancy.¹¹⁸

Foods to Avoid		Safer Alternatives	
•	Raw and undercooked: fish (e.g. sushi), shellfish (e.g. raw oysters), meats (e.g. steak tartare), and poultry.	 Oysters, clams, and mussels that are cooked until the shell has opened. Sushi that does not contain raw fish. Meat and poultry that are cooked to a safe internal temperature. Beef or pork (including ground) 71°C (160°F) Wild game (deer, elk, small game) 74°C (165°F) Poultry 74°C (165°F) Fish 70°C (158°F) 	
•	Ready-to-eat meat and poultry such as hot dogs and deli meats (e.g. bologna, roast beef, and turkey breast).	 Dried and salted deli meats (e.g. salami and pepperoni). Hot dogs and deli meats can be eaten if heated until steaming hot. Meat deli meats and hot dogs to at least 74°C (165°F) 	
•	Refrigerated pates, meat spreads, smoked seafood, and fish.	 When these products are sold in a can. When they are heated to a safe internal temperature. Meat refrigerated meat spreads, smoked fish, or shellfish until at least 74°C (165°F) 	
•	Foods that contain raw or undercooked eggs such as homemade Caesar vinaigrette, cookie dough, cake batter, and homemade eggnog.	 Cook eggs until the yolk is firm. Egg dishes that are well cooked to a safe internal temperature of 74°C (165°F). Pasteurized eggnog Use pasteurized egg products when making uncooked food that calls for raw eggs. 	
•	Foods that contain raw or undercooked flour (e.g. raw dough or batter or any other product containing raw non-baked flour). ¹²²	Cooked flour.	

Table 11. Foods to Avoid an	d Safe Food Alterna	atives for Pregnancy
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Foods to Avoid		Safer Alternatives	
•	Raw or unpasteurized milk and dairy products (e.g. yogurt made from unpasteurized milk).	• •	Pasteurized milk. Pasteurized dairy products that are cooked, in a casserole or au gratin.
•	Unpasteurized and pasteurized soft, semi- soft and blue-veined cheeses such as Havarti, Brie, Camembert, and Mexican- style cheeses (e.g. queso fresco, queso blanco).	•	For additional information on cheese safety during pregnancy see: <u>What are the food safety concerns</u> with cheese and what are safe cheese choices?
•	Unpasteurized fruit juice and cider.	•	Pasteurized fruit juice and cider.
•	Raw and cooked sprouts (e.g. alfalfa, clover, radish, and mung bean). Usual cooking methods don't consistently cook sprouts thoroughly to make them safe for consumption.		

Source: Health Canada, 2016 Aug 09¹¹⁸

Is it safe to consume fish during pregnancy?

Most fish can be safely consumed during pregnancy. Fish is a widely consumed, highly nutritious source of protein, vitamin D, and omega-3 fatty acids.³⁶ Health Canada recommends that people eat at least 150 g (5 oz) of cooked fish every week while pregnant.³⁶

Along with the potential benefits of fish consumption, there are risks of exposure to harmful contaminants. A form of mercury known as methylmercury (MeHg) is a toxin present in the environment and trace amounts in all foods,⁵⁸ with fish being the primary source for humans.¹²³ Infants who have had very high MeHg exposure in the womb may experience neurodevelopment abnormalities.¹²⁴ At chronic lower exposure levels, other neurodevelopment deficits, such as deficits in memory, motor, attention, and verbal skills, may also occur.¹²⁴

Individuals who are pregnant are advised to:

- consume a variety of fish and shellfish that are low in MeHg and high in omega-3 fatty acids. Fish that are low in MeHg include anchovy, capelin, hake, herring, Atlantic mackerel, pollock (Boston bluefish), salmon (farmed and wild), smelt, rainbow trout, shrimp, clams, mussels, and oysters.¹²³
- choose canned "light" tuna instead of canned "white" or albacore tuna as "light" tuna contains less MeHg.^{58,123}
- avoid fish that are high in MeHg. High MeHg fish include fresh or frozen tuna, shark, swordfish, escolar, marlin, and orange roughy.¹²³
- avoid raw fish and shellfish to reduce the risk of bacterial illness.^{9,118}

Fish consumption advisories for fish caught in Alberta lakes and rivers can be accessed at <u>aephin.alberta.ca/ShouldIEatThisFish</u> or by calling Alberta Environment and Sustainable Resource Development toll-free at 1-877-944-0313.

A free mobile app for fish consumption developed by the Government of Alberta is available on Apple and Google Play platforms.¹²⁵ The app is called Should I Eat This Fish?

See also:

What advice can be given about omega-3 fatty acid supplements during pregnancy?

What are the food safety concerns with cheese and what are safe cheese choices?

Soft, semi-soft, and blue-veined cheeses have a higher risk of *Listeria monocytogenes* (*L. monocytogenes*) contamination, which can result in listeriosis. The highest incidence of listeriosis is amongst the vulnerable population including individuals who are pregnant.¹²⁶ Symptoms of listeriosis are typically mild in people during pregnancy, but the passage of the organism through the placenta can cause miscarriage, stillbirth, perinatal septicemia, and meningitis in the newborn baby.¹²⁶ Due to the risk it carries to the unborn child, individuals who are pregnant are advised to follow cheese safety recommendations.

