

### Recommendations

- Women who could become pregnant should be encouraged to achieve a healthy body mass index (BMI) of 18.5 - 24.9 prior to becoming pregnant.
- During pregnancy, women should follow Canada's Food Guide and include an extra 2 to 3 Food Guide Servings from any food group(s) every day in the 2<sup>nd</sup> and 3<sup>rd</sup> trimesters.
- All pregnant women should be advised to take a multivitamin containing 0.4 mg (400 mcg) of folic acid, 16-20 mg of iron, and a minimum of 400 IU of vitamin D. The multivitamin should also contain vitamin B<sub>12</sub>
- Pregnant women should be provided nutrition information that will help them make informed choices about:
  - Healthy weight gain
  - Important nutrients (folate, calcium, vitamin D, iron, omega 3 fatty acids)
  - Vegetarian lifestyles
  - Items to limit or avoid (alcohol, caffeine, some artificial sweeteners, fish higher in methylmercury, herbal products)
  - Food safety
  - Physical activity
  - Common concerns such as nausea, heartburn, constipation, and gestational diabetes mellitus.
- Referral for nutrition counselling by a Registered Dietitian is appropriate in circumstances such as:
  - a concurrent medical condition with an impact on nutrition (e.g. hyperemesis, bowel diseases)
  - an eating disorder, or a history of an eating disorder
  - less than 20 years old
  - expresses concerns around weight gain or body changes
  - pregnancy weight trend indicates inadequate or excessive weight gain
  - previous bariatric surgery
  - restricted diet (restricting multiple foods, avoiding an entire food group, vegan, etc.).

### Key Questions

#### How does maternal weight affect pregnancy outcomes?

Body mass index (BMI) is an independent predictor of many adverse events during pregnancy. Women should be encouraged to reach a healthy BMI before becoming pregnant.<sup>1</sup>

Weight gain is a normal part of pregnancy and dieting and weight loss should be avoided during pregnancy.<sup>2</sup> A woman 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 pre-term delivery.<sup>2</sup>

Women who gain excess amounts of weight are at increased risk for pre-term delivery, Caesarean section delivery, and retaining extra weight after delivery.<sup>2</sup> Maternal obesity and excessive weight gain during pregnancy is also associated with large-for-gestational-age infants.<sup>2,3</sup> These infants are at increased risk for childhood obesity.<sup>3,4</sup>

**How much weight gain is appropriate during pregnancy?**

Pre-pregnant BMI should be evaluated to determine individual weight gain recommendations and help with goal-setting. Appropriate weight gain ranges should be communicated to pregnant women, recognizing that individual variations occur.<sup>1,5</sup> Weight gain should be monitored by the primary health care provider and progress should be reviewed with pregnant women regularly to help them gain within their target range.<sup>1</sup>

Table 1 shows Canadian gestational weight gain recommendations for various pre-pregnant BMIs.<sup>1,2</sup>

**Table 1: Canadian gestational weight gain recommendations**

Pre-pregnancy BMI	Recommended range of total weight gain during pregnancy		Recommended <u>weekly</u> rate of weight gain (in 2 <sup>nd</sup> and 3 <sup>rd</sup> trimester)
	kg	lb	
<b>BMI &lt; 18.5</b> Underweight	12.5-18	28-40	0.5 kg (1.1 lb)
<b>BMI 18.5-24.9</b> Normal weight	11.5-16	25-35	0.4 kg (0.9 lb)
<b>BMI 25.0-29.9</b> Overweight	7-11.5	15-25	0.3 kg (0.6 lb)
<b>BMI ≥ 30</b> Obese	5-9	11-20	0.2 kg (0.5 lb)

Women who have already surpassed the recommended weight gain should be encouraged to continue gaining weight at the appropriate rate of gain according to their pre-pregnancy BMI.<sup>2</sup> These women will need additional post partum support to lose the extra weight gained in pregnancy and should be referred to a Registered Dietitian. Women who are gaining too much or not enough weight in pregnancy should be referred to a Registered Dietitian.<sup>2</sup>

**How much weight gain is appropriate for women carrying multiples?**

Women carrying multiple fetuses are at an increased risk of complications including preterm delivery, small-for-gestational-age infants and intrauterine growth restriction.<sup>6,7</sup> The Institute of Medicine (IOM) states there is insufficient data to establish firm guidelines on how much more weight women carrying multiple fetuses should gain beyond that recommended for women carrying singleton fetuses; however the IOM does give provisional guidelines for twin pregnancies, based on pre-pregnant weight, as follows:

**Table 2: IOM Provisional guidelines for total weight gain in twin pregnancies<sup>1</sup>**

Pre-pregnancy BMI	Recommended range of total weight gain during pregnancy	
	kg	lb
<b>BMI 18.5-24.9, Normal weight</b>	17-25	37-54
<b>BMI 25.0-29.9, Overweight</b>	14-23	31-50
<b>BMI ≥ 30, Obese</b>	11-19	25-42

These provisional guidelines reflect a rate of weight gain as indicated in Table 3:<sup>8</sup>

**Table 3: IOM Provisional guidelines for rate of weight gain in twin pregnancies**

Pre-Pregnancy BMI	Rates of weight gain/week (wk)			Cumulative weight gain		
	2-13 wks	14-26 wks	27 wks-delivery	By 13 wks	By 26 wks	37-42 wks
<b>Normal (18.5-24.9)</b>	0.12-0.49 kg (0.27-1.07 lbs)	0.64-0.94 kg (1.40-2.06 lbs)	0.50-0.83 kg (1.09-1.83 lbs)	1.4-5.4 kg (3.0-11.8 lbs)	10.0-16.4 kg (22.0-36.0 lbs)	16.8-24.5 kg (37-54 lbs)
<b>Overweight (25-29.9)</b>	0.03-0.39 kg (0.06-0.84 lbs)	0.57-0.87 kg (1.25-1.91 lbs)	0.42-0.81 kg (0.92-1.79 lbs)	0.3-4.3 kg (0.7-9.4 lbs)	7.7-14.1 kg (17.0-31.0 lbs)	14.1-22.7 kg (31-50 lbs)
<b>Obese (<math>\geq</math> 30)</b>	Not determined					

The IOM has concluded that there is insufficient information available to develop guidelines for underweight women carrying twins or for women carrying more than two fetuses.<sup>1</sup> Observational data by others has suggested that for triplet pregnancies a minimum weight gain of 16.3 kilograms (36 pounds) by 24 weeks gestation and a cumulative weight gain of at least 23 kilograms (50 pounds) is recommended.<sup>9</sup>

Women carrying multiples should be referred for supportive nutrition counselling with a Registered Dietitian.<sup>10</sup>

**What if my patient has had bariatric surgery and is now considering pregnancy?**

Pregnancy after bariatric surgery is an evolving field with limited evidence. With appropriate care, pregnancy after bariatric surgery appears to be safe and produces good maternal and fetal outcomes in those populations studied, however evidence is limited.<sup>11</sup> Women should discuss the timing of bariatric surgery and pregnancy with their physician.

*Refer to Guideline: Bariatric Surgery for Adults*

**Do women need to eat more food than usual during pregnancy?**

Energy requirements for pregnant women in their second or third trimesters are higher than for women who are not pregnant or breastfeeding.<sup>12</sup> Energy requirements for women who have a normal body weight at the start of their pregnancy are as follows:<sup>13</sup>

- First trimester: 0 additional calories per day
- Second trimester: approximately 350 additional calories per day
- Third trimester: approximately 450 additional calories per day

Health Canada recommends including an extra 2 to 3 Food Guide Servings from any food group of Canada's Food Guide each day to meet these increased requirements.<sup>14,13</sup> Women should be provided practical examples of additional caloric intake. Some examples of one Food Guide Serving are:

- 1 cup (250 mL) of 1% milk
- 1 slice of whole grain bread
- ½ cup (125 mL) of 100% orange juice
- 1½ ounces (50 g) of cheese

Women with multiple pregnancies have an even greater need for calories and nutrition to support the growing babies (organs, skeleton, brain, etc.), to help prevent preterm labour and to improve birth weight outcomes. It is estimated that women with twin pregnancies require additional calories daily above that of a singleton pregnancy.<sup>15</sup> These women are encouraged to have a minimum of 2-3 extra Food Guide Servings for *each* baby everyday to meet these needs.<sup>10</sup>

The increased energy requirements are a general guide. Caloric needs may be higher or lower based on pre-pregnancy weight and gestational weight history. If there is concern about inadequate or excessive intake, consider consultation with a Registered Dietitian.

#### What nutrients are important during pregnancy?

##### Folate

Folate has been shown to reduce the risk of neural tube defects (NTD).<sup>16</sup> Health Canada makes the following recommendations regarding folate intake:<sup>16</sup>

##### All women who could become pregnant require:

- a folate-rich diet;
- daily supplementation with a multivitamin containing folic acid (0.4 mg or 400 mcg) and vitamin B<sub>12</sub> for at least three months before conception and throughout pregnancy and lactation.

Examples of folate-rich foods include:

- lentils
- Romano beans
- black beans
- okra
- pinto beans
- white beans
- salad greens (such as Romaine lettuce, mustard greens and endive)
- asparagus
- spinach
- chick peas
- kidney beans

**Women with health risks** such as diabetes, epilepsy, obesity, family history of NTDs or a previous pregnancy with a NTD may require more than 0.4 mg (400 mcg) folic acid per day at least 3 months prior to conception and for the first 10 to 12 weeks of pregnancy, and should discuss recommendations with their doctor. Women should not take more than 1 mg (1000 mcg) without first talking to a doctor.

Applicable to: Nurses, Physicians and Other Health Professionals

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For more information, refer to Health Canada's *Prenatal nutrition guidelines for health professionals: Folate contributes to a healthy pregnancy*, available from <http://www.hc-sc.gc.ca/fn-an/pubs/nutrition/folate-eng.php>.

