



Health
Canada

Santé
Canada

*Your health and
safety... our priority.*

*Votre santé et votre
sécurité... notre priorité.*

Prenatal Nutrition Guidelines for Health Professionals

A photograph of a pregnant woman from the waist up, wearing a pink short-sleeved top. She is holding her belly with both hands. The background is a soft, out-of-focus blue and white.

gestational
weight gain

Canada 

ACKNOWLEDGEMENTS

Health Canada sincerely thanks the members of the Expert Advisory Group on National Nutrition Pregnancy Guidelines who generously gave their time and expertise to help prepare this resource:

- Aline Allain-Doiron, RD, Public Health Nutritionist-Dietitian, Horizon Health Network, Zone 7 Miramichi
- Andrée Gruslin, MD, FRCS, Director of the Post-graduate Residency Training Program in Obstetrics and Gynaecology, University of Ottawa
- Sheila M. Innis, RD, PhD, Director of Nutrition Research Program, Child and Family Research Institute, University of British Columbia
- Kristine G. Koski, RD, PhD, Director School of Dietetics and Human Nutrition, McGill University
- Michel Lucas, RD, MPH, PhD, Epidemiologist/Nutritionist, Post-Doctoral Fellow, Harvard School of Public Health
- Laura A Magee, MD, FRCS, Clinical Associate Professor in the Department of Medicine, University of British Columbia
- Ann Montgomery, RM, MSc in Epidemiology, Research Fellow, Centre for Global Health Research
- Michelle F Mottola, PhD, Director of the R. Samuel McLaughlin Foundation - Exercise and Pregnancy Laboratory, University of Western Ontario
- Deborah L. O'Connor, RD, PhD, Director of Clinical Dietetics, The Hospital for Sick Children, and Associate Professor, Department of Nutritional Sciences, University of Toronto
- Kay Yee, RD, Public Health Nutritionist, Regina Qu'Appelle Health Region

We gratefully acknowledge Dr. Rhonda Bell from the University of Alberta who prepared a background paper to inform the work to revise the gestational weight gain recommendations.

Health Canada would also like to thank the many stakeholders who took part in the consultation including Dr. André Lalonde, Executive Vice-President of the Society of Obstetricians and Gynaecologists of Canada, and Dr. Bill Ehman, representative of the College of Family Physicians of Canada.

Également offert en français sous le titre :

Bien manger et être active pour un gain de poids approprié pendant la grossesse

© Her Majesty the Queen in Right of Canada, represented by the Minister of Health Canada, 2010

This publication may be reproduced without permission provided the source is fully acknowledged.

Cat.: 978-1-100-16831-9
ISBN: H164-126/2010E-PDF

Eating Well and Being Active: Towards a Healthy Weight Gain during Pregnancy

This document is based in large part on information from the United States Institute of Medicine 2009 report 'Weight Gain during Pregnancy: Re-examining the Guidelines'. The full report is available at the following link: http://www.nap.edu/catalog.php?record_id=12584#toc.

Poor dietary habits, inactivity, and being under- or overweight can negatively affect maternal and fetal health. Counselling during the time preceding a pregnancy – the preconception period – or between pregnancies can help a woman improve her eating and physical activity habits. These changes can have a positive and lasting effect on the health of the mother and her baby.

PRECONCEPTION AND WEIGHT

A woman's weight status before pregnancy is used to set recommendations for proper weight gain during pregnancy (see [Recommended gestational weight gain](#)).

Weight status is assessed using the body mass index (BMI). The BMI is a ratio of weight-to-height that is calculated by dividing weight in kilograms by height in meters squared (kg/m^2). The BMI signals the long term health risks associated with being under- or overweight. There are four categories of BMI ranges in the Canadian weight classification system (Health Canada [HC], 2003):

- Underweight (BMI less than 18.5)
- Normal¹ weight (BMI between 18.5 and 24.9)
- Overweight (BMI between 25.0 and 29.9)
- Obese (BMI 30.0 or more)

NOTE: These adult BMI cut-offs are not recommended for the assessment of weight status in adolescence (HC, 2003); however, they may be used to establish an appropriate gestational weight gain goal in teen pregnancies (Institute of Medicine [IOM], 2009).

Current evidence suggests that when a woman enters pregnancy with a normal BMI, both she and her baby have better health and less chance of disease (IOM, 2009). According to national survey data, sixty percent of Canadian women entered pregnancy within this BMI range (see [Table 1, Appendix A](#)).

(1) The term 'normal' is used to describe the 'least risk' BMI category. The term 'healthy' was also considered but not retained since it could incorrectly imply an assurance of good health for all people within the specified BMI range. Overall health is also dependent on the presence of other risk factors such as genetic predisposition, individual weight history and age, as well as influencing factors such as health behaviours (HC, 2003).