Soft, semi-soft, and blue-veined cheeses contain higher levels of moisture than hard or firm cheeses. Higher moisture content can aid in the growth of *L. monocytogenes*. In addition, soft, semi-soft, and blue-veined cheeses can also support the growth of the bacteria *L. monocytogenes* if contaminated after pasteurization (e.g. during packaging, while storing at home).¹²⁷

Safe cheese choices during pregnancy include:^{118,128}

- hard cheeses (e.g. parmesan, Romano), firm cheeses (e.g. cheddar, Swiss, and Colby) processed cheese slices and spreads, cream cheese, and cottage cheese when made from pasteurized milk.
- well-cooked soft, semi-soft, and blue-veined cheeses made from pasteurized milk.

Clarification on cheese safety messaging:

- AHS's recommendations are more cautious and advise the public is to choose pasteurized milk products.
 - Health Canada resources list unpasteurized hard cheeses as a safe alternative, due to their low moisture content.¹¹⁸
 - Health Canada resources list cheese dishes (e.g. casserole or au gratin) that contain unpasteurized and/or pasteurized soft, semi-soft, and blue-veined cheeses as safe to consume if cooked to an internal temperature of 74°C (165°F).^{118,129}
- Popular cheeses such as mozzarella, feta, Monterey Jack, and paneer can vary in risk. Advise people to consume only when cooked well when pregnant.^{126,128,130}

What are other food-related safety considerations?

Arsenic

Arsenic is a naturally occurring element found in our environment. It can enter groundwater through soil or erosion, and compounds of arsenic can be used for the manufacturing of products that can enter our environment.^{131,132} Arsenic may be found at very low levels in many foods including meat and poultry, milk and dairy products, bakery goods and cereals, vegetables, fruits and fruit juices, and fish and shellfish.¹³² The inorganic form of arsenic is of concern as it may contribute to potential adverse health effects including an increased risk of cancer.^{131,132} Rice and some types of seaweed can contain higher amounts of inorganic arsenic compared to other foods.¹³²

Some evidence has shown a positive relationship between in-utero arsenic exposure and acute respiratory tract infections among infants when high levels of arsenic were present in drinking water.¹³³ There are limitations in the research studies investigating associations between arsenic and adverse outcomes.^{133,134} As well, there is uncertainty about short and long-term health risks associated with a low dose, chronic arsenic exposure.¹³⁵

More research is needed to determine if there is an association between levels of arsenic exposure during pregnancy and adverse outcomes in infants and children. The Canadian Food Inspection Agency (CFIA) continues to monitor arsenic in foods and the potential human health risks associated with arsenic exposure.¹³² People are advised to follow a balanced diet that contains a variety of grains and whole grains (e.g. barley, oats, rice, and wheat).¹³⁵

Flaxseed and Flaxseed Supplements

There is insufficient evidence regarding the safety of flaxseed in pregnancy.^{91,92} Current recommendations are for individuals who are pregnant to restrict their consumption of flaxseed to the amounts commonly found in foods or to a maximum of 1 tbsp (15 mL)/day.⁹¹ During pregnancy, people are also advised to avoid flaxseed oil.⁹²

See also:

What advice can be given about omega-3 fatty acid supplements during pregnancy?

Honey

Both pasteurized and unpasteurized honey are considered safe for consumption during pregnancy.¹³⁶ Questions about the safety of honey arise because it can be contaminated with the spores of the bacteria *Clostridium botulinum*, which can grow in the digestive tract and produce harmful toxins, leading to botulism.^{136–139} In healthy adults, including during pregnancy, the digestive tract is able to protect against botulism infection.^{136,140,141} Botulism in adults is very rare.^{136,140,141} Honey has very low moisture content and high acidity, which makes contamination of honey with other harmful bacteria unlikely.¹³⁷ Honey is not recommended for children under one year of age as they are at risk of developing botulism because they have yet to develop sufficient protective bacteria in their intestines.¹⁴²

Liver

Individuals who are consuming foods high in preformed vitamin A, especially liver, may be at risk of exceeding the UL for vitamin A, depending on preformed vitamin A intake from other food and supplement sources. People are recommended to limit their consumption of beef liver, particularly during the first trimester of pregnancy, to less than 75 grams (2½ ounces) every two weeks.^{1,96} Public resources are more cautious in their recommendations and may suggest individuals who are pregnant limit liver consumption to no more than 75 g (2½ ounces) every two weeks, with no specification for the trimester of pregnancy.¹⁴³ This recommendation is below the tolerable upper limit level (UL) for vitamin A and considered safe for individuals^{\alpha} who are pregnant when taking a multivitamin supplement containing vitamin A.⁹⁶

Individual assessment and counselling by an RD can support people in adapting food and nutrient recommendations to their unique situations.

See also:

What is the concern with vitamin A supplements in pregnancy? When is a referral to a registered dietitian recommended?