### Calcium and Vitamin D

Pregnant and lactating women need calcium and vitamin D to maintain the integrity of their bones, while providing for the skeletal development of the fetus and the production of breast milk.<sup>17</sup>

Calcium needs in pregnancy are the same as the age-adjusted guidelines for all females. This is because pregnancy causes alterations in vitamin D synthesis, which increases the intestinal absorption of calcium.<sup>17</sup>

Canadian women are at risk for having low vitamin D status.<sup>18</sup> Risk factors for low vitamin D status include being overweight or obese, living at northern (north of 37°N) latitudes during the winter, having darker pigmented skin, or having limited exposure to direct sunlight.<sup>19,20,21,22,23,24</sup>

The IOM recommends pregnant individuals obtain the following daily amounts of calcium and vitamin D from all sources (food and supplements).<sup>17,25</sup>

- 9 to 18 years of age: 1300 mg/d of calcium and 600 IU/d of vitamin D
- 19 to 50 years of age: 1000 mg/d of calcium and 600 IU/d of vitamin D

All pregnant women should be advised:

- to consume food sources of calcium and vitamin D, including the consumption of at least 2 cups of fluid milk or fortified plant based beverage daily and at least 2 servings of fish per week;
- to ensure their multivitamin contains 400 IU of vitamin D.<sup>17,26</sup> Some pregnant women may be advised higher levels based on individual assessment by their primary health care provider;
- to not exceed the upper limit of 4000 IU of vitamin D and 2500 mg calcium (3000 mg for <18 years) from food and supplements.<sup>17</sup>

### Iron

Additional iron is needed during pregnancy to increase the maternal red blood cell mass and to supply the growing fetus and placenta.<sup>27</sup> The iron obtained from a mixed diet as recommended by Canada's Food Guide and a multivitamin containing iron will help women obtain the amount of iron they need for pregnancy.<sup>14</sup>

Examples of dietary sources of iron are beef, shrimp, sardines, lamb, chicken, pork, fish, pumpkin seed kernels, tofu (medium or firm), legumes (such as beans, lentils, chick peas).<sup>27</sup>

Pregnant women should take a multivitamin each day that has between 16 and 20 mg of iron.<sup>27</sup> Health care providers should confirm with pregnant women the type and amount of iron supplements they are taking, and discuss whether they have requirements above those stated here.

For more information, refer to Health Canada's *Prenatal nutrition guidelines for health professionals: Iron contributes to a healthy pregnancy*, available from: <http://www.hc-sc.gc.ca/fn-an/pubs/nutrition/iron-fer-eng.php>.

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**Omega 3 Fatty Acids**

Research has shown that omega-3 fatty acids are important for overall health, providing benefits such as lowering the risk of heart disease.<sup>28</sup> Omega-3 fatty acids include:<sup>29</sup>

- Alpha-linolenic acid (ALA)
- Eicosapentaenoic acid (EPA)
- Docosahexaenoic acid (DHA)

More of the documented health benefits of omega-3 fatty acids are from EPA and DHA than from plant-derived ALA.<sup>30,31</sup> Literature emphasizes the importance of DHA for an infant’s early neurodevelopment during pregnancy and in the first 2 years of life.<sup>32,33</sup> EPA and DHA are primarily found in fish, shellfish, fish oil supplements, and omega-3 enriched eggs.<sup>34</sup> ALA is found in plant sources such as walnuts, flaxseed, canola and soybean oils.<sup>34</sup> ALA is converted to EPA and DHA in humans, but the amount of ALA converted is very low.<sup>34,35</sup>

Dietitians of Canada and the Academy of Nutrition and Dietetics recommend 500 mg per day of DHA and EPA for healthy individuals.<sup>35</sup> DHA is difficult to get from foods other than fish, fish oil supplements or DHA-supplemented food.<sup>34</sup> Pregnant women should be advised to consume at least 2 Food Guide Servings (75 grams or 2 ½ ounces each) of fish each week,<sup>14</sup> emphasizing fish that are high in EPA and DHA.<sup>36</sup> Good sources of EPA and DHA are herring, Atlantic mackerel, salmon, sardines and rainbow trout.<sup>32</sup>

**Table 4: Food sources of omega-3 fats:<sup>37,38</sup>**

	ALA (mg)	DHA (mg)	EPA (mg)
Flaxseed oil- 1 tsp (5 mL)	2581	-	-
Flaxseeds, ground - 1 tbsp (15 mL)	1641	-	-
Salmon, Atlantic- 2 ½ oz (75 g)	85	1093	518
Tuna, light, canned in water – 2½ oz (75 g)	-	167	35
Rainbow Trout - 2 ½ oz (75 g)	140	390	351
Walnuts, chopped - ¼ cup (60 mL)	2694	-	-
Shrimp, mixed species - 2 ½ oz (75 g)	9	-	128
Clam, mixed species - 2 ½ oz (75 g)	6	110	104
Naturegg™ Omega 3 - 2 large eggs (106 g)	614	150	12
Naturegg™ Omega Pro™ 2 egg equivalent liquid egg – 1/2 cup (125 mL)	52	250	250

For more information on the safety of sources of omega 3 fatty acids, refer to Key Questions “Is it safe for pregnant women to consume fish?” and “Is it safe for pregnant women to take omega 3 supplements?”

**Are there any extra considerations for adolescent pregnancy?**

The growing adolescent has distinct nutritional needs compared to non-adolescents. Failure to consume an adequate diet during this period can result in delayed sexual maturation and can stop or slow linear growth.<sup>39</sup> Adolescents may not have adequate knowledge of nutrition and their “present focused” orientation may inhibit them from easily understanding how their current behaviours relate to later outcomes.<sup>39</sup>

Limited data is available on the nutrient needs in pregnant adolescents. The Dietary Reference Intakes developed by the Institutes of Medicine should be referred to as a guideline.<sup>29</sup> Energy needs are influenced by many factors, including: growth status, pregravid weight, physical activity, stage of pregnancy, and body composition. Dietary survey findings indicate that adolescent girls have inadequate intakes of vitamins (folate, vitamin A, E, B<sub>6</sub>), minerals (calcium, iron, zinc), and fibre, as well as excessive intakes of total fat, saturated fat, sodium and cholesterol.<sup>40</sup> Pregnant adolescents are at increased risk of anemia, and should be monitored by their health care provider for diagnosis and treatment.<sup>41</sup>

Pregnant adolescents should be referred to a Registered Dietitian for nutrition assessment and counselling.

**Are there any extra considerations with vegetarian lifestyles?**

Well-planned vegetarian diets are appropriate for all stages of the life cycle, including pregnancy and lactation.<sup>42</sup> Vegetarian diets support good nutritional 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 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.<sup>42</sup>

To optimize nutrition, health care providers should:

- identify the type of vegetarian diet followed (e.g. lacto-ovo, vegan);<sup>42</sup>
- help vegetarian women assess, as early as possible, whether eating patterns generally follow Canada's Food Guide;<sup>43</sup>
- encourage vegetarian women to plan their diet well, by including a variety of vegetarian food choices offered in each food group of Canada's Food Guide;<sup>43</sup>
- advise vegans to consume a source of vitamin B<sub>12</sub> to meet the Recommended Dietary Allowance (RDA) of 2.4 µg/d for adults;<sup>44</sup> and
- refer vegan women who are pregnant or planning a pregnancy to a Registered Dietitian for nutrition assessment and counselling.

**Energy**

The energy recommendations for pregnant vegetarian women do not differ from those for non-vegetarian women.<sup>42</sup> Vegans may have a lower BMI than non-vegetarians. Women with a BMI <18.5 should be encouraged to consume enough energy to gain an appropriate amount of weight during pregnancy.<sup>1</sup>

### Iron

Pregnant women following vegetarian diets are at higher risk for iron deficiency.<sup>44</sup> Well-chosen vegetarian diets can provide adequate iron; however, iron needs of vegetarians are 1.8 times higher than non-vegetarians due to the reduced bioavailability of vegetarian sources of iron.<sup>42</sup> Iron supplements may be needed to prevent or treat iron deficiency anemia.<sup>42,44</sup> High intakes of calcium, phytates and polyphenols found in tea and cocoa are inhibitors of iron absorption, while vitamin C enhances absorption.<sup>42</sup>

### Calcium and Vitamin D

Vegans face the greatest risk of inadequate calcium intake and should include a wide variety of non-dairy sources of calcium in their diet.<sup>42</sup>

All pregnant women should be advised to ensure their multivitamin contains 400 IU of vitamin D.<sup>17,26</sup>

A higher dose supplement may be needed for those individuals at risk for vitamin D deficiency or osteoporosis.<sup>45</sup> Individuals can be referred to their physician or health care provider to find out if they are at risk of vitamin D deficiency or osteoporosis.

### Vitamin B<sub>12</sub>

Vegans are at high risk of inadequate intake of vitamin B<sub>12</sub>, which is available only from animal sources.<sup>42,44</sup> Vegans who exclude all animal products from their diet will require a source of vitamin B<sub>12</sub> from a combination of supplements, fortified food, or a reliable plant source modified to contain a bio-available source of vitamin B<sub>12</sub> to meet the daily requirement of 2.4 ug. Dietary sources of vitamin B<sub>12</sub> appropriate for a vegan diet include fortified soy milk and meat analogues.<sup>44</sup> In Canada, although vitamin B<sub>12</sub> fortification is permitted in meat analogues, such as tofu burgers, often these foods are not fortified. It is important to read labels. Vegetarian diets are typically high in folic acid, which can mask the hematological symptoms of vitamin B<sub>12</sub> deficiency.<sup>42</sup>

### Zinc

In general, zinc status among vegetarians is good. However, as with iron, high intakes of phytates may interfere with absorption and are potentially detrimental to zinc status.<sup>42</sup> Vegetarians should consume zinc-rich foods such as nuts, legumes, cheese, soy, whole grains, milk, and egg yolk often.