WHAT IT MEANS TO HAVE A HIGH PRE-PREGNANCY BMI

Women of childbearing age living in Canada today are significantly heavier than in the past (Tjepkema, 2005). One third of Canadian women entered pregnancy with a BMI equal or greater than 25 (see [Table 1, Appendix A](#)).

Observational data show that women with a higher BMI are more likely to have poor health and poor pregnancy outcomes. For instance, women with a high BMI are more likely to develop gestational diabetes mellitus (Torloni et al., 2008) and have a caesarean delivery (Chu et al., 2007; Margerison Zilko et al., 2010). Women who have a higher pre-pregnancy BMI are more likely to have a large-for-gestational age infant² (Viswanathan et al., 2008; Margerison Zilko et al., 2010) or an infant with a birth-weight of more than 4000 to 4500 g (8.8-9.9 lbs) at birth (Viswanathan et al., 2008). More recent evidence also points to a potential increased risk of preterm birth in women with a high pre-pregnancy BMI (McDonald et al., 2010).

Infants of these women are less likely to be breastfed (Amir & Donath, 2007) and more likely to be overweight in childhood (as measured by BMI) (Margerison Zilko et al., 2010).

WHAT IT MEANS TO HAVE A LOW PRE-PREGNANCY BMI

It is estimated that less than 10 percent of Canadian women enter pregnancy at a low BMI (see [Table 1, Appendix A](#)). However, low pre-pregnancy BMI remains a public health concern. Observational data show that women with a BMI less than 18.5 are at risk for poor health and poor pregnancy outcomes. For example, low pre-pregnancy weight is linked to preterm birth (Viswanathan et al., 2008) and giving birth to a small-for-gestational-age infant³ (Viswanathan et al., 2008; Margerison Zilko et al., 2010).

Women with a low pre-pregnancy BMI may reduce these risks by gaining the recommended amount of gestational weight (see [Table 2, Appendix A](#)).

WHAT THIS MEANS FOR YOUR PRACTICE

A variety of factors including personal choices, as well as genetics and our social, cultural, physical and economic environments can make it harder for women to adopt healthy lifestyle practices (Canadian Institute for Health Information [CIHI], 2006). Health professionals play an important role in supporting women who may be faced with barriers to eating well and being active during the childbearing years.

By engaging women before they get pregnant, health professionals can help them adopt a healthy lifestyle and prepare for pregnancy.

- Encourage women with a low or a high⁴ BMI to improve their weight before becoming pregnant. Let them know how being under- or overweight during pregnancy can negatively affect their health and the health of their babies.
- Use Canada's Food Guide and [Canada's Physical Activity Guide](#) to describe healthy eating and physical activity patterns. Women can prepare for a healthy pregnancy by being active everyday, eating according to Canada's Food Guide

(2) An infant whose weight is above the 90th percentile for gestational age

(3) An infant whose weight is below the 10th percentile for their gestational age

(4) The Society of Obstetricians and Gynaecologists of Canada (SOGC) recommends that women be encouraged to enter pregnancy with a BMI less than 30, and ideally less than 25 (Davies et al, 2010).

and taking a daily multivitamin containing 400 mcg (0.4 mg) of folic acid (HC, 2009a).

NOTE: [Eating Well with Canada's Food Guide](#) is available in 12 languages and [Eating Well with Canada's Food Guide - First Nations, Inuit and Métis](#) is available in four Aboriginal languages, in addition to English and French.

- Encourage women to record and assess their level of activity and the type and amount of food they eat. Show them how to use printable tools such as [My Food Guide Servings Tracker](#) or online tools like the Dietitians of Canada [EATracker](#).
- Find out if women need help to eat well and be active. For example, some women may need nutrition counselling with a Registered Dietitian. Others may require social support and better access to healthy foods or opportunities for physical activity.

NOTE: Some provinces such as [Ontario](#) and [British Columbia](#) provide a publicly funded nutrition information line for their residents.

- Consult your local public health unit or community health centre for print resources⁵ and information about programs that are adapted to the needs of cultural groups in your area.

WEIGHT GAIN IN PREGNANCY

Throughout pregnancy, maternal body weight is used as a general indicator of the health of the mother and the developing fetus. The placenta, fetus and amniotic fluid account for about 35 percent of the total pregnancy weight gain (Pitkin, 1976). The rest comes from increased blood and fluids, tissues of the breast and uterus, and fat stores (see [Table 3, Appendix A](#)). Most weight gain in pregnancy occurs in the second and third trimesters, with minimal weight gain in the first trimester (IOM, 2009).