Nutrition Guideline

Probiotic-containing Foods

Probiotics consumed in moderation from common foods with a long history of consumption such as yogurt and kefir are generally considered safe.²⁴ The probiotics generally used in these foods are usually *Lactobacillus* and *Bifidobacterium*.¹⁴⁴ Advise individuals who are pregnant to check with their care provider before consuming other popular food products. A specific example of a probiotic food product that has health and safety risks,^{145,146} may have adverse effects in immunocompromised individuals¹⁴⁵ and is not recommended during pregnancy is kombucha tea of any form.¹⁴⁷

Few probiotic strains have been tested for their safety during pregnancy.¹⁴⁸ Adverse effects have been reported for the probiotic *Saccharomyces*.¹⁴⁸ Advise people who are pregnant and considering taking probiotic supplements that limited evidence exists on the safety of their use during pregnancy and it is best to avoid probiotic supplement use.

Soy-containing Foods

The amount of soy commonly found in foods or beverages is unlikely to be a concern during pregnancy.^{1,95} Soy protein supplements or isoflavone supplements are not recommended during pregnancy as high intakes are mildly estrogenic and potentially could adversely affect fetal development.^{1,95}

Sugar Substitutes

Moderation is encouraged when consuming or recommending products sweetened with sugar substitutes.¹⁴⁹ Sugar substitutes include artificial sweeteners and intense sweeteners obtained from natural sources.¹⁵⁰ They may be bought as tabletop products or present in beverages (such as pop or fruit-flavoured beverages), 'diet' products, yogurt, breakfast cereals, canned fruit packed in water, baked goods, desserts, spreads, salad dressings, and chewing gums.

The moderate use of sugar substitutes during pregnancy is considered safe.¹⁴⁹ It is recommended that people who are pregnant avoid excessive consumption of products containing sugar substitutes as such foods could replace nutrient-dense, energy-yielding foods.¹⁴⁹

Table 12. Sugar Substitutes and Common Brands Considered Safe in Moderate Amounts¹⁵¹

Sugar Substitutes	Common Brand Names
Acesulfame Potassium	Ace-K or Sunett [®]
Aspartame	Nutrasweet®, Equal®, private label brand
Saccharin	Hermesetas®
Stevia	Krisda®, Truvia®, stevia, Pure Via™
Sucralose	(Splenda [®])

Note: Advise clients to read the ingredient label as name brands and store brands can have multiple products with different sugar substitutes. For example, the Sugar Twin[®] brand products may use cyclamate, sucralose, or stevia sugar substitutes.

Cyclamates:

 Caution¹⁴⁹ or avoidance is recommended for the use of cyclamates (Sucaryl[®], Sugar Twin[®], Sweet N'Low[®], Weight Watchers Table-Top Sweetner[®]) during pregnancy due to unknown risks associated with consumption above the acceptable daily intake (ADI) of 11 mg/kg body weight. People who are using cyclamates are advised to limit their intake to below the ADI. Limit intake to two packages of Sugar Twin[®] containing cyclamate/day to remain within this recommendation.¹⁵²

Stevia leaves:

• Stevia leaves (fresh, dried, or powdered) and crude extracts of stevia leaves are available in Canada for use in personal cooking.¹⁵⁰ The safety of this product for consumption during pregnancy is not known.¹⁵³

Other:

- Other sugar substitutes permitted for use in Canada¹⁵¹ and considered safe for consumption at or below the ADI for the specific sugar substitute include advantame, D-tagatose, neotame, and thaumatin.¹⁵⁴
- Sugar alcohols permitted for use as food additives in Canada include hydrogenated starch hydrolysates, isomalt, lactitol, maltitol, maltitol syrup, mannitol, sorbitol, sorbitol syrup, xylitol, and erythritol. Health Canada advises that the consumption of approved sugar alcohols does not pose a health risk during pregnancy.^{154,155}

Common Discomforts of Pregnancy Considerations

Return to Key Questions

Nausea and vomiting-what can be done during pregnancy?

Nausea and vomiting during pregnancy (NVP) is the most common medical condition of pregnancy, affecting 50% to 80% of all individuals^α who are pregnant.¹⁵⁶ In most cases NVP subsides by the 16th week of pregnancy, however, up to 20% of individuals continue to have symptoms throughout their pregnancy.¹⁵⁷ It is recommended that other causes of nausea and vomiting (gastrointestinal, genitourinary, central nervous system, and toxic/metabolic problems) be ruled out when assessing clients.¹

Hyperemesis gravidarum (HG) is a severe form of NVP that affects approximately 0.3–2% of pregnancies.¹⁵⁶ HG has been defined as persistent and excessive vomiting starting before the end of the 22nd week of pregnancy and may be diagnosed as mild or severe.¹⁵⁶ Severe HG may include metabolic disturbances such as carbohydrate depletion, dehydration, and electrolyte imbalance.¹⁵⁶ Large ketonuria and a significant weight loss of at least 5% from pre-pregnancy weight are often included as criteria for diagnosis of HG.¹ Treatment for HG may require hospitalization and interventions such as intravenous fluid replacement therapy, total parenteral nutrition, and anti-nausea medication.