### DHA

Vegetarians or vegans who avoid fish may not be consuming adequate DHA. Because of DHA's beneficial effects on an infant's early neurodevelopment, pregnant and lactating vegetarians and vegans should choose food sources of DHA (fortified foods or omega-3 eggs) or use a microalgae-derived DHA supplement.<sup>42</sup>

For more information on key nutrients in pregnancy, refer to Key Question *"What nutrients are important during pregnancy?"*

*Refer to Guidelines:* Vegetarian Eating; Calcium and Vitamin D

**Is it safe for pregnant women to consume fish?**

Fish is a widely consumed, highly nutritious source of protein, vitamin D and omega-3 fatty acids. To obtain the many nutritional benefits that eating fish provides, Health Canada recommends that everyone aged 2 and up eat at least 2 Food Guide Servings (75 grams or 2 ½ ounces each) of fish each week.<sup>14</sup>

Along with the potential benefits of fish consumption, there are risks of possible exposure to harmful contaminants. A form of mercury known as methylmercury (MeHg) is a toxin present in the environment and in trace amounts in all foods.<sup>46</sup> Fish is the primary source of MeHg exposure in humans,<sup>32,46,47</sup> and is present in some types of fish at concentrations that have the potential to impair human health.<sup>48</sup> Infants who have had very high MeHg exposure in the womb may experience neurodevelopment abnormalities such as mental retardation, cerebellar ataxia, primitive reflexes, dysarthria and hyperkinesias.<sup>49</sup> At chronic lower exposure levels, other neurodevelopment deficits, such as deficits in memory, motor, attention and verbal skills, may also occur.<sup>32,49</sup>

It is important to learn how to choose fish in order to obtain the greatest benefit while minimizing risk.

Pregnant women should be advised:

- to consume at least 2 Food Guide Servings each week of 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, clam, mussel and oyster;<sup>48</sup>
- that canned “light” tuna should be chosen over canned “white” or albacore tuna as “light” tuna contains less MeHg;<sup>48</sup>
- that it may be safest to avoid fish that are high in MeHg. High MeHg fish include fresh or frozen tuna, shark, swordfish, escolar, marlin, and orange roughy;<sup>48</sup> and
- to avoid raw fish and shellfish to reduce the risk of bacterial illness.<sup>50</sup>

Fish consumption advisories for fish caught in Alberta lakes and rivers can be accessed at <http://mywildalberta.com/> or by calling Alberta Health and Wellness at (780) 427- 4518. For toll-free access to Alberta Government offices clients can call 310-0000.

**Is it safe for pregnant women take omega-3 fatty acid supplements?**

***Individuals should consult a physician before taking an omega-3 fatty acid supplement.***

Supplements should not be considered equivalent to eating fish.<sup>51</sup>

**Fish Oil Supplements**

Fish oil supplements vary in the levels of EPA and DHA they contain.<sup>32</sup> Doses of fish oil (EPA + DHA) of less than 3 grams per day can be safely used by most individuals.<sup>52,53</sup> Fish oil supplements contain little to no mercury.<sup>54</sup> However, fish *liver* oil supplements (e.g. cod liver oil) contain high levels of vitamins A and D. Therefore, they should not be taken by pregnant or breastfeeding women.<sup>55</sup> Fish oil supplements are contraindicated for women with intra-uterine bleeding and other bleeding disorders, or for women taking blood thinners.<sup>56</sup> Women should be advised to look for a Natural Product Number (NPN) when choosing a supplement. Those who dislike the “fishy” taste of fish oil supplements can be advised to store them in the freezer or look for an enteric coated supplement.

### Algal Supplements

Supplements containing EPA and/or DHA made from algae are also available.<sup>57</sup> These would be suitable for vegetarians and individuals who are allergic to fish.

### Flaxseed and Flaxseed Supplements

Theoretically, flaxseed may adversely affect pregnancy due to its mild estrogenic effects; however, there is insufficient reliable clinical evidence about the effects of flaxseed on pregnancy outcomes.<sup>58,59</sup> A Health Canada monograph for flaxseed does not identify any contraindications with doses of up to 6 Tbsp (90 mL) of ground flaxseed or 2 Tbsp (30 mL) of flaxseed oil per day during pregnancy.<sup>60,61</sup> However, because of the insufficient evidence regarding the safety of flaxseed in pregnancy and potential negative outcomes,<sup>58,59</sup> it may be safest for pregnant women to consume flax only occasionally, not daily.

### Should pregnant women limit caffeine intake?

Health Canada's recommendation for safe intake of caffeine in pregnancy is 300 mg per day.<sup>62</sup> Evidence suggests that a high caffeine intake (more than 300 mg/day) is associated with negative effects on reproduction, spontaneous miscarriage and low birth weight.<sup>63</sup>

Table 5: Caffeine content of some common foods and beverages<sup>37,64</sup>

Food and beverages	Amount	Caffeine content (mg)
Brewed coffee	8 oz (250 mL)	~100-145
Espresso coffee, restaurant-prepared	6 oz (175 mL)	376
Tea, regular	8 oz (250 mL)	35
Tea, green	8 oz (250 mL)	32
Tea, chai latte	8 oz (250 mL)	12
Tea, instant, sweetened, powder, water added	8 oz (250 mL)	8
Chocolate milk	8 oz (250 mL)	5
Energy drink	8 oz (250 mL)	75 or more
Cola	12 oz (355 mL)	30-100
Milk chocolate	1 oz (30 g)	7
Dark chocolate	1 oz (30 g)	13-26
Chocolate soy beverage	8 oz (250 mL)	5

Label reading should be encouraged so that individuals can make informed decisions about caffeine intake.

Decaffeinated coffees and teas can be enjoyed if they do not replace healthier drinks such as milk. For women who are not consuming adequate servings of Milk & Alternatives, decaf (coffee or tea) lattes may improve calcium intake.

**Should pregnant women avoid consuming energy drinks?**

The packaging for energy drinks regulated by Health Canada warns that the drinks should not be consumed during pregnancy.<sup>64</sup> Some energy drinks contain about as much or more caffeine per serving as an 8 oz cup (250 mL) of brewed coffee.

Some of the caffeine in energy drinks may come from herbs, such as guarana and yerba maté. The label on these energy drinks would list the herbs as ingredients, but the caffeine in the herbs may not be listed as a separate ingredient.<sup>65</sup> Therefore, it is possible to unintentionally consume more caffeine than is listed on the label.

**Are sugar substitutes safe during pregnancy?**

Sugar substitutes, which include artificial sweeteners and intense sweeteners obtained from natural sources,<sup>66</sup> may be present in beverages, table top sweeteners, “diet” products, baking, desserts, spreads, salad dressings and chewing gums. Moderate use of certain sugar substitutes (listed in table 6) during pregnancy is considered safe. Recently, the sugar substitutes saccharin and stevia were approved by Health Canada as safe to use in moderation during pregnancy.<sup>67,68,69,70,71,72,73</sup> Excessive consumption of products containing sugar substitutes should be avoided since such foods could replace nutrient dense, energy-yielding foods.

Cyclamates are not recommended in pregnancy.<sup>67,68,70,74</sup>

**Table 6: Sugar Substitutes and common brands**

Safe in moderate amounts	Not recommended
Aspartame (NutraSweet®, Equal®)	Cyclamates (Sucaryl®, Sugar Twin®, Sweet N’Low®, Weight Watchers Table Top Sweetener®)
Sucralose (Splenda®)	
Acesulfame Potassium (Ace-K or Sunett®)	
Saccharin (Hermesetas®)	
Stevia	

More information on the use of sugar substitutes can be found at:

<http://www.hc-sc.gc.ca/fn-an/securit/addit/sweeten-edulcor/index-eng.php>

**Should pregnant women avoid alcohol?**

Yes, alcohol should be avoided completely during pregnancy.<sup>75</sup> There is no safe amount or safe time to drink alcohol during pregnancy. Alcohol consumption during pregnancy can result in both low birth weight, and IUGR.<sup>76,77</sup> Drinking alcohol is associated with major developmental and neurological birth defects, which can have lifelong effects.<sup>78</sup> Alcohol increases the risk of giving birth to a baby with Fetal Alcohol Spectrum Disorder (FASD).<sup>75</sup>

**Are herbal teas and herbal products, natural health products, alternative and natural medicines safe during pregnancy?**

Herbs, herbal products, natural health products, and alternative and natural medicines can act like drugs in the body and some are not considered safe during pregnancy or lactation.<sup>79</sup>

Herbal teas generally considered safe during pregnancy, if taken in moderation (no more than 2-3 cups daily), are ginger,<sup>79,80,81,82</sup> orange peel,<sup>83,84,85,86</sup> red raspberry leaf,<sup>87,88,89,90,91,92,93,94</sup> peppermint leaf,<sup>87,95</sup> and rose hip.<sup>96</sup>

The consumption of herbs in pregnancy should be limited to the amount commonly found in foods or consumed in moderation as an herbal tea (no more than 2-3 cups daily).<sup>97</sup> If drinking herbal tea, pregnant women should only choose herbal teas that list the ingredients,<sup>98</sup> and should avoid consuming teas with any herbal ingredients listed in Table 7.

**Table 7: Herbal teas not recommended for consumption during pregnancy<sup>98,99,100</sup>**

Herbal teas identified as <u>not</u> safe to drink	Herbal teas with insufficient reliable information to recommend as safe to drink
chamomile <sup>101</sup> aloe coltsfoot juniper berry pennyroyal buckthorn bark comfrey labrador tea saffron duck root lobelia senna leaves hibiscus <sup>102</sup> chicory root <sup>103</sup>	burdock hops Japanese mint red bush tea (Rooibos tea) lemon balm <sup>104</sup> linden <sup>105</sup> valerian wild yam fennel Echinacea <sup>106,107,108,109</sup> evening primrose oil ginkgo St. John's Wort tea tree oil

For further information about the safety of herbal products, contact the Medication and Herbal Advice Line at 1-888-944-1012. Pregnant women should ask their physician before consuming any natural/complementary health product or herbal therapy.

**Are there foods a pregnant woman should or should not eat to prevent allergies in her baby?**

There is not enough evidence to recommend consumption of any single nutrient or food to prevent allergy from developing in the infant. Pregnant women should be advised to follow a varied diet based on Canada's Food Guide.

There is also insufficient evidence for a pregnant woman to exclude any highly allergenic foods (e.g. peanuts, eggs, cow's milk) from her diet to prevent her baby from becoming allergic.<sup>110,111,112,113,114,115,116,117,118</sup> Maternal elimination diets for allergy prevention during pregnancy are not recommended and could adversely affect maternal or fetal health.<sup>119</sup>

However, it is necessary for a pregnant woman to avoid the foods to which she has a diagnosed allergy.<sup>110</sup> There is evidence that reducing the number of times a woman suffers from allergic reactions while she is pregnant can help reduce the chances of the baby becoming allergic.<sup>120</sup>

Pregnant mothers who are following a diet that restricts foods from an entire food group due to pre-existing allergies (i.e. Grain Products, Vegetables and Fruit, Milk and Alternatives or Meat and Alternatives), or who have multiple food allergies, should see a Registered Dietitian for nutrition counselling.