DETERMINANTS⁶ OF PREGNANCY WEIGHT GAIN (IOM, 2009)

Although pre-pregnancy BMI largely determines gestational weight gain, there are many other factors that can affect a woman's weight such as genetic characteristics, underlying health issues, socioeconomic status and attitude toward weight gain.

The amount a woman gains can also depend on her living and working environment, including cultural norms and beliefs, access to healthy foods, opportunities for physical activity, family and partner support.

These and other factors should not be overlooked as they can hinder or enhance a woman's ability to gain an appropriate amount of weight during her pregnancy.

(5) Print resources on preparing for a healthy pregnancy are also available from the Society of Obstetricians and Gynaecologists of Canada ([Healthy Beginnings, 4th edition](#)) and the Public Health Agency of Canada ([The Sensible Guide to a Healthy Pregnancy](#)).

(6) For a more in-depth look at potential determinants of pregnancy weight gain, see Chapter 4 of the 2009 IOM report [Weight Gain during Pregnancy: Reexamining the Guidelines](#).

RECOMMENDED GESTATIONAL WEIGHT GAIN

Health Canada uses the U.S. Institute of Medicine 2009 recommendations when advising women about gaining weight as part of a healthy pregnancy (see [Table 2, Appendix A](#)). The IOM suggests a different range of weight gain for each pre-pregnancy BMI category.

Women who have healthy babies gain varying amounts of weight during pregnancy. However, observational data consistently show that women who gain the recommended amount of weight have better pregnancy outcomes than others (IOM, 2009). This does not mean that every woman who gains more or less than the recommended amount of weight will have an unhealthy pregnancy. Many other factors (such as smoking, maternal age and underlying illness) can affect pregnancy outcomes.

The IOM recommendations take into account population trends that are similar in Canada and the U.S., such as the increase in pre-pregnancy BMI and in the rates of caesarean delivery (Tjepkema, 2005; Public Health Agency of Canada [PHAC], 2008; IOM, 2009) and generally apply to all healthy Canadian women with a singleton pregnancy.

Women carrying twins or multiple fetuses have more maternal tissues and higher fetal weight, and should therefore gain more weight (see [Table 4, Appendix A](#)). There is little information on weight gain for women carrying three or more babies (IOM, 2009). It seems reasonable that these women will need to gain more weight than those carrying twins.

WHAT HAPPENS WHEN WOMEN GAIN MORE WEIGHT THAN RECOMMENDED

In both the U.S. (Chu et al., 2009) and Canada (see [figure a, Appendix B](#)), many women gain more weight than the recommended amounts. Women who gain too much weight during pregnancy are more often (Lowell & Miller, 2010):

- giving birth for the first time
- Aboriginal
- individuals with less than secondary education
- less than 25 years old.

Based on observational data, women who gain more weight in pregnancy tend to retain excess weight for up to 3 years postpartum (Viswanathan et al., 2008). Women who gain too much weight also tend to have large-for-gestational age infants or infants whose birth weight is greater than 4000 to 4500 g (8.8-9.9 lbs) (Viswanathan et al., 2008; Crane et al., 2009; Margerison Zilgo et al., 2010).

Observational studies also show that women who have babies whose birth weight is more than 4500 g (9.9 lbs) face higher risks of longer labour and birth, birth trauma⁷, birth asphyxia⁸, caesarean birth, and increased risk of perinatal mortality⁹ (Zhang et al., 2008).

(7) Physical injury to an infant during the birth process

(8) Failure to start regular respiration within a minute of birth

(9) Infant mortality between delivery and discharge

Recent population-based studies suggest a link between higher gestational weight gains and children who are overweight (as measured by BMI) (Oken et al., 2007; Oken et al., 2008; Wrotniak et al., 2008; Margerison Zilgo et al., 2010; Schack-Nielsen et al., 2010).

Babies born at higher birth-weights may also be at increased risk for type 2 diabetes later in life (Harder et al., 2007).

Large-for-gestational age births are more common among First Nations women, particularly those who develop gestational diabetes (Rodrigues et al., 2000).

WHAT HAPPENS WHEN WOMEN GAIN LESS WEIGHT THAN RECOMMENDED

Not gaining enough weight in pregnancy is less common than gaining too much weight in both the United States (Chu et al., 2009) and Canada (see [figure a, Appendix B](#)). Gaining less weight than recommended is more common if a woman (Lowell & Miller, 2010):

- has giving birth more than once
- was born outside of Canada
- has a lower household income.

Women who do not gain enough weight in pregnancy may have an infant born preterm, a small-for-gestational age infant or a low birth-weight infant¹⁰ (Viswanathan et al., 2008). These infants face more risk of neonatal morbidity and mortality, physical and cognitive disabilities, and chronic health problems later in life (Goldenberg & Culhane, 2007). In addition, women who do not gain enough weight are less likely to initiate breastfeeding (Viswanathan et al., 2008).