Individuals with NVP or HG can experience substantial physical and emotional impacts on their daily functioning, affecting their well-being and quality of life. Supportive counselling from any care provider is recommended to help clients deal more positively with the effects.¹⁵⁶

Supplementation with a multivitamin containing iron may not be tolerated for some people experiencing NVP. If a multivitamin supplement with iron is not tolerated and iron stores are sufficient, a multivitamin supplement with lower iron or without iron may be taken until NVP subsides. If any multivitamin supplement is not tolerated single vitamin supplements of 0.4 mg (400 mcg) folic acid and 400 IU vitamin D may be taken until NVP subsides.^{156,157}

Advise clients experiencing NVP to eat pregnancy-safe foods that are appealing and tolerable to them while aiming for a healthy diet. Anecdotal evidence suggests dietary strategies that may reduce symptoms of nausea and vomiting include:

- Eat small frequent meals every 1–2 hours to avoid a full stomach.
- Separate solids and liquids to prevent the stomach from becoming too full. For example, eat a small portion of food, wait 20–30 minutes, then take some liquids.
- Choose dry, bland, salty, and/or high-protein foods for snacks and meals.
- Eat foods and beverages at room temperature and avoid those that are hot or cold (depending on personal preference).

• Choose lower-fat, higher-protein foods.

- Eat before getting out of bed and when nausea is less severe.
- Eat before, or as soon as feeling hungry to avoid an empty stomach that may aggravate nausea.
- Do not swallow excessive saliva (spit out the saliva and rinse mouth frequently).
- Avoid offensive odours or sensory stimuli.
- Try colder fluids, including ice chips and Popsicles[®].

Individuals with nausea are encouraged to drink fluids as tolerated, particularly fluids with electrolytes if dehydration is a concern.¹⁵⁸ When liquids cannot be tolerated without vomiting and vomiting has not responded to outpatient management, a physician may recommend hospitalization for evaluation and treatment. Fatigue may exacerbate NVP; clients can be encouraged to lie down as needed and increase rest.¹⁵⁶ Advise individuals experiencing NVP to discuss the condition with their physician, especially when medical or alternative therapies for NVP are being considered.

Constipation-what can be done during pregnancy?

Constipation occurs among 11–38% of people^{α} during pregnancy.^{9,159} It may occur as a side effect of high doses of supplemental iron and/or as part of the digestive changes associated with pregnancy.⁹ Constipation is often caused by increased levels of progesterone and a decrease in gut transit time in the second and third trimesters.¹⁵⁹

There is limited evidence to support the effectiveness of interventions to manage constipation during pregnancy.⁹ Anecdotal evidence suggests strategies that may reduce symptoms of constipation include:

- Drinking 10 cups (~2.5 L) fluids every day.⁹ One cup is equivalent to 250 mL (8 oz). This total amount of fluids includes all types of non-alcoholic beverages such as milk and plant-based beverages and fluids found in soups. Water is recommended to be the main source of fluids.⁹
- Increasing fibre intake by eating high-fibre foods including legumes such as beans, split peas and lentils, whole grain breads, 100% bran cereals, and vegetables and fruit.⁹
- Regular physical activity including safe activities during pregnancy such as walking and swimming.⁹

Additional support from an RD is recommended for people with severe ongoing constipation issues for dietary intervention. Advise clients to discuss the use of fibre supplements and laxatives with a physician before use.

See also:

When is a referral to a registered dietitian recommended?

What advice can be given to people about physical activity during pregnancy?

Heartburn-what can be done during pregnancy?

Approximately 17–45% of individuals^α who are pregnant experience acid reflux or heartburn.⁹ Heartburn is a sensation of burning in the upper part of the digestive tract including the throat. It is caused by pregnancy hormones affecting the muscle that keeps food in the stomach and letting acid in the stomach come back up the throat.¹⁶⁰ Heartburn is a concern if it discourages eating during pregnancy. Relief from heartburn may be achieved through dietary and lifestyle changes. However, there has been no evidence-based recommendation for the treatment of heartburn in pregnancy.¹⁶⁰

Anecdotal evidence of strategies that may reduce symptoms of heartburn include:

- avoiding foods and drinks that make symptoms worse^{160,161}
- eating small, more frequent meals^{9,160-162}
- eating slowly and chewing food well¹⁶²
- drinking fluids between meals, not with meals¹⁶²
- avoiding carbonated drinks and beverages containing caffeine^{9,162}
- avoiding lying down right after eating^{9,161,162}
- raising head and shoulders when lying down^{9,160-162}
- avoiding fried or greasy foods^{9,162}

People with resistant symptoms are recommended to seek advice from their physicians about the use of over-the-counter and prescription medications to relieve symptoms.

Health Condition Considerations in Pregnancy

Return to <u>Key Questions</u>

Are there special nutrition considerations regarding diabetes in pregnancy?