#### Are pregnant women at a higher risk for food-borne illness?

Food poisoning or contamination by bacteria or parasites can happen at any time, but pregnant women and their unborn children are at higher risk of illness. Women who are planning to become pregnant and those who are pregnant should be counseled to avoid the following foods:<sup>75,121</sup>

- Raw foods: raw fish and shellfish (especially raw shellfish such as oysters and clams), raw meats, raw poultry.
- Foods made with raw or undercooked eggs such as homemade Caesar vinaigrette.
- Undercooked or ready-to-eat meat, poultry, and seafood such as hot dogs, non-dried deli-meats, refrigerated meat spreads, smoked seafood and fish. Hot dogs and non-dried deli meats can be eaten if heated until steaming hot.
- Unpasteurized milk products and foods made from them, including soft and semi-soft cheeses such as Brie, Camembert, feta, blue-veined varieties and Mexican-style cheeses unless made with pasteurized milk.
- Unpasteurized juices, such as unpasteurized apple cider.
- Raw sprouts, especially alfalfa sprouts, unless cooked before eating.

Pregnant women should follow food safety practices:<sup>75,121</sup>

- Read expiry dates.
- Avoid cross-contamination between raw foods and cooked foods.
- Do not store fresh or cooked meat and poultry products for more than 2 to 3 days in the refrigerator.
- Wash all raw fruit and vegetables thoroughly .
- Make sure hot foods are hot (above 60°C/140°F), cold foods are cold (below 4°C/39°F), and that all meats are well-cooked.
- Sufficient cooking or reheating of foods will destroy any micro-organisms; cook meats to 70 to 75°C, and reheat to at least 74°C; do not eat poultry or ground meat that is still pink, and avoid runny eggs or foods that contain raw eggs (e.g. Caesar salad and beverages such as eggnog).
- Wash hands prior to food preparation, and wash and disinfect (with household bleach) food preparation surfaces and utensils that have been in contact with raw foods.
- Do not wash hands or food with untreated water.
- Since cats are the definitive host for *Toxoplasma*, pregnant women should avoid contact with cat litter or garden soil that may contain cat feces.

**Should women be physically active during pregnancy?**

All women with no contraindications should be encouraged to participate in aerobic and strength conditioning exercise, as part of a healthy lifestyle, throughout their pregnancy. Activities should be chosen that minimize the risk of loss of balance and fetal trauma.<sup>122</sup> Women should be encouraged to discuss this topic with their physician/obstetrician.<sup>122</sup>

The PARmed-X for pregnancy is a screening tool developed by the Canadian Society for Exercise Physiology (CSEP) and endorsed by the Society of Obstetricians and Gynaecologists of Canada (SOGC) and Health Canada (available at: <http://www.csep.ca/forms.asp>). This tool can be used to screen women interested in physical activity during pregnancy.<sup>123</sup>

**Absolute contraindications** to exercise in pregnancy (as defined by the SOGC and CSEP) are: Ruptured membranes, preterm labour, hypertensive disorders of pregnancy, incompetent cervix, growth restricted fetus, high order multiple gestation (>3), placenta previa after 28 weeks, persistent 2<sup>nd</sup> or 3<sup>rd</sup> trimester bleeding, uncontrolled type 1 diabetes, thyroid disease, or other serious cardiovascular, respiratory or systemic disorder.<sup>123</sup>

**Relative contraindications** to exercise in pregnancy (as defined by the SOGC and CSEP) are: Previous spontaneous abortion, previous preterm birth, mild/moderate cardiovascular disorder, mild/moderate respiratory disorder, anemia, malnutrition or eating disorder, twin pregnancy after 28 weeks, or other significant medical conditions.<sup>123</sup>

**Nausea and Vomiting – what can be done during pregnancy?**

Nausea and vomiting of pregnancy (NVP) is the most common medical condition of pregnancy, affecting up to 80% of all pregnant women to some degree.<sup>124</sup> In most cases NVP subsides by the 16<sup>th</sup> week of pregnancy, however up to 20% of women continue to have symptoms throughout their pregnancy.<sup>125</sup>

It is recommended that other causes of nausea and vomiting (gastrointestinal, genitourinary, central nervous system and toxic/metabolic problems) be ruled out when assessing pregnant women.<sup>126</sup>

Hyperemesis gravidarum (HG) is a severe form of NVP that occurs in about 1% of pregnancies.<sup>127</sup> HG can lead to fluid, electrolyte, and acid-base imbalance, nutritional deficiency, and weight loss. Some have defined it as the occurrence of greater than 3 episodes of vomiting per day accompanied by ketonuria and a weight loss of more than 3 kg or 5 % of body weight.<sup>126</sup> Treatment for HG may require hospitalization and interventions such as intravenous fluid replacement therapy, total parenteral nutrition and anti-nausea medication.<sup>128</sup>

Women with NVP or HG can experience substantial physical and emotional impacts to their daily functioning. Supportive counselling from any health care professional should always be offered to help women deal more positively with the effects.<sup>129</sup>

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Women should be advised on dietary changes to reduce symptoms of NVP. They should be encouraged to eat what appeals to them and what they can tolerate while aiming to eat a healthy diet. This may include:<sup>130</sup>

- eating small frequent meals every 1-2 hours;
- separating solids and liquids. For example eat a small portion of food, wait 20-30 minutes, then drink some liquids;
- eating salty, dry, bland and/or high protein snacks/meals;
- avoiding hot or cold foods (depending on personal preference);
- choosing lower fat, higher protein foods;
- eating before getting out of bed & when nausea is less severe;
- eating before feeling hungry, or as soon as feeling hungry, to avoid an empty stomach that may aggravate nausea;
- not swallowing excessive saliva (spitting out the saliva and frequent mouth washing); and
- avoiding offensive odours or sensory stimuli.

Pregnant women with nausea should be encouraged to drink fluids as tolerated, particularly fluids with electrolytes if dehydration is a concern.<sup>131</sup> Because fatigue may exacerbate NVP, women should be encouraged to increase their rest, especially when symptomatic. Some women may benefit from prescription medications for their nausea; these should only be used under medical advice and supervision.<sup>132</sup>

<b>Heartburn – what can be done during pregnancy?</b>
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Many pregnant women experience heartburn caused by gastric reflux.<sup>133</sup> Heartburn is a concern if it discourages pregnant women from eating. Relief from heartburn is often achieved through simple dietary and lifestyle changes.

Reflux is more likely to happen during pregnancy because of a number of factors including:

- The enlarging uterus presses on the stomach and can force stomach contents up into the esophagus.
- Changing hormone levels during pregnancy lower the usual resistance of the esophageal sphincter.<sup>134</sup>

For women suffering from heartburn, the following practical management tips can be offered:<sup>135</sup>

- eat smaller, more frequent meals;
- eat slowly, chew food well, avoid tension while eating;
- drink fluids between meals rather than with meals to avoid stomach fullness;
- avoid spicy foods if they seem to exacerbate heartburn;
- reduce caffeine, chocolate and high fat foods;
- avoid lying down for at least one to two hours after eating to minimize reflux;
- avoid bending and stooping after eating;
- avoid eating and drinking, except for water, before bedtime;
- walk after meals;
- wear loose-fitting clothing;
- elevate the head of the bed; and
- do not take antacids without consulting a physician.

Women with resistant symptoms should seek advice from their physicians about the use of over the counter and prescription medications to relieve symptoms.

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**Constipation – what can be done during pregnancy?**

Constipation affects many women in pregnancy.<sup>75</sup> Dietary and lifestyle changes usually correct it. Constipation during pregnancy is linked to several physiological changes associated with pregnancy and an eating pattern low in fibre and liquids. Decreased physical activity, extra bed rest and iron supplements may also contribute to this common discomfort.<sup>136</sup>

To relieve the discomfort of constipation, pregnant women should be advised to:<sup>75</sup>

- increase fibre intake by eating more vegetables and fruit, whole grain breads and cereals, and legumes such as beans, split peas and lentils;
- drink 2.3 L or around 9 cups (1 cup = 8 oz or 250 ml) of fluid every day. Fluid can be in the form of beverages such as water, milk, and 100% fruit or vegetable juice.<sup>137,138</sup> Warm or hot fluids may be particularly helpful; and
- be active daily, with activities such as walking or swimming.

The use of fibre supplements and laxatives should be discussed with a physician prior to use.

**What is gestational diabetes?**

Gestational diabetes mellitus (GDM) refers to “glucose intolerance with onset or first recognition during pregnancy.”<sup>139</sup>

The Canadian Diabetes Association (CDA) recommends all pregnant women should be screened for GDM between 24 and 28 weeks gestation. If multiple risk factors for GDM are present, screening should occur during the first trimester and be reassessed during subsequent trimesters.<sup>139</sup>

Risk factors include:<sup>139,140</sup>

- Previous delivery of a macrosomic infant (Large for Gestational Age)
- Member of high risk ethnic group (Aboriginal, Hispanic, South Asian, Asian, African)
- Age  $\geq 35$
- BMI  $\geq 30$  kg/m<sup>2</sup>
- Polycystic ovarian syndrome (PCOS), acanthosis nigricans
- Corticosteroid use
- GDM in a previous pregnancy

Untreated GDM leads to increased maternal and perinatal morbidity, while intensive treatment is associated with outcomes similar to control populations.<sup>139</sup> The offspring exposed to GDM is at increased risk for:<sup>140</sup>

- macrosomia;
- cardiomyopathy;
- respiratory distress syndrome;
- birth trauma;
- neonatal metabolic derangements (hypoglycemia, hypocalcemia, hyperbilirubinemia, hypomagnesemia);
- and stillbirth.

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These children are also predisposed to type 2 diabetes, doubling the risk of children born to non-diabetic women.<sup>140</sup> Women with a history of GDM are at higher risk for type 2 diabetes and metabolic syndrome. Women should be screened postpartum to determine their glucose status.<sup>139</sup>

Women should be advised that a healthy weight prior to pregnancy may help reduce the risk of developing GDM.