Considering the risks linked to poor gestational weight gain, women should not avoid gaining weight or try to lose weight during pregnancy.

TRACKING PREGNANCY WEIGHT GAIN

Health professionals can use weight monitoring tools (see [figure b, Appendix B](#)) to assess the progress of pregnancy, track a woman's weight gain over time and identify unusual patterns of weight gain earlier in pregnancy. These tools look at the overall pattern of weight gain, as the rate of gain is highly variable. A single measure is not enough to determine whether weight gain is on track (IOM, 2009).

These tools assume that women gain weight consistently during their second and third trimesters. However, women often gain more weight in the second than they do in the third trimester of pregnancy. This is true across pre-pregnancy BMI categories, except BMIs of 30 or greater (IOM, 2009). The rate of weight gain can also vary depending on the woman's age and ethnicity (IOM, 2009).

Weight gain in the first trimester

Women who have good pregnancy outcomes gain about 1 to 2 kg (2 to 4 lbs) in the first trimester (IOM, 2009). Nausea and vomiting¹¹, which are common early in a pregnancy,

(10) Birth weights less than 2500 g or 5.5 lbs

(11) To manage nausea and vomiting of pregnancy, refer to the [Clinical Practice Guidelines and client handout from the SOGC](#)

may cause women to lose a small amount of weight. However, some women may eat less to avoid gaining weight. Women who lose more than 5-10% of their pre-pregnancy weight should be assessed.

Similarly, women who gain a large amount of weight in the first trimester (much more than 2 kg or 4 lbs) should be assessed. These women may be at increased risk for gestational diabetes, particularly women with a pre-pregnancy BMI greater than 25 (Hedderson et al., 2010).

Weight gain in the second and third trimesters

After their first trimester, women put on weight steadily, as they gain lean and fat tissues. Erratic patterns of weight gain and weight gains that vary from the recommended amounts should be evaluated.

If a woman's pattern of weight gain falls well below or above the recommended amount, the health professional can work with the woman to bring her weight gain back to the suggested rate of gain through the rest of the pregnancy. The following steps can be used to help assess the underlying causes:

- check that it is not the result of a measurement or recording error,
- check that the fetus is growing properly,
- make sure there are no medical problems (such as edema),
- find out if there are any factors that can be changed (such as a high energy intake or a sedentary lifestyle), and
- consider the woman's personal circumstance (such as stress or not having enough income).

WHAT THIS MEANS FOR YOUR PRACTICE

While there is not a strong evidence base for interventions that work reliably to help women meet the recommended weight gain ranges, or avoid postpartum weight retention (IOM, 2009), the following section offers ideas to help women meet the recommendations for healthy weight gain during pregnancy. These ideas build on the IOM's recommendations and Health Canada's advice on eating well and being active. The challenge for health professionals will be to help pregnant women create healthy attitudes and beliefs about their changing bodies, while encouraging them to maintain healthy eating and activity patterns.

Setting a weight gain goal based on a woman's pre-pregnancy BMI

Weight gain during pregnancy can be a sensitive topic for many women and health care providers may be reluctant to discuss it (Stotland et al., 2010). However, health professional advice can influence how much weight a woman gains during pregnancy (IOM, 2009). By communicating the recommended weight gain ranges early in the pregnancy, health care providers can improve a woman's chances of reaching the recommendations. Engaging women early can also help support their decision to breastfeed (Lu et al., 2001).

- Work with each pregnant woman to set a weight gain goal early in her pregnancy. Base this goal on her pre-pregnancy BMI (see [figure c, Appendix B](#)) and other relevant considerations, such as her health status prior to pregnancy (IOM, 2009).

- If you do not have a pre-pregnancy weight record, you can determine this weight by estimating a woman's BMI based on her current weight and height. If possible, do this at the first prenatal visit. A woman can also tell you her pre-pregnancy weight. Keep in mind that some women may underestimate (or overestimate) this weight.
- Weigh women when they are wearing light clothing and have their shoes off. Record her weight to the nearest 0.2 kg (1/2 lb) (HC, 2003). Check for zero-balance before each measurement and calibrate the scale from time to time.
- When measuring a woman's height, make sure she stands straight with her feet together, looks straight ahead, and stands with her heels against a wall or measuring board.
- To record a woman's height, lower a horizontal bar, rectangular block of wood or another similar device to rest flat on the top of her head. Record her height to the nearest 0.5 cm (1/4 in) (HC, 2003).

Talking to women about gestational weight gain

When women learn what to expect about weight changes that take place during pregnancy, they may not feel as anxious about these changes.