Nutrition counselling by an RD is a recommended component of care for people at risk for or diagnosed with diabetes in pregnancy, including people with pre-existing type 1 diabetes, type 2 diabetes, or those diagnosed with gestational diabetes mellitus (glucose intolerance with onset or first recognition during pregnancy).¹⁶³ Individuals with pre-existing diabetes (type 1 or type 2) who are of reproductive age are advised to seek preconception care from an interdisciplinary team.¹⁶³ Recommended counselling components for individuals with pre-existing diabetes include the importance of glycemic control prior to pregnancy, the impact of BMI on pregnancy outcomes, and the need for a multivitamin supplement containing 1 mg (1000 mcg) folic acid every day, starting at least three months prior to pregnancy.¹⁶³

People at high risk for gestational diabetes mellitus (GDM) can be referred for nutrition counselling on healthy eating and prevention of excessive gestational weight gain in early pregnancy, ideally, before 15 weeks of gestation, to reduce the risk of developing GDM. Risk factors for GDM include:¹⁶³

- age 35 or older
- BMI greater than or equal to 30 kg/m²
- member of a high-risk population (Indigenous, Hispanic, South Asian, Asian, African, Arab)
- parent or sibling with type 2 diabetes
- corticosteroid use
- prediabetes
- previous GDM diagnosis
- previous delivery of a macrosomic infant (large for gestational age)
- polycystic ovarian syndrome
- acanthosis nigricans (darkened patches of skin)

Screening for GDM at 24–28 weeks gestation is recommended for all people during pregnancy while screening at any stage of pregnancy is recommended for people with a high risk of GDM.¹⁶³ Individualized nutrition care from an RD for people at risk for or diagnosed with diabetes in pregnancy can promote adequate nutrition intake, achievement of target glucose levels, and appropriate weight gain and growth of the fetus.¹⁶³

See also:

When is a referral to a registered dietitian recommended?

For related Nutrition Guidelines see: Nutrition Guideline: Diabetes in Pregnancy

Are there nutrition considerations for hypertensive disorders of pregnancy?

Hypertensive disorders of pregnancy are the leading cause of adverse health and perinatal outcomes.¹ Hypertensive disorders of pregnancy include pre-existing hypertension, gestational hypertension, and pre-eclampsia or eclampsia.¹¹ Risks of uncontrolled pre-eclampsia include preterm delivery, intrauterine growth restriction, and morbidity and mortality during pregnancy.⁹

It is advised that individuals with pre-existing or chronic hypertension manage their blood pressure by monitoring sodium intake and following a balanced diet.¹⁶⁴ Individuals who are pregnant and have chronic hypertension combined with inadequate calcium intake during pregnancy may require a calcium supplement in doses of 1000–2500 mg per day to reduce their risk of preeclampsia.²² Referral to an RD is recommended to assess adequate calcium intake and the need for supplementation among clients with chronic hypertension.

Different dietary interventions for the prevention of gestational hypertension have been suggested. These include dietary salt restriction, calcium supplementation, vitamin D supplementation (alone or combined with calcium supplementation), multivitamin supplement with folic acid, and vitamin C and/or E supplementation.²² However, there is insufficient evidence at this time to make recommendations for specific dietary interventions or strategies.^{22,23} A healthy pre-pregnancy body weight is associated with a decreased risk of gestational hypertension. Note, however, that individuals are advised to follow the weight gain recommendations for their pre-pregnancy BMI. Weight loss or caloric restriction at any time during pregnancy is not recommended.²²

To manage hypertensive disorders during pregnancy, individuals who are pregnant are advised to:

- follow recommendations for adequate weight gain during pregnancy.
- monitor sodium intake and follow a balanced diet following Canada's food guide.
- take a multivitamin supplement that meets the recommendations of iron, folic acid, and vitamin D every day.
- meet calcium requirements with calcium-rich foods or to talk with an RD to assess the need for single mineral supplementation.

See also:

When is a referral to a registered dietitian recommended? How much weight gain is appropriate during pregnancy? Nutrients: Calcium and Vitamin D

Are there recommended foods to avoid during pregnancy to prevent infant allergies?

There is insufficient evidence to recommend avoidance of any single nutrient or any single food during pregnancy to prevent an allergy from developing in the infant.¹⁶⁵ During pregnancy, no restriction or avoidance of particular foods¹⁶⁶ or addition of foods or supplements¹⁶⁷ are proven to prevent allergy in the infant at this time. This is an area of current research.^{166,167}

During pregnancy, people are advised to follow a varied diet based on Canada's food guide. Dietary exclusion of nutritious foods can put the individual who is pregnant and their fetus at risk of nutrition inadequacy. When there is a diagnosed allergy, it is necessary to avoid foods that contain the allergy. There is evidence that reducing the number of times a person suffers from allergic reactions while pregnant can help reduce infant morbidity and mortality.^{168,169}

Refer individuals with multiple food allergies, or who restrict foods (protein foods, grains, and/or fruits and vegetables) due to pre-existing allergies, to an RD for nutrition counselling.

See also: When is a referral to a registered dietitian recommended?

Adolescent Pregnancy

Return to Key Questions

Adolescent pregnancies are considered high-risk.^{170,171} Adolescents who are pregnant are at increased risk of anemia, preterm birth, intrauterine growth restriction (IUGR), low birth weight (LBW), congenital anomalies, neonatal intensive care unit (NICU) admissions, and neonatal death.¹⁷⁰ Evidence suggests that medical risks are most severe for adolescents under 15 years.¹⁷¹

What are the nutrients of concern for pregnancy during adolescence?