### What resources are available for pregnant women?

**Alberta Health**– Healthy Eating and Active Living for Pregnancy booklet. Available online at: <http://www.healthyalberta.com/Documents/healthy-eating-pregnancy.pdf>

**Health Canada** – Has a website devoted to pregnancy information. Available at: [www.healthypregnancy.gc.ca](http://www.healthypregnancy.gc.ca)

### Are there any handouts on pregnancy I can use with my clients?

Refer to approved provincial Alberta Health Services bariatric nutrition handouts to support patient education. For more information, contact [Nutrition.Resources@albertahealthservices.ca](mailto:Nutrition.Resources@albertahealthservices.ca)

### References

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- <sup>1</sup> Food and Nutrition Board, Institute of Medicine; Board on Children, Youth and Families. Weight gain during pregnancy: reexamining the guidelines [Online] 2009 [cited 2010 Jul 12]; Available from: [http://books.nap.edu/catalog.php?record\\_id=12584#orgs](http://books.nap.edu/catalog.php?record_id=12584#orgs)
- <sup>2</sup> Health Canada. The Canadian gestational weight gain recommendations [Online] 2009 [cited 2013 Mar 15]; Available from: <http://www.hc-sc.gc.ca/fn-an/nutrition/prenatal/qa-gest-gros-qr-eng.php>
- <sup>3</sup> American College of Obstetricians and Gynecologists. The Committee opinion: obesity in pregnancy. *Obstet Gynecol.* 2005;106(3):671-5.
- <sup>4</sup> Tough S, Tofflemire K, Jack M. Reproduction in Alberta: a look at the preconception, prenatal, and postnatal periods. Prepared for the Alberta Centre for Child, Family and Community Research [Online] 2006 Jun [cited 2009 Oct 27]; Available from: <http://www.aphp.ca/pdf/Reproduction%20in%20Alberta-2006%2006%2020.pdf>
- <sup>5</sup> Walker LO. Managing excessive weight gain during pregnancy and the post-partum period. *J Obstet Gynecol Neonatal Nurs.* 2007;36:490-500.
- <sup>6</sup> Goodnight W, Newman R – for the Society of Maternal-Fetal Medicine. Optimal nutrition for improved twin pregnancy outcome. *Obstetrics & Gynecology.* 2009 November; 114(5):1121-34.
- <sup>7</sup> Chu SY, D'Angelo DV. Gestational weight gain among US women who deliver twins, 2001-2006. *Am J Obstet Gynecol.* 2009;200:390.e1-390.e6
- <sup>8</sup> Rasmussen KM, Yaktine AL, editors. Weight gain during pregnancy: reexamining the guidelines [consensus report online]. Washington: The National Academies; 2009 [cited 2012 Sept 12]; Available from: <http://www.iom.edu/Reports/2009/Weight-Gain-During-Pregnancy-Reexamining-the-Guidelines.aspx>
- <sup>9</sup> Dietitians of Canada. What is the recommended weight gain for women carrying multiple fetuses? In: Practice-based evidence in nutrition [knowledge pathway online]. 2010 Oct 13 [cited 2010 Oct 26]; Available from: [:http://www.pennutrition.com](http://www.pennutrition.com). Restricted to access members only.
- <sup>10</sup> Dietitians of Canada. Multi-fetal pregnancy background. In: Practice-based evidence in nutrition [knowledge pathway online]. 2009 Apr 2 [cited 2012 May 31]; Available from: [:http://www.pennutrition.com](http://www.pennutrition.com). Access only by subscription.
- <sup>11</sup> Kominiarek, MA. Pregnancy after Bariatric Surgery. *Obstet. Gynecol. Clin. N.Am.* 2010;37:305-307-320.
- <sup>12</sup> Food and Nutrition Board, Institute of Medicine. Dietary reference intakes for energy, carbohydrate, fibre, fat, fatty acids, cholesterol, protein and amino acids (macronutrients). Washington, DC: National Academy Press; 2005.
- <sup>13</sup> Health Canada. Prenatal nutrition guidelines for health professionals – background on Canada's Food Guide [Online]. 2009 [cited 2010 Jul 19]; Available from: [:http://www.hc-sc.gc.ca/fn-an/pubs/nutrition/guide-prenatal-eng.php](http://www.hc-sc.gc.ca/fn-an/pubs/nutrition/guide-prenatal-eng.php)
- <sup>14</sup> Health Canada. Eating well with Canada's food guide. Ottawa, Ontario: Health Canada; 2007. Pub 4651
- <sup>15</sup> Rosello-Soberon ME, Fuentes-Chaparro L, Casanueva E. Twin pregnancies: eating for three? *Maternal nutrition update Nutr Rev.* 2005 Sep; 63(9):295-302.
- <sup>16</sup> Health Canada. Prenatal Nutrition Guidelines for Health Professionals – Folate Contributes to a Healthy Pregnancy, [Online] 2009 [cited 2012, May 4]; Available from: [:http://www.hc-sc.gc.ca/fn-an/pubs/nutrition/folate-eng.php](http://www.hc-sc.gc.ca/fn-an/pubs/nutrition/folate-eng.php)

- <sup>17</sup> Ross AC, Taylor, CL, Yaktine AL, Del Valle HB, editors. Dietary Reference Intakes for Calcium and Vitamin D [book online]. Washington: National Academy Press; 2011 [cited 2012 May 2]; Available from: : [http://books.nap.edu/openbook.php?record\\_id=13050&page=361](http://books.nap.edu/openbook.php?record_id=13050&page=361)
- <sup>18</sup> Statistics Canada. Vitamin D status of Canadians as measured in the 2007 to 2009 Canadian Health Measures Survey. Health Reports. 2010; 21(1):47-54.
- <sup>19</sup> First Nations, Inuit, and Métis Health Committee, Canadian Pediatric Society. Vitamin D supplementation: recommendations for Canadian mothers and infants. Paediatrics and Child Health [serial on the Internet]. 2007 (Reaffirmed 2012 Mar) [cited 2013 Feb 14];12(7):583-9. Available from: <http://www.cps.ca/english/statements/ii/fnim07-01.htm>.
- <sup>20</sup> Johnson DD, Wagner CL, Hulsey TC, McNeil RB, Ebeling M, Hollis BW. Vitamin D deficiency and Insufficiency is common during Pregnancy. American Journal of Perinatology. 2011; 28(1):7-11.
- <sup>21</sup> Dietitians of Canada. How much sunlight exposure, at what times of the year and at what latitude, is adequate in Canada for adequate skin vitamin D synthesis? In: Practice-based evidence in nutrition [knowledge pathway online]. 2008 Nov 10 [cited 2013 Feb 14]. Available from: <http://www.pennutrition.com>. Restricted access to members only.
- <sup>22</sup> Holick MF. High prevalence of vitamin D inadequacy and implications for health. Mayo Clin Proc. 2006;81(3):353-73.
- <sup>23</sup> Benson J. Hiding from the Sun: Vitamin D Deficiency in Refugees. Australian Family Physician. 2007; 36(5): 355-7.
- <sup>24</sup> Bodnar LM, Simhan HN, Powers RW, Frank MP, Cooperstein E, Roberts JM. High Prevalence of Vitamin D Insufficiency in Black and White Pregnant Women Residing in the Northern United States and Their Neonates. The Journal of Nutrition 2007; 137: 447-52.
- <sup>25</sup> Brown JP, Josse RG. 2002 Clinical practice guidelines for the diagnosis and management osteoporosis in Canada. CMAJ. 2002;167(10 suppl):S1-34.
- <sup>26</sup> National Institute for Health & Clinical Excellence. Improving the nutrition of pregnant and breastfeeding mothers and children in low-income households [Online] 2008 [cited 2012 Sept 12]; Available from: : <http://publications.nice.org.uk/improving-the-nutrition-of-pregnant-and-breastfeeding-mothers-and-children-in-low-income-households-ph11>
- <sup>27</sup> Health Canada. Prenatal Nutrition Guidelines for Health Professionals- Iron Contributes to a Healthy Pregnancy [Online] 2009 [cited 2012, May 4]; Available from: :<http://www.hc-sc.gc.ca/fn-an/pubs/nutrition/iron-fer-eng.php>
- <sup>28</sup> United States National Library of Medicine, National Institutes of Health. Medline Plus: Fish oil [Online] Updated 2011 Dec 10 [cited 2012 Apr 30]; Available from: <http://www.nlm.nih.gov/medlineplus/druginfo/natural/patient-fishoil.html>
- <sup>29</sup> Food and Nutrition Board, Institute of Medicine. The dietary reference intakes: The essential guide to nutrient requirements. Washington DC: National Academies Press; 2006.
- <sup>30</sup> Akabas SR, Deckelbaum, RJ. Summary of a workshop on n-3 fatty acids: current status of recommendations and future directions. Am J Clin Nutr. 2006; 83(suppl):1536S-8S.
- <sup>31</sup> Dietitians of Canada. What is the recommended dietary intake of omega-3 fatty acids for secondary prevention of cardiovascular disease? In: Practice-based evidence in nutrition [knowledge pathway online]. 2010 Apr 01 [cited 2012 May 09]; Available from: <http://www.pennutrition.com>. Access only by subscription.
- <sup>32</sup> Ursitti F, Law M, Li-Muller A, Cook B, Archbold J, Vanderlinder A, et al. Toronto Public Health. Fish consumption: benefits and risks for women in childbearing years and young children [Online] 2006 Sept [cited 2012 Apr 30]; Available from: [http://www.toronto.ca/health/hp/he/fish\\_mercury.htm](http://www.toronto.ca/health/hp/he/fish_mercury.htm)
-