- Ask women what they expect to happen with their weight during pregnancy. If possible, have this discussion in the preconception period or early in the pregnancy. Let women know why gestational weight gain is important (for example, it nourishes the growing baby) and why weight loss is not recommended (as it could affect the baby's growth).

NOTE: Understanding a woman's cultural customs, beliefs and life circumstances is important. For example, a pregnant newcomer to Canada, from an area where maternal or infant mortality rates are high, may not wish to gain the recommended amount of weight and may fear that the weight will complicate her labour. In contrast, large weight gains in pregnancy may be valued in other communities.

- Describe weight gain as a natural outcome of pregnancy that helps the baby grow and develop. Indicate that some of the energy reserves of pregnancy will be used to support breastfeeding. Explain that most women can expect to gain about 1 to 2 kg (2.2 to 4.2 lbs) in the first trimester. It may be helpful for the woman to know that, by the end of the first trimester, the fetus is only about 7.5 cm (3 inches) long and weighs about 30 g (1 ounce).
- Explain that most weight gain happens steadily during the second and third trimesters as the fetus and supporting tissues develop and grow.

Advising women about eating well and being active during pregnancy

Eating well and being active provides benefits that go well beyond a woman's immediate well-being to support future pregnancies and ensure a better health status later in life.

EATING WELL

Most women know that they need to eat more food when they are pregnant to support their baby's growth and development but they do not always know how much more. Women are commonly told they are "eating for two". In reality, women who eat for two will eat too much and gain more weight than is needed. Usually, pregnant women only

need modest increases in energy (calories) and greater increases in vitamin and mineral intake (IOM, 2009).

- Let women know that they need “just a little more food” in the second and third trimesters to meet the additional energy needs of pregnancy. Canada’s Food Guide suggests adding 2 to 3 Food Guide Servings per day to a woman’s total number of recommended Food Guide Servings (HC, 2009b).
- Talk to women about making the most of their food choices (e.g., eating ‘twice as healthy’ not ‘twice as much’). Emphasize that pregnancy can be a chance for a woman to improve the nutritional quality of her dietary pattern. These changes can help her and her growing baby stay healthy.
- Encourage women to eat vegetables, fruit, whole grains, meat alternatives (like beans, peas, lentils, nuts and seeds), low fat milk, fish¹², lean meats, and unsaturated oils. Following a healthy eating pattern like the one described in Canada’s Food Guide means that many women will need to make different food choices. For example, some women will need to eat more vegetables and fruit while others will need to reduce their intake of sugary drinks, salty snack foods or baked goods (Garriguet, 2004). Whenever possible, encourage women to adopt these changes before pregnancy.
- Help pregnant women get the support they need to nourish themselves and their families. Refer nutritionally at-risk pregnant women to services or programs that can help. At-risk women can include pregnant teenagers, women living in poverty and new immigrants (Best Start, 2002). The [Canada Prenatal Nutrition Program](#)¹³ Website provides contact information for programs and services for at risk pregnant women.

BEING ACTIVE

Being active during pregnancy may help women gain an appropriate amount of weight (IOM, 2009; Stuebe et al., 2009). It may also make it easier for them to accept the physical changes that go with pregnancy (Davies et al., 2003). Additionally, physical activity in pregnancy may help women maintain muscular and cardiovascular fitness, reduce the risk of gestational diabetes or pre-eclampsia, and decrease physical complaints like back pain (Davies et al., 2003).

Health professionals play an important role in encouraging healthy women with uncomplicated pregnancies to build physical activity into their daily life, without major risks to themselves or to their unborn child.

- Describe the benefits of having an active lifestyle during pregnancy.
- In addition to everyday physical activities like gardening and house cleaning, women can try walking, swimming and dancing. Start with 15 minutes at a time and work towards 30 minutes. Women should be able to talk while exercising. Women can continue these activities 3 to 4 times per week.

Note: Women may find it easier to start exercising in the second trimester, when their nausea has subsided and they have more energy (Davies et al., 2003).

(12) Health Canada provides advice for limiting exposure to mercury from certain fish (HC, 2009c).

(13) The Canada Prenatal Nutrition Program is developed and delivered in partnership with the provinces and territories, and with First Nations and Inuit communities. The services provided include food supplementations, nutritional counselling, breastfeeding support, education, referral and counselling on health and lifestyle issues.

- Encourage women who have been less active and those with a high BMI to follow these general physical activity guidelines unless they have a medical reason that stops them (Mottola, 2009).

NOTE: The form titled [PARmed-X for Pregnancy: Physical Activity Readiness Medical Examination](#) is a guideline developed by the Canadian Society for Exercise Physiology (CSEP) that can be used to identify contraindications to exercise during pregnancy. This tool can also be used to discuss safety considerations, and explain the reasons why women should stop exercising and seek medical advice.