The growing adolescent has distinct nutrition needs compared to adults, such that their nutrient requirements are higher than at any other point in life.¹⁷² Limited evidence suggests that nutrient intakes that fall most frequently below the DRI for adolescents during pregnancy are energy, iron, folate, calcium, vitamin E, and magnesium.¹⁷¹ Dietary survey findings from the 2004 Canadian Community Health Survey indicate that adolescents have inadequate intakes of nutrients of concern in pregnancy including folate, vitamin B₁₂, calcium, iron, and fibre.¹⁷³ During pregnancy, adolescents' calcium needs are higher than those of adults.⁴⁸ Adolescents who are pregnant need a total of 1300 mg calcium and 600 IU vitamin D daily to meet their requirements.⁴⁸

Energy needs are influenced by many factors, including growth status, pregravid weight, physical activity, stage of pregnancy, and body composition. Adolescents who are pregnant are at increased risk of anemia, and monitoring by their care provider for diagnosis and treatment is recommended.¹⁶⁶

Table 13. Nutrient Amounts Recommended for Adolescent Pregnancy from All Sources(food, multivitamin supplement, single-source supplement)

Nutrient	Recommended Amount Per Day for Adolescent Pregnancy (under 19 years)	Upper Limit (UL)
Calcium	1300 mgª	Total daily intake not to exceed 3000 mg ^a
Choline	450 mg ^a	Total daily intake not to exceed 3.0 g ^a
Fibre	28 g ^a	Safe upper limit not defined ^a
Folate/Folic Acid	0.6 mg (600 mcg) ^a	0.8 mg (800 mcg ^a) The UL for folate applies only to synthetic forms obtained from supplements, fortified foods, or a combination of the two ^a
lodine	0.22 mg (220 mcg)ª	Total daily intake not to exceed 1.1 mg (1100 mcg)ª
Iron	27 mg ^a	Total daily intake not to exceed 45 mg ^{a,b} unless advised by a physician. Monitor iron status closely.
Omega-3 Fatty Acids (DHA and EPA)	Include at least 150 g (5 oz) cooked fish rich in omega 3 fatty acids and low in mercury each week during pregnancy ^c	Safe upper limit not defined ^c
Vitamin A	750 mcg² (2500 IU)	2800 mcg ^a (9333 IU UL is for preformed vitamin A only ^a
Vitamin B ₁₂	2.6 mcg ^a	Safe upper limit not defined ^a
Vitamin D	600 IU ^a	Total daily intake not to exceed 4000 IU ^a

Sources:

^a Health Canada, 2010. Dietary Reference Intake Tables^{34,48}

^bIOM 2006⁴⁸

°Health Canada, 2009. Prenatal Nutrition Guidelines for Health Professionals: Fish and Omega-3 Fatty Acids³⁷

Referral to an RD for nutrition assessment and counselling is recommended, as this may result in improvements in mean birth weights, reduced low birth weight, and reduced preterm birth.^{170,174} Referral to a Canada Prenatal Nutrition Program, where projects are available in their community, is also recommended.

See also: When is a referral to a registered dietitian recommended?

Nutrition Guideline

What are the recommendations for gestational weight gain in adolescents?

Adolescents are at increased risk of preterm delivery and having low birth weight (LBW) and small gestational age (SGA) infants. The 2009 IOM report concluded there is insufficient evidence to support a modification of the gestational weight gain guidelines for adolescents greater than two years post-menarche.³² The IOM and the AND recommend that adolescents gain weight within the ranges for adult individuals^α for their pre-pregnancy BMI category.^{9,32} Very young adolescents (under 16 years of age) are at higher risk of delivering a small infant compared to those aged 16 years and older, despite the similar weight gain, and are advised to strive for weight gain at the upper end of the recommended range for their pre-pregnancy BMI category.³²

Nutrition assessment and counselling regarding weight gain during pregnancy is recommended for all adolescents.¹⁷⁰

See also:

When is a referral to a registered dietitian recommended? How much weight gain is appropriate during pregnancy?

Substance Use During Pregnancy

Return to Key Questions

Is it safe to consume alcohol during pregnancy?

Advise all people to avoid alcohol during pregnancy.^{9,175,176} Alcohol consumption in pregnancy can cause fetal harm.^{9,175-177} Alcohol is a teratogen that can cross the placenta and pass from parent to fetus. It is well established that exposure to alcohol at high-risk levels can have physical and neurodevelopmental effects on the infant.¹⁷⁵

Evidence of fetal safety or harm at low levels of alcohol consumption is inconsistent; therefore, a safe level of alcohol consumption cannot be established.^{9,175,177} Amount, timing, and frequency of alcohol intake alongside factors such as fetal genetic susceptibility and the health of the individual impact fetal alcohol spectrum disorder (FASD) risk.¹⁷⁸ Alcohol abstinence during pregnancy prevents FASD and the resulting birth defects and developmental disabilities.¹⁷⁸ Care providers are advised to create a safe environment for people to report alcohol consumption and to offer motivational counselling strategies aimed at helping to reduce or eliminate alcohol use.¹⁷⁵

Is it safe to consume cannabis during pregnancy?