- <sup>33</sup> Mozaffarian D, Rimm EB. Fish intake, contaminants and human health: Evaluating the risks and the benefits. *JAMA*. 2006; 296:1885-99.
- <sup>34</sup> Burdge GC, Calder PC. Conversion of alpha-linolenic acid to longer-chain polyunsaturated fatty acids in human adults. *Reprod Nutr Dev*. 2005; 45(5):581-97.
- <sup>35</sup> Kris-Etherton PM, Innis S. Position of the American Dietetic Association and Dietitians of Canada: dietary fatty acids. *J Am Diet Assoc*. 2007; 107:1599-1611.
- <sup>36</sup> Health Canada. Eating well with Canada's Food Guide: a resource for educators and communicators [Online] 2007 [cited 2012 Apr 30]; Available from: <http://www.hc-sc.gc.ca/fn-an/pubs/res-educat/res-educat-eng.php>
- <sup>37</sup> Health Canada. Canadian Nutrient File, version 2010 [database online] 2010 Sept 16 [cited 2012 May 09]; Available from: <http://www.hc-sc.gc.ca/fn-an/nutrition/fiche-nutri-data/index-eng.php>
- <sup>38</sup> Burnbrae Farms. Our products - Liquid eggs: Naturegg Omega Pro Liquid Eggs [Online] No date [cited 2012 May 09]; Available from: <http://www.burnbraefarms.com/consumer/index.htm>
- <sup>39</sup> Montgomery K. Improving Nutrition in Pregnant Adolescents: Recommendations for Clinical Practitioners. *Journal of Perinatal Education*. 2003;12(2): 22-30.
- <sup>40</sup> Story M, Hermanson J. Nutrient needs during adolescence and pregnancy. In: *Nutrition and the pregnant adolescent: a practical reference guide*. Minneapolis (MN): Center for Leadership, Education, and Training in Maternal and Child Nutrition, University of Minnesota; 2000. p. 37-46.
- <sup>41</sup> Mangiaterra V, Pendse R., McClure K. and Rosen J. Adolescent pregnancy. *World Health Organization MPS Notes*. 2008;1(1):1-4.
- <sup>42</sup> American Dietetic Association. Position of the American Dietetic Association: Vegetarian diets. *J Am Diet Assoc*. 2009 July;109:1266-82.
- <sup>43</sup> Dietitians of Canada. Vegetarianism practice guidance summary. In: *Practice-based evidence in nutrition [knowledge pathway online]*. 2012 Mar 10 [cited 2012 Aug 22]; Available from: <http://www.pennutrition.com>. Access only by subscription.
- <sup>44</sup> Dietitians of Canada. Do vegetarians (lacto, ovo, lacto-ovo, vegan) need to take a supplement in order to meet recommendations for iron and/or vitamin B12 intake? In: *Practice-based evidence in nutrition [knowledge pathway online]*. 2009 Jun 26 [cited 2010 Nov 10]; Available from: <http://www.pennutrition.com>. Access only by subscription.
- <sup>45</sup> Papaioannou A, Morin S, Cheung AM, Atkinson S, Brown JP, Feldman S, et al. 2010 clinical practice guidelines for the diagnosis and management of osteoporosis in Canada: summary. *Can Med Assoc J [Online]*. Early release, 2010 October 12, [cited 2010 Nov 13]; Available from: [www.cmaj.ca](http://www.cmaj.ca)
- <sup>46</sup> Desjardins E. Position on fish consumption, with respect to methylmercury content, by pregnant women, women of childbearing age and young children [Online] 2004 [cited 2012 Apr 30]; Available from: [http://chd.region.waterloo.on.ca/en/researchResourcesPublications/resources/Mercury\\_Fish.pdf](http://chd.region.waterloo.on.ca/en/researchResourcesPublications/resources/Mercury_Fish.pdf)
- <sup>47</sup> Health Canada: Bureau of Chemical Safety, Food Directorate, Health Products and Food Branch. Human health risk assessment of mercury in fish and health benefits of fish consumption [Online] 2007 Mar [cited 2012 Apr 30]; Available from: [http://www.hc-sc.gc.ca/fn-an/pubs/mercur/merc\\_fish\\_poisson\\_e.html](http://www.hc-sc.gc.ca/fn-an/pubs/mercur/merc_fish_poisson_e.html)
- <sup>48</sup> Health Canada: Bureau of Chemical Safety, Food Directorate, Health Products and Food Branch. Mercury in fish – Consumption advice: Making informed choices about fish [Online] 2008 Feb [cited 2012 Apr 30]; Available from: <http://hc-sc.gc.ca/fn-an/secureit/chem-chim/environ/mercur/cons-adv-etud-eng.php>
-

# Nutrition Guideline

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Applicable to: Nurses, Physicians and Other Health Professionals

---

- <sup>49</sup> Mergler D, Anderson HA, Hing Man Chan L, Mahaffey KR, Murray M, Sakamoto M, et al. Methylmercury exposure and health effects in humans: a worldwide concern. *Ambio*. 2007;36(1):3-11.
- <sup>50</sup> Health Canada. It's your health: Listeria and food safety [Online] 2005 Nov updated 2008 Aug [cited 2012 Apr 30]; Available from: [http://www.hc-sc.gc.ca/iyh-vsv/food-aliment/listeria\\_e.html](http://www.hc-sc.gc.ca/iyh-vsv/food-aliment/listeria_e.html)
- <sup>51</sup> Health Canada. Prenatal nutrition guidelines for health professionals – Fish and omega-3 fatty acids [Online] 2009 [cited 2012 Apr 30]; Available from: <http://www.hc-sc.gc.ca/fn-an/pubs/nutrition/omega3-eng.php>
- <sup>52</sup> Natural Medicines Comprehensive Database. Fish oil [Online] 2012 May 09 [cited 2012 May 09]; Available from: <http://naturaldatabase.therapeuticresearch.com/nd/Search.aspx?cs=CHA%7ECEPDA&s=ND&pt=9&Product=fish+oil> . Access only by subscription.
- <sup>53</sup> Health Canada. Monograph – Fish oil [Online] 2008 Jan 10 [cited 2012 Apr 30]; Available from: [http://www.hc-sc.gc.ca/dhp-mps/prodnatur/applications/licen-prod/monograph/mono\\_fish\\_oil\\_huile\\_poisson-eng.php](http://www.hc-sc.gc.ca/dhp-mps/prodnatur/applications/licen-prod/monograph/mono_fish_oil_huile_poisson-eng.php)
- <sup>54</sup> Foran SE, Flood JG, Lewandrowski KB. Measurement of mercury levels in concentrated over-the-counter fish oil preparations: Is fish oil healthier than fish? *Arch Pathol Lab Med*. 2003;127:1603–5.
- <sup>55</sup> Natural Medicines Comprehensive Database. Cod liver oil [Online] updated 2012 May 09 [cited 2012 May 09]; Available from: <http://naturaldatabase.therapeuticresearch.com/nd/Search.aspx?cs=CHA%7ECEPDA&s=ND&pt=9&Product=cod+liver+oil>. Access only by subscription.
- <sup>56</sup> Dietitians of Canada. Is there evidence to support a benefit for taking omega-3 fatty acid supplements during pregnancy? In: Practice-based evidence in nutrition [knowledge pathway online]. 2009 Nov 25 [cited 2012 May 09]; Available from: <http://www.pennutrition.com>. Access only by subscription.
- <sup>57</sup> Dietitians of Canada. What sources of DHA and EPA are acceptable to vegetarians? In: Practice-based evidence in nutrition [knowledge pathway online]. 2012 Feb 21 [cited 2012 May 09]; Available from: <http://www.pennutrition.com>. Access only by subscription.
- <sup>58</sup> Natural Medicines Comprehensive Database. Flaxseed [Online] updated 2012 Apr 30 [cited 2012 Apr 30]; Available from: <http://naturaldatabase.therapeuticresearch.com/nd/Search.aspx?cs=CHA%7ECEPDA&s=ND&pt=9&Product=flaxseed>. Access only by subscription.
- <sup>59</sup> Natural Medicines Comprehensive Database. Flaxseed oil [Online] updated 2012 Apr 30 [cited 2012 Apr 30]; Available from: <http://naturaldatabase.therapeuticresearch.com/nd/Search.aspx?cs=CHA%7ECEPDA&s=ND&pt=9&Product=flaxseed+oil>. Access only by subscription.
- <sup>60</sup> Health Canada. Monograph – Flaxseed [Online] 2010 Apr 13 [cited 2012 Apr 30]; Available from: <http://webprod.hc-sc.gc.ca/nhpid-bdipsn/monoReq.do?id=219&lang=eng>
- <sup>61</sup> Health Canada. Monograph – Flaxseed oil [Online] 2010 Apr 13 [cited 2012 Aug 28]; Available from: <http://webprod.hc-sc.gc.ca/nhpid-bdipsn/monoReq.do?id=220&lang=eng>
- <sup>62</sup> Public Health Agency of Canada. Healthy pregnancy, caffeine in pregnancy [Online] 2008 Sept 9 [cited 2012 May 8]; Available from: <http://www.phac-aspc.gc.ca/hp-gs/know-savoir/caffeine-eng.php>
- <sup>63</sup> Dietitians of Canada, What is the impact of caffeine intake in pregnancy and lactation? In: Practice-based Evidence in Nutrition [knowledge pathway online]. 2009 Apr 28 [cited 2012 May 8]; Available from: <http://www.pennutrition.com>. Access only by subscription
-

Applicable to: Nurses, Physicians and Other Health Professionals

---

<sup>64</sup> Health Canada. Caffeine in Foods [Online] 2012 Feb 16 [cited 2012 May 9]; Available from: <http://hc-sc.gc.ca/fn-an/securit/addit/caf/food-caf-aliments-eng.php>

<sup>65</sup> Health Canada. It's Your Health: Caffeine [Online] 2011 Oct 7 [cited 2012 May 9]; Available from: <http://hc-sc.gc.ca/hl-vs/iyh-vsv/food-aliment/caffeine-eng.php>

<sup>66</sup> Health Canada. It's Your Health: The Safety of Sugar Substitutes [Online] 2008 Mar [cited Mar 2013]; Available from: [http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/food-aliment/sugar\\_sub\\_sucres-eng.php](http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/food-aliment/sugar_sub_sucres-eng.php)

<sup>67</sup> Health Canada. Sugar Substitutes [Online] updated 2010 Mar 25 [cited May 2012]; Available from: <http://www.hc-sc.gc.ca/fn-an/securit/addit/sweeten-edulcor/index-eng.php>

<sup>68</sup> Duffy FB, Sigman-Grant M. Position of the American Dietetic Association: Use of Nutritive and Nonnutritive Sweeteners. *J Am Diet Assoc.* 2004;104:255-75.

<sup>69</sup> Health Canada. Questions and Answers: Saccharin [Online] updated 2007 July 30 [cited 2012 May]; Available from: [http://www.hc-sc.gc.ca/fn-an/securit/addit/sweeten-edulcor/saccharin\\_qa-qr-eng.php](http://www.hc-sc.gc.ca/fn-an/securit/addit/sweeten-edulcor/saccharin_qa-qr-eng.php)

<sup>70</sup> Dietitians of Canada. Sweeteners [knowledge pathway online] 2012 [cited 2012 May]; Available from: <http://www.pennutrition.com>. Access only by subscription.