- Encourage pregnant women to identify strategies (such as locating safe places to walk in their neighbourhood) that help them be active during pregnancy. Some women may need more support to overcome financial, social, physical or cultural barriers to being physically active during pregnancy.
- Become familiar with community programs and initiatives that provide opportunities for physical activity for pregnant women at low or no cost.

SPECIAL ADVICE FOR WOMEN WITH A PRE-PREGNANCY BMI LESS THAN 18.5

You may need to change your messages about eating well and being active for women with a low pre-pregnancy BMI, particularly if they are still in their teens, if they have abnormal eating behaviours (Berkman et al., 2006), or if they spend too much time exercising.

- Assess a woman's diet early. If possible, get this information before a woman is pregnant. Give women with a low pre-pregnancy BMI tailored advice on meeting their energy and nutrient needs. Refer them to a Registered Dietitian for complete nutritional assessment and counselling.
- Encourage women who are exercising in excess to reduce their activity level to be in line with the guidelines for aerobic and muscle conditioning exercise that are outlined in the *PARmed-X for Pregnancy*.

THE POSTPARTUM PERIOD

After pregnancy, gradual weight loss through breastfeeding and keeping up a healthy and active lifestyle should be emphasized.

Weight loss following pregnancy is variable. Women who gain more than the recommended range for their pre-pregnancy BMI are more likely to keep excess weight up to 3 years after birth (Vishwanathan et al., 2008). Many other factors can also affect a woman's efforts to lose weight after pregnancy such as pre-pregnancy BMI, household income, ethnicity, energy intake, and infant feeding practices (Chung et al., 2007).

Women who retain excess weight or gain weight in the postpartum period are at greater risk of experiencing complications during their next pregnancy, and at increased risk of long term maternal health complications. These women may need extra time and support to lose weight. They may also need nutrition counselling with a Registered Dietitian, peer support, or improved access to opportunities for physical activity, such as access to programs that provide child care at no or low cost.

APPENDIX A

Table 1: Weight status of women having children in Canada

This data is based on self-reported height and weight (adapted from: Public Health Agency of Canada [PHAC], 2009).

Age	BMI			
	Less than 18.5 (underweight)	18.5 to 24.9 (normal weight)	25.0 to 29.9 (overweight)	30.0 or more (obese)
15 to 19 years old	11.8 ^a	67.3	14.9	6.0 ^a
20 to 24 years old	10.7	56.6	19.0	13.7
25 to 29 years old	5.2	58.3	21.4	15.1
30 to 34 years old	5.5	59.1	21.7	13.8
35 to 39 years old	4.5 ^a	63.4 ^b	19.9 ^c	12.3 ^c
40+ years old	3.8 ^d	58.4 ^b	29.0 ^c	8.8 ^{a,c}
All women	6.1	59.3	21.0	13.6

(a) Coefficient of variation between 16.6% and 33.3%. Interpret with caution.

(b) Overestimated compared to measured height and weight data from the Canadian Community Health Survey [CCHS] (2004, 2005 and 2007-08).

(c) Underestimated compared to measured height and weight data from CCHS (2004, 2005 and 2007-08).

(d) Coefficient of variation > 33.3%. Interpret with caution.

Data source: Canadian Maternity Experiences Survey, 2006-2007

Table 2: Weight gain in singleton pregnancies

The following table shows the rate and total weight gain recommended for singleton pregnancies based on a woman's pre-pregnancy BMI (adapted from: IOM, 2009).

Pre-pregnancy BMI	Mean ^a rate of weight gain in the 2 nd and 3 rd trimester		Recommended total weight gain ^b	
	kg/week	lb/week	kg	lbs
BMI < 18.5	0.5	1.0	12.5 - 18	28 - 40
BMI 18.5 - 24.9	0.4	1.0	11.5 - 16	25 - 35
BMI 25.0 - 29.9	0.3	0.6	7 - 11.5	15 - 25
BMI ≥ 30.0^c	0.2	0.5	5 - 9	11 - 20

(a) Rounded values.

(b) Calculations for the recommended weight gain range assume a gain of 0.5 to 2 kg (1.1 to 4.4 lbs) in the first trimester (Siega-Riz et al., 1994; Abrams et al., 1995; Carmichael et al., 1997).

(c) A lower weight gain may be advised for women with a BMI of 35 or greater, based on clinical judgement and a thorough assessment of the risks and benefits to mother and child (Crane et al, 2009; Oken et al, 2009; Hinkle et al, 2010).

Table 3: Weight gain distribution

The following example shows where a pregnant woman gains weight in pregnancy. This woman gained 12.4 kg (27 lbs 4 oz) through pregnancy and delivered a 3.3 kg (7 lbs 4 oz) baby (adapted from: Hytten, 1991).