Evidence exists about the side effects of cannabis or cannabis-derived products (e.g. cannabis edibles) used during pregnancy.¹⁷⁹ Cannabis use has been linked to birth defects, premature delivery, and low birth weight.¹⁸⁰ People are advised to avoid the use of these products throughout pregnancy and lactation.^{179,180}

Physical Activity During Pregnancy

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What needs to be considered when discussing physical activity during pregnancy?

There are many benefits to being physically active throughout pregnancy for both parent and fetus. Physical activity during pregnancy has been shown to have benefits such as the prevention of excessive gestational weight gain, gestational diabetes, and hypertensive disorders, as well as impacting appropriate birth weight, the timing of delivery, and child body composition.¹⁸¹⁻¹⁸³ Contraindications to physical activity may include, but are not limited to previous preterm birth or spontaneous abortion, intrauterine growth restriction, anemia, malnutrition or eating disorder, and other medical conditions such as uncontrolled type 1 diabetes, pregnancy-induced hypertension, and cardiovascular, respiratory, or systemic disorders.¹⁸³

The key recommendations of the 2019 Canadian Guideline for Physical Activity throughout Pregnancy are:¹⁸³

- Physical activity reduces the risk of common pregnancy complications.
- It is recommended to accumulate at least 150 minutes of moderate-intensity physical activity each week. There are many ways to achieve this including activities such as walking, that have minimal added expenses.
- Previously inactive people can safely start physical activity and gradually progress toward the recommended amount.

When participating in physical activity people should be cautious of activities where falling or direct physical contact may result in harm to themselves or their fetus.

Individuals who are pregnant are advised:

- to be physically active throughout pregnancy unless they have contraindications to being physically active and/or have been told not to be active by a care provider.
- to consult with their physician, obstetrician, or another prenatal provider (nurse practitioner or midwife) regarding advice about physical activity.
- that a physical activity professional (such as a kinesiologist, certified exercise physiologist, or an exercise therapist) can provide advice on being physically active throughout pregnancy

Other Special Considerations

Return to Key Questions

Are there special considerations when working with individuals with culturally diverse backgrounds (e.g. Indigenous peoples, immigrants, and refugees)?

Pregnancy may be a time for many people that provokes culturally-based responses and reactions from themselves, their families, and others. Care providers are encouraged to approach each client interaction as unique, avoiding stereotyping possible cultural influences in pregnancy based on past experiences or knowledge of cultural food practices.

Care providers are advised to continually assess and improve their own cultural competence. While no care provider can be an expert in all aspects of diversity, cultural competence involves continual learning that arises from experiences, encounters, and ongoing reflection.⁷

What are other important considerations when working with any individual?

Household Food Insecurity

Household food insecurity (HFI) is defined as "an inadequate or insecure access to food because of financial constraints",¹⁸⁴ it impacts physical, mental and social well-being. Care providers will encounter clients living in food-insecure households, due to the high prevalence of HFI among those accessing health care.¹⁸⁵

HFI is best addressed through income-based interventions.^{184,186,187} Those experiencing HFI have food preparation, budgeting, and cooking skills similar to the general population.¹⁸⁸ Interventions focused on food skills do not protect people from, nor improve HFI.¹⁸⁸ Emergency food programs (e.g. food banks) may provide temporary relief.¹⁸⁹ However, these programs do not solve HFI and are inappropriate and/or inaccessible for many clients.¹⁸⁹

Care providers can offer better support if they are aware when clients are worried about having enough money for food and are experiencing other challenges because of financial strain.^{190,191} Care providers are encouraged to work with clients to develop interventions that are sensitive to financial strain.

Key steps for care providers include:

 Learn about financial strain, how to screen clients for poverty, and the link between poverty and poorer health through the Identifying Financial Strain and Addressing Financial Barriers to Health Care Modules; available on MyLearningLink for AHS staff and on CLiC for Covenant Health staff.

- Review the <u>Nutrition Guideline: Household Food Insecurity</u> for additional information on how to support clients experiencing HFI.
- Assist clients in accessing available income supports. 211 Alberta (<u>ab.211.ca</u>) is a provincial directory that can be used to identify financial benefits, programs, and services.

Cost can be an obstacle to timely and appropriate folic acid supplementation and a significant barrier to healthy eating during pregnancy.⁴⁰ Support clients can access all eligible pregnancy-specific special diet funding and vitamin and mineral supplementation funding.

Additional income or nutrition supplement support may exist for individuals during their pregnancy:

- People who receive Assured Income for the Severely Handicapped (AISH) or Income Support (Alberta Works) may be eligible for funding to help cover the cost of a healthy diet during pregnancy.
- Multivitamin supplements may be available through the Alberta Adult Health Benefit (AAHB), Alberta Child Health Benefit (ACHB), Interim Federal Health Program (IFHP), the Non-Insured Health Benefits (NIHB) for First Nations and Inuit, Assured Income for the Severely Handicapped (AISH), and Income Support (Alberta Works).

Refer to the Point of Care Reference: Funding Options for Special Diets and Nutrition Products (via <u>ahs.ca/FoodInsecurity</u>) for details on all programs, eligibility and required steps to access coverage.