<sup>71</sup> Health Canada, Information and Consultation Document on Health Canada's Proposal to Allow the Use of the Food Additive Steviol Glycosides as a Table-Top Sweetener and as a Sweetener in Certain Food Categories, Bureau of Chemical Safety, Food Directorate Bureau of Chemical Safety, Food Directorate, July 2012 on-line Dec 2012 <http://www.hc-sc.gc.ca/fn-an/consult/steviol/document-consultation-eng.php>

<sup>72</sup> Australia New Zealand Food Standards, Final Assessment Report Application A540 Steviol Glycosides as Intense Sweeteners, 2008 on-line: [http://www.foodstandards.gov.au/\\_srcfiles/FAR\\_A540\\_Steviol\\_glycosides.pdf](http://www.foodstandards.gov.au/_srcfiles/FAR_A540_Steviol_glycosides.pdf)

<sup>74</sup> Natural Medicines Comprehensive Database. Stevia [Online] 2011 Sept 11 [cited 2012 Sept 12]; Available from: [http://www.naturaldatabase.com/\(S\(rwnifc55ucyb0055ugr1fu55\)\)/nd/Search.aspx?cs=CHA&s=ND&pt=100&id=682&ds=&name=STEVIA&searchid=14925091](http://www.naturaldatabase.com/(S(rwnifc55ucyb0055ugr1fu55))/nd/Search.aspx?cs=CHA&s=ND&pt=100&id=682&ds=&name=STEVIA&searchid=14925091). Access only by subscription.

<sup>75</sup> Public Health Agency of Canada. The sensible guide to a healthy pregnancy. Minister of Health; 2008.

<sup>76</sup> Alberta Health and Wellness. Annual report 2007-2008. Government of Alberta [Online]. 2008 [cited 2009 Sep 14]. Available from: <http://www.health.alberta.ca/documents/Annual-Report-08-Section-1.pdf>.

<sup>77</sup> Health Canada. Perinatal health indicators for Canada: a resource manual [Online]. Ottawa: Minister of Public Works and Government Services Canada; 2000b [cited 2009 Aug 13]. Available from: <http://www.phac-aspc.gc.ca/rhs-ssg/phic-ispcc/pdf/indperie.pdf>.

<sup>78</sup> Keski-Rahkonene A, Kaprio J, Rissanen A, Virkkunen M, Rose RJ., Breakfast skipping and health-compromising behaviours in adolescents and adults. *Eur J Clin Nutr.* 2003;57:842-53.

<sup>79</sup> Tiran D. The use of herbs by pregnant and childbearing women: a risk-benefit assessment. *Complementary Therapies in Nursing and Midwifery.* 2003 Nov; 9(4):176-81.

<sup>80</sup> Portnoi G, Chng LA, Karimi-Tabesh L, Koren G, Tan MP, Einarson A. Prospective comparative study of the safety and effectiveness of ginger for the treatment of nausea and vomiting in pregnancy. *Am J Obstet Gynecol.* 2003; 189:1374-7.

<sup>81</sup> Borrelli F, Capasso R, Aviello G, Pittler MH, Izzo AA. Effectiveness and safety of ginger in the treatment of pregnancy-induced nausea and vomiting. *Obstet Gynecol.* 2005 Apr; 105(4):849-56.

- <sup>82</sup> Smith C, Crowther C, Wilson K, Hotham N, McMillian V. A randomized controlled trial of ginger to treat nausea and vomiting in pregnancy. *Obstet Gynecol.* 2004 Apr;103(4):639-45.
- <sup>83</sup> Penzak SR, Jann MW, Cold JA, Hon YY, Desai HD, Gurley BJ. Seville (sour) orange juice: synephrine content and cardiovascular effects in normotensive adults. *J Clin Pharmacol.* 2001 Oct; 41(10):1059-63.
- <sup>84</sup> Nykamp DL, Fackih MN, Compton AL. Possible association of acute lateral-wall myocardial infarction and bitter orange supplement. *Ann Pharmacother.* 2004 May; 38(5):812-6.
- <sup>85</sup> Nasir JM, Durning SJ, Ferguson M, Barold HS, Haigney MC. Exercise-induced syncope associated with QT prolongation and ephedra-free Xenadrine. *Mayo Clin Proc.* 2004 Aug; 79(8):1059-62.
- <sup>86</sup> Sultan S, Spector J, Mitchell RM. Ischemic colitis associated with use of a bitter orange-containing dietary weight-loss supplement. *Mayo Clin Proc.* 2006 Dec; 81(12):1630-1.
- <sup>87</sup> United States Food and Drug Administration. Center for Food Safety and Applied Nutrition, Office of Premarket Approval, EAFUS: A food additive database. [Online] 1998 Feb [cited 2012 Sept 12]; Available from: <http://www.usc.es/caa/EdulcWeb/EAFUS.pdf>
- <sup>88</sup> Mullen W, McGinn J, Lean ME, MacLean MR, Gardner P, Duthie GG, et al. Ellagitannins, flavonoids, and other phenolics in red raspberries and their contribution to antioxidant capacity and vasorelaxation properties. *J Agric Food Chem.* 2002 Aug 28; 50(15):5191-6.
- <sup>89</sup> Simpson M, Parsons M, Greenwood J, Wade K. Raspberry leaf in pregnancy: its safety and efficacy in labor. *J Midwifery Womens Health* [Online] 2001 Mar-Apr; 46(2):51-9 [cited 2008 Feb 19]; Abstract available from: <http://www.ncbi.nlm.nih.gov/pubmed/11370690>
- <sup>90</sup> Parsons M, Simpson M, Ponton T. Raspberry leaf and its effects on labour: safety and efficacy. *J Aust Coll Midwives* [Online] 1999 Sep; 12(3):20-5 [cited 2008 Feb 19]; Abstract available from: <http://www.ncbi.nlm.nih.gov/pubmed/10754818>
- <sup>91</sup> Eagon PK, Elm MS, Hunter DS, Bergerson J, Ayers HH, Tress NB, et al. Medicinal herbs: modulation of estrogen action. Atlanta (GA): Era of Hope Mtg, Dept Defense; Breast Cancer Res Prog. 2000 Jun; 8-11.
- <sup>92</sup> Society of Obstetricians and Gynaecologists of Canada. Women's Health Information: Pregnancy - Herbal Remedies [Online] updated 2011 May 4 [cited 2012 Sept 12]; Available from: [http://www.sogc.org/health/pregnancy-herbal\\_e.asp](http://www.sogc.org/health/pregnancy-herbal_e.asp)
- <sup>93</sup> Chitty, A. Review of evidence: Complementary therapies in pregnancy. NCT [serial on the Internet]. 2009 Apr [cited 2012 Mar 16]; *New Digest* 46:20-6. Available from: [http://www.nct.org.uk/sites/default/files/related\\_documents/New%20Digest%2046%20\(Chitty\)\\_0.pdf](http://www.nct.org.uk/sites/default/files/related_documents/New%20Digest%2046%20(Chitty)_0.pdf)
- <sup>94</sup> Dog TL. The use of botanicals during pregnancy and lactation, alternative therapies in health & medicine [serial online]. 2009 Jan-Feb [cited 2012 Mar 16]; Available from: [http://drlowdog.com/Assets/pdf\\_files/Pregnancy\\_lowdog.pdf](http://drlowdog.com/Assets/pdf_files/Pregnancy_lowdog.pdf)
- <sup>95</sup> Natural Medicines Comprehensive Database. Peppermint [Online] updated 2012 Feb 03 [cited 2012 May]; Available from: <http://naturaldatabase.therapeuticresearch.com/nd/PatientHandout.aspx?cs=CHA-CEPDA&s=ND&id=705>. Access only by subscription.
- <sup>96</sup> Natural Medicines Comprehensive Database. Rose Hip [Online] updated 2012 Jan 6 [cited 2012 May]; Available from: <http://naturaldatabase.therapeuticresearch.com/nd/PatientHandout.aspx?cs=CHA-CEPDA&s=ND&id=839>. Access only by subscription.
-