Weight from	Grams	Pounds and ounces
Fetus	3294 g	7 lbs 4 oz
Placenta	644 g	1 lb 7 oz
Amniotic fluid	795 g	1 lb 12 oz
Blood volume	1442 g	3 lbs 3oz
Uterus	970 g	2 lbs 2 oz
Water ^a	1496 g	3 lbs 5 oz
Breasts	397 g	14 oz
Fat stores	3345 g	7 lbs 6 oz
Total weight gain	12.4 kg	27 lbs 4 oz

(a) Extracellular and extravascular water, assuming there is no generalized edema

Table 4: Weight gain in twin pregnancies

The following table shows the IOM (2009) provisional guidelines for total weight gain in twin pregnancies based on a woman's pre-pregnancy BMI.

Pre-pregnancy BMI ^a	Recommended total weight gain ^b	
	kg	lbs
BMI 18.5 - 24.9	17 - 25	37- 54
BMI 25 - 29.9	14 - 23	31 - 50
BMI ≥ 30	11 - 19	25 - 42

(a) There is insufficient information to develop guidelines for underweight women carrying twins (IOM, 2009).

(b) These provisional guidelines reflect the interquartile (25th to 75th percentiles) range of cumulative weight gain among women who delivered twins, who each weighed ≥ 2,500 g on average at term (IOM, 2009).

APPENDIX B

figure a: Gestational weight gain in Canada

Figures a1 to a4 compare the distribution of weight gain in pregnancy to the recommended weight gain range (pink zone) based on pre-pregnancy BMI (estimates and 95% confidence intervals are shown).

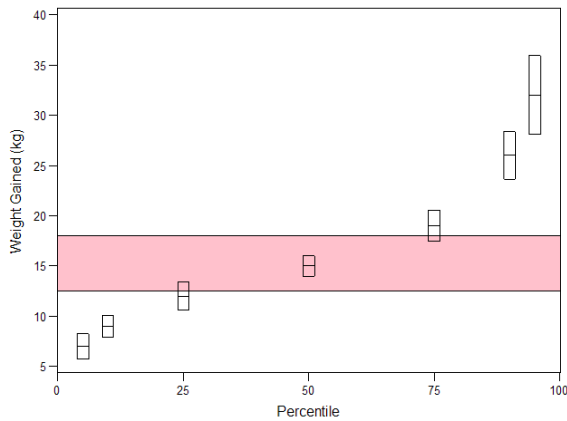


figure a1: pre-pregnancy BMI <18.5

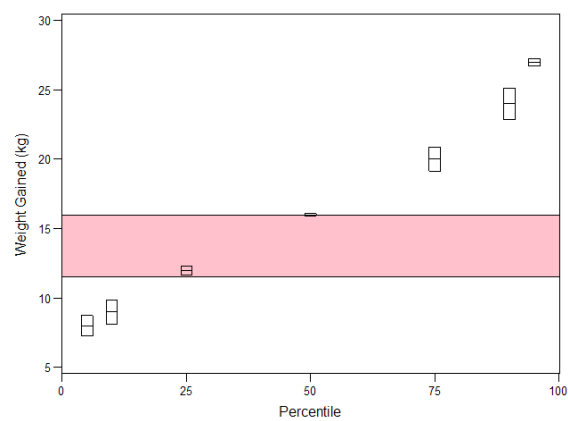


figure. a2: pre-pregnancy BMI 18.5-24.9

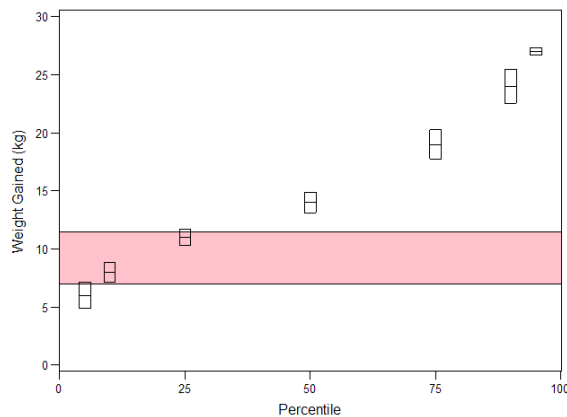


figure a3: pre-pregnancy BMI 25-29.9

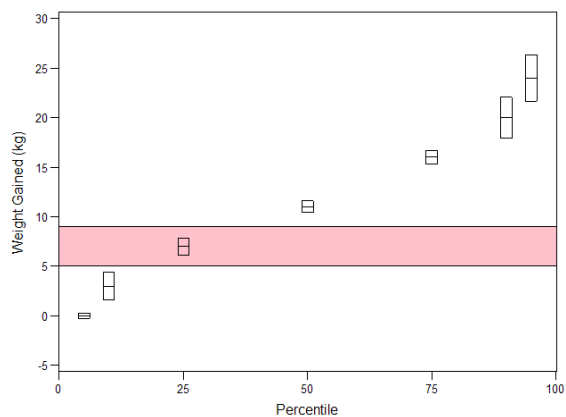


figure a4: pre-pregnancy BMI ≥30

Data source: Canadian Maternity Experiences Survey, 2006-07.

figure b: Sample weight gain tracking charts

Health Canada has prepared sample weight gain tracking charts that can be adapted and used to assess the progress of a woman's gestational weight gain. Five graphics are available: a combined chart with all four BMI categories (figure b1) and one chart for each of the four BMI categories (figures b2 to b5).

NOTE: These sample graphics were prepared based on provisional charts put forward by the IOM in its 2009 report [Weight Gain during Pregnancy: Reexamining the Guidelines](#).

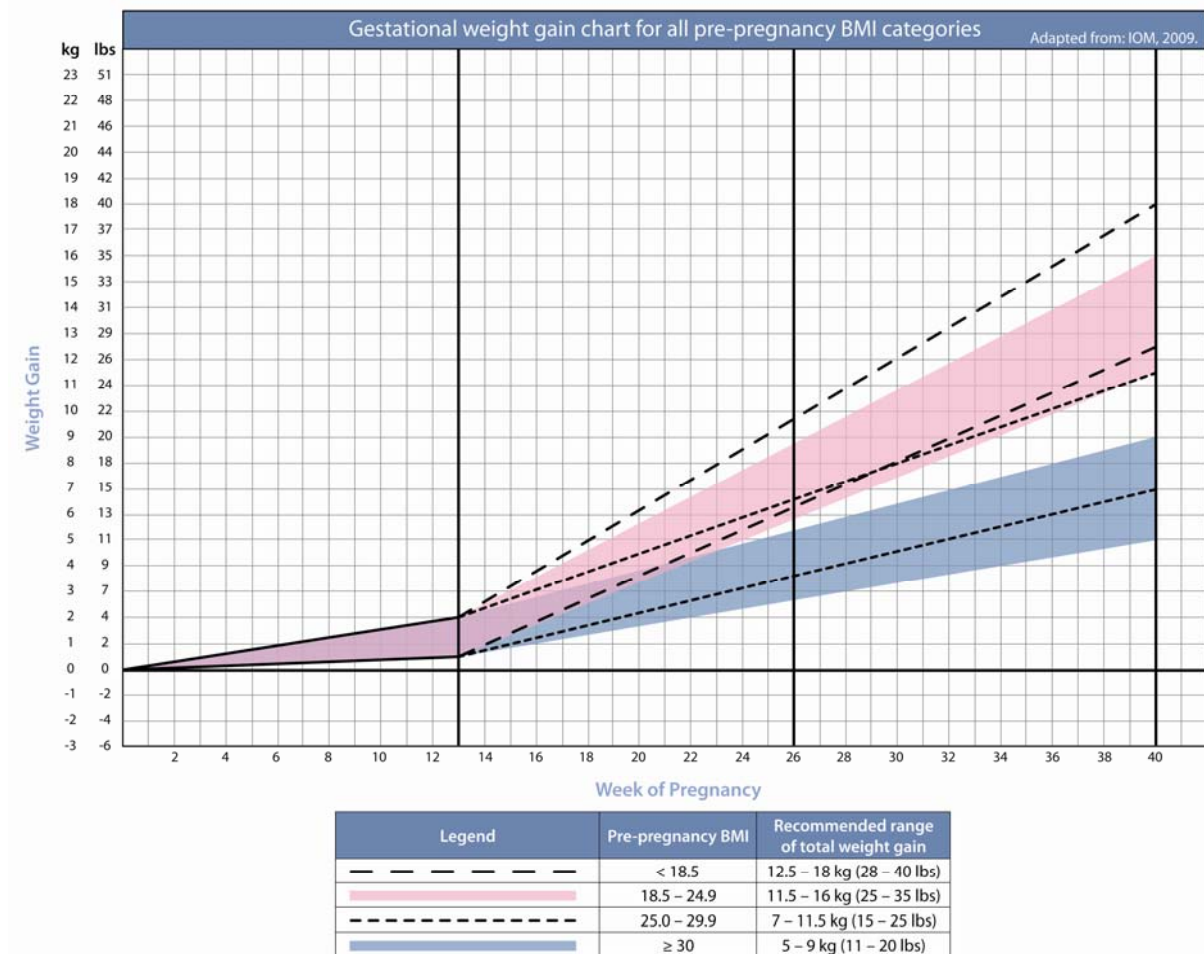


figure b1: Combined chart