<u>Canada Prenatal Nutrition Program</u> (CPNP) projects in your community may provide vitamins, food, food coupons, and/or nutrition counselling.

Referral to a Registered Dietitian Return to Key Questions

When is a referral to a registered dietitian (RD) recommended?

A nutrition assessment by an RD will help determine if an individual has adequate calorie and nutrient intake. In addition to calorie and macronutrient intake, specific micronutrients to be assessed in pregnancy include calcium, vitamin D, omega-3 fatty acids, folic acid, and iron.

Referrals for individual nutrition assessment and counselling by an RD are especially important for individuals who:

- Are adolescents (less than 15 years old or less than 3 years since the onset of menses).
- Are pregnant with twins, triplets, or higher-order multiples.
- Previously had a low birth weight infant.
- Have a low pre-pregnancy weight-defined as less than 90% of desirable body weight or BMI less than 18.5 kg/m².

Have a poor weight gain in the second or third trimester-defined as less than 0.25 kg (0.5 lbs)/week for people with a pre-pregnancy BMI of 18.5–24.9 kg/m² and less than 0.5 kg

(1 lb)/week for multiple gestations and people with a pre-pregnancy BMI below 18.5 kg/m^2 .

• Have a nutrition-related health condition they are managing in conjunction to their pregnancy, such as gestational diabetes, pre-eclampsia, or other medical conditions with an impact on nutrition (e.g. inflammatory bowel disease, bariatric surgery, celiac disease).

Other reasons that could indicate an RD referral:

- Severe nausea and vomiting of pregnancy.
- Higher requirements for specific nutrients (e.g. additional folic acid needs above those recommended for most pregnancies).
- Weight gain during pregnancy that exceeds the recommended range based on prepregnancy BMI
- Risk for poor nutrient intake due to other factors including alcohol and substance use, poverty, and low socioeconomic status.
- Food allergies or food intolerances that cause severe food restrictions.
- Other restricted patterns of eating such as following a restricted vegetarian or vegan pattern of eating.

Referral processes will vary based on zone and site policy. Referral information and referral forms can be found at the Alberta Referral Directory.

Members of the public can also access a dietitian through 811. If Albertans over the age of 18 have a nutrition question, they can complete a self-referral at <u>ahs.ca/811</u> or call 811 and ask to talk to a dietitian. For more information about the dietitian services offered through Health Link, visit Health Link Dietitian Service.

Resources

Return to Key Questions

What resources are available for professionals?

Prenatal Nutrition Tool (PreNuT)

The <u>Prenatal Nutrition Tool (PreNuT)</u> helps prenatal programs or care providers identify nutrition issues to discuss with clients during their pregnancy and offer client-centred conversations about key nutrition issues. The tool is meant to be used by the care providers in discussions with a client.

Nutrition Guidelines and Supporting Resources

- Nutrition Guidelines for care providers on a variety of healthy eating and active living topics including general nutrition and nutrient information can be found on the <u>Nutrition</u> <u>Guidelines page</u>.
- Nutrition Guidelines for care providers on Pregnancy: Multiples.
- Health Canada Prenatal and Pregnancy Guidelines
- Resources to support healthy gestational weight gain:
 - Healthy pregnancy weight gain charts for singletons
 - BMI calculator wheel
 - Healthy pregnancy weight gain poster
- An accredited continuing medical education learning program on healthy pregnancy weight gain. Registration is free. All care providers are welcome to register.
 - Look for Healthy Pregnancy Weight Gain in the listing of <u>Self-Paced eLearning</u> <u>Courses on the University of Calgary Continuing Medical Education and Professional</u> Development online learning platform.
- <u>Clinical Practice Guideline on the Management of Nausea and Vomiting of Pregnancy</u> from the Society of Obstetrics and Gynecology Canada
- <u>Natural Medicines Database</u> provides information on health and safety considerations associated with food, herbs, and supplements.
- <u>A Clinical Guide to Probiotic Products Available in Canada</u>: Translates scientific evidence available for probiotic products into practical, clinically relevant information for health care providers.

Community Programs for At-Risk Individuals

• The <u>Canada Prenatal Nutrition Program (CPNP)</u> is a community-based program that provides support to improve the health and well-being of people who are pregnant, new parents, and babies facing challenging life circumstances.

What resources are available for the public?

Preconception Health

• For information on preconception health: ReadyOrNotAlberta.ca

Pregnancy and Birth

- General pregnancy nutrition information for the public can be found in <u>Healthy Parents</u>, Healthy Children.
- Health Canada has a website devoted to pregnancy information.
- Best Start has a <u>How to Survive Morning Sickness Guide</u> with tips for managing nausea and vomiting of pregnancy
- My Health Alberta also has a video on Managing Morning Sickness

Nutrition Handouts

- For nutrition resources visit Nutrition Education Materials.
- To access pictorial handouts for clients who are pregnant look under "Pregnancy & Breastfeeding". These pictorial handouts were created to support all individuals with food knowledge and skill-building during pregnancy, including English language learners.

Food Safety Handouts

 Health Canada: <u>Food Safety for Pregnant Women</u>^α. (Note: the sprout information does not align with AHS recommendations)

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