# Nutrition Guideline

## Pregnancy

*For Professional Reference Only*

Applicable to: Nurses, Physicians and Other Health Professionals

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- <sup>97</sup> Public Health Agency of Canada. Healthy pregnancy: Caffeine and pregnancy [Online] 2008 Sept 9 [cited 2012 Sept 12]; Available from: <http://www.phac-aspc.gc.ca/hp-gs/know-savoir/caffeine-eng.php>
- <sup>98</sup> Kaiser LL, Allen L. Position of the American Dietetic Association: Nutrition and lifestyle for a healthy pregnancy outcome. *J Am Diet Assoc* 2002 Oct; 102(10):1479-90.
- <sup>99</sup> Dietitians of Canada. Thinking about having a baby? [Online] 2010 [cited 2012 Sept 12]; Available from: <http://www.dietitians.ca/getattachment/db38fc04-2c1b-4255-8578-59564d3901d7/FactSheet---Thinking-About-having-a-Baby.pdf.aspx>
- <sup>100</sup> Natural Medicines Comprehensive Database [database online]. site updated 2012 Mar 15 [cited 2012 Mar 16]; Available from: <http://naturaldatabase.therapeuticresearch.com/home.aspx?cs=CHA-CEPDA&s=ND>. Access only by subscription.
- <sup>101</sup> Jensen-Jarolim E, Reider N, Fritsch R, Breiteneder H. Fatal outcome of anaphylaxis to camomile-containing enema during labor: a case study. *J Allergy Clin Immunol*. 1998 Dec; 102(6 Pt 1):1041-2.
- <sup>102</sup> Natural Medicines Comprehensive Database. Hibiscus [Online] updated 2012 Feb 13 [cited 2012 Sept 12]; Available from: <http://naturaldatabase.therapeuticresearch.com/nd/PatientHandout.aspx?cs=CHA-CEPDA&s=ND&id=211>. Access only by subscription.
- <sup>103</sup> Natural Medicines Comprehensive Database. Chicory [Online] updated 2012 Sept 11 [cited 2012 Sept 12]; Available from: <http://naturaldatabase.therapeuticresearch.com/nd/Search.aspx?cs=CHA-CEPDA&s=ND&pt=100&sh=32&id=92>. Restricted access to subscribers only.
- <sup>104</sup> Natural Medicines Comprehensive Database. Lemon Balm [Online] updated 2012 May 4 [cited 9 May 2012]; Available from: <http://naturaldatabase.therapeuticresearch.com/nd/PatientHandout.aspx?cs=CHA-CEPDA&s=ND&id=437>. Access only by subscription.
- <sup>105</sup> Natural Medicines Comprehensive Database. Linden [Online] updated 2012 Sep 4 [cited 2012 Sept 12]; Available from: <http://naturaldatabase.therapeuticresearch.com/nd/PatientHandout.aspx?cs=&s=ND&id=550>. Access only by subscription.
- <sup>106</sup> Perri D, Dugoua JJ, Mills E, Koren G. Safety and efficacy of echinacea (*Echinacea augustifolia*, *e. purpurea* and *e. pallida*) during pregnancy and lactation. *Can J Clin Pharmacol*. 2006 Fall;13(3):e262-7.
- <sup>107</sup> Gallo M, Sarkar M, Au W, Pietrzak K, Comas B, Smith M, et al. Pregnancy outcome following gestational exposure to echinacea: a prospective controlled study. *Arch Intern Med*. 2000 Nov 13;160(2):3141-3.
- <sup>108</sup> Huntley AL, Thompson Coon J, Ernst E. The safety of herbal medicinal products derived from *Echinacea* species: a systematic review. *Drug Saf*. 2005 28(5):387-400.
- <sup>109</sup> Blumenthal M, Busse RW, Goldberg A. The complete German Commission E monographs: therapeutic guide to herbal medicines. Boston(MA); American Botanical Council; [Online] 1998 [cited 2008 21 Nov]; Available from <http://books.google.ca/books?id=Q8YOxB6jXsIC&printsec=frontcover#PPR7,M1>
- <sup>110</sup> Muraro A, Dreborg S, Halken S, Host S, Niggemann B, Aalberse R, et al. Dietary prevention of allergic diseases in infants and small children. Part III: Critical review of published peer-reviewed observational and interventional studies and final recommendations. *Pediatr Allergy Immunol* 2004;15(4):291-307.
- <sup>111</sup> American Academy of Pediatrics, Greer F, Sicherer S, Burks A, and the Committee on Nutrition and Section on Allergy and Immunology. Effects of early nutritional interventions on the development of atopic disease in infants and
-

children: The role of maternal dietary restriction, breastfeeding, timing of introduction of complementary foods, and hydrolyzed formulas. *Pediatrics*. 2008;121:183-91.

<sup>112</sup> Canadian Paediatric Society, Dietitians of Canada, Health Canada. Breastfeeding. In: Nutrition for healthy term infants [Online] 2005 [cited 2010 Jul 19]; Available from: [http://www.hc-sc.gc.ca/fn-an/pubs/infant-nourrisson/nut\\_infant\\_nourrisson\\_term-eng.php](http://www.hc-sc.gc.ca/fn-an/pubs/infant-nourrisson/nut_infant_nourrisson_term-eng.php)

<sup>113</sup> Muche-Borowski C, Kopp M, Reese I, Sitter H, Werfel T, Schäfer T. Clinical practice guideline: Allergy Prevention. *Dtsch Arztebl Int*. 2009; 106 (39):625-31.

<sup>114</sup> Kramer MS, Kakuma R. Maternal dietary antigen avoidance during pregnancy and lactation for preventing or treating atopic disease in the child. (Cochrane Review) In: *Cochrane Database Syst Rev*. 2003;(4):CD000133.

<sup>115</sup> Canadian Paediatric Society, Dietitians of Canada and Health Canada. Prevention of allergies. In: Nutrition for healthy term infants [Online] 2005 [cited 2012 Sept 12]; Available from: [http://www.hc-sc.gc.ca/fn-an/pubs/infant-nourrisson/nut\\_infant\\_nourrisson\\_term-eng.php](http://www.hc-sc.gc.ca/fn-an/pubs/infant-nourrisson/nut_infant_nourrisson_term-eng.php)

<sup>116</sup> Pali-scholl I, Renz H, Jensesn-Jarolin E. Update on allergies in pregnancy, lactation, and early childhood. *J Allergy Clin Immunol*. 2009;123:1012-21.

<sup>117</sup> Du Toit G, Lack G. Can food allergy be prevented? The current evidence. *Pediatr Clin N Am*. 2011; (58): 481-509.

<sup>118</sup> Dietitians of Canada. Do infants with a parental history of allergy have a reduced incidence of allergy if their mothers avoid common allergenic foods during pregnancy as compared to infants of mothers who do not restrict their diets during pregnancy? In: Practice-based Evidence in Nutrition [knowledge pathway online]. updated 2009 Feb 26 [cited 2012 Apr 02]; Available from: <http://www.pennutrition.com>. Access only by subscription.

<sup>119</sup> Tang M, Robinson M. Allergy prevention: current recommendations and new insights. *Australian Family Physician*. 2008;37(4):204-8.

<sup>120</sup> Auckland Allergy Clinic. Allergy prevention [Online] updated 2006 May 24 [cited 2012 Apr 3]; Available from: <http://www.allergyclinic.co.nz/guides/27.htm1>

<sup>121</sup> Health Canada. It's your health: Food Safety for Pregnant Women [Online] 2010 Mar [cited 2012 May 31]; Available from: [http://www.hc-sc.gc.ca/hl-vs/alt\\_formats/pdf/iyh-vsv/food-aliment/pregnant-enceintes-mar-2010-eng.pdf](http://www.hc-sc.gc.ca/hl-vs/alt_formats/pdf/iyh-vsv/food-aliment/pregnant-enceintes-mar-2010-eng.pdf)

<sup>122</sup> Davies GAL, Wolfe LA, Mottola MF, MacKinnon C. Joint SOGC /CSEP clinical practice guideline: Exercise in pregnancy and the postpartum period. *Can J Appl Physiology*. 2003;28(3):329-41.

<sup>123</sup> Canadian Society for Exercise Physiology. Physical Activity Readiness Medical Examination (PARmed-X) [Online] Updated 2002 [cited 2009 April 28]; Available from: <http://www.csep.ca/forms.asp>

<sup>124</sup> Lee N, Saha S. Nausea and Vomiting of Pregnancy. *Gastroenterology Clinics of North America*. 2011;40:309-334.

<sup>125</sup> Einarson A, Maltepe C, Boskovic R, Koren G. Treatment of nausea and vomiting in pregnancy, an updated algorithm. *Can. Fam. Phys*. 2007; 53(12):2103-11.

<sup>126</sup> Lee NM, Saha S. Nausea and Vomiting of Pregnancy. *Gastroenterology Clinics of North America*. 2011; 40(2):309-34.

<sup>127</sup> Arsenalut MY, Lane CA. The management of Nausea and Vomiting of Pregnancy. Clinical practice guidelines. *JOGC*. 2002; 24(10): 817-23.

<sup>128</sup> Ismail S, Kenny L. Review on Hyperemesis Gravidarum. *Best Practice & Research Clinical Gastroenterology*. 2007; 21(5):755-769.

# Nutrition Guideline

## Pregnancy

*For Professional Reference Only*

Applicable to: Nurses, Physicians and Other Health Professionals

---

- <sup>129</sup> Jueckstock JK, Kaestner R, Mylonas I. Managing Hyperemesis Gravidarum: A Multimodal Challenge. *BioMed Central Medicine*. 2010; 8(46):1-12.
- <sup>130</sup> Arsenault MY, Lane CA. The management of Nausea and Vomiting of Pregnancy. *Clinical practice guidelines. JOGC*. 2002; 24(10): 817-23.
- <sup>131</sup> Hunter L, Sullivan C, Young R, Weber C. Nausea and Vomiting of Pregnancy: Clinical Management. *The American Journal for Nurse Practitioners*. 2007;11(8):57-67.
- <sup>132</sup> Clinical Practice Obstetrics Committee, Society of Obstetricians and Gynecologists of Canada. Clinical practice guidelines: Management of nausea and vomiting in pregnancy. *JOGC [serial on the Internet] 2002 [2010 Oct 26]; 24(10):817*. Available from: [http://www.sogc.org/health/pregnancy-nausea\\_e.asp](http://www.sogc.org/health/pregnancy-nausea_e.asp).
- <sup>133</sup> Dall'Alba V, Fornari F, Krahe C, Callegari-Jaques S, Silva de Barros S. Heartburn and Regurgitation in Pregnancy: The Effect of Fat Ingestion. *Digestive Diseases and Science*. 2010; 55:1610-1614.
- <sup>134</sup> Richter JE. The management of heartburn in pregnancy. *Aliment Pharmacol Ther*. 2005; 22(9):749–57.
- <sup>135</sup> Alberta Health. Healthy Eating & Active Living for Pregnancy. 2009. NT0010.
- <sup>136</sup> 131Roberto-Nichols DM, Stanley-Haney JL, Hawkins JW. 2012. Guidelines for Nurse Practitioners in Gynecologic Settings - 10th Ed. New York. Springer Publishing Company. STAT!Ref Online Electronic Medical Library. <http://online.statref.com/document>. [cited 9/25/2012]
- <sup>137</sup> Food and Nutrition Board, Institute of Medicine. Dietary reference intakes for water, potassium, sodium, chlorine and sulphate. Washington, DC: National Academy Press; 2004.
- <sup>138</sup> Dietitians of Canada. Current issues – The inside story: Water for health and sport [document online]. 2009 Feb [cited 2009 Jul 10]; Available from: [http://www.dietitians.ca/Downloadable-Content/Members-Only/Current\\_Issues\\_Feb2009\\_Water.aspx](http://www.dietitians.ca/Downloadable-Content/Members-Only/Current_Issues_Feb2009_Water.aspx) . Restricted access to members only.
- <sup>139</sup> Canadian Diabetes Association. Clinical Practice Guidelines Expert Committee. Canadian Diabetes Association. 2008. Clinical practice guidelines for the prevention and management of diabetes in Canada. *Can J Diabetes*. 2008;32(Suppl 1):S1-S201
- <sup>140</sup> Kendrick J. Screening and diagnosing gestational diabetes mellitus revisited. *J Perinat Neonat Nurs*. 2011; 25(3): 226–32.

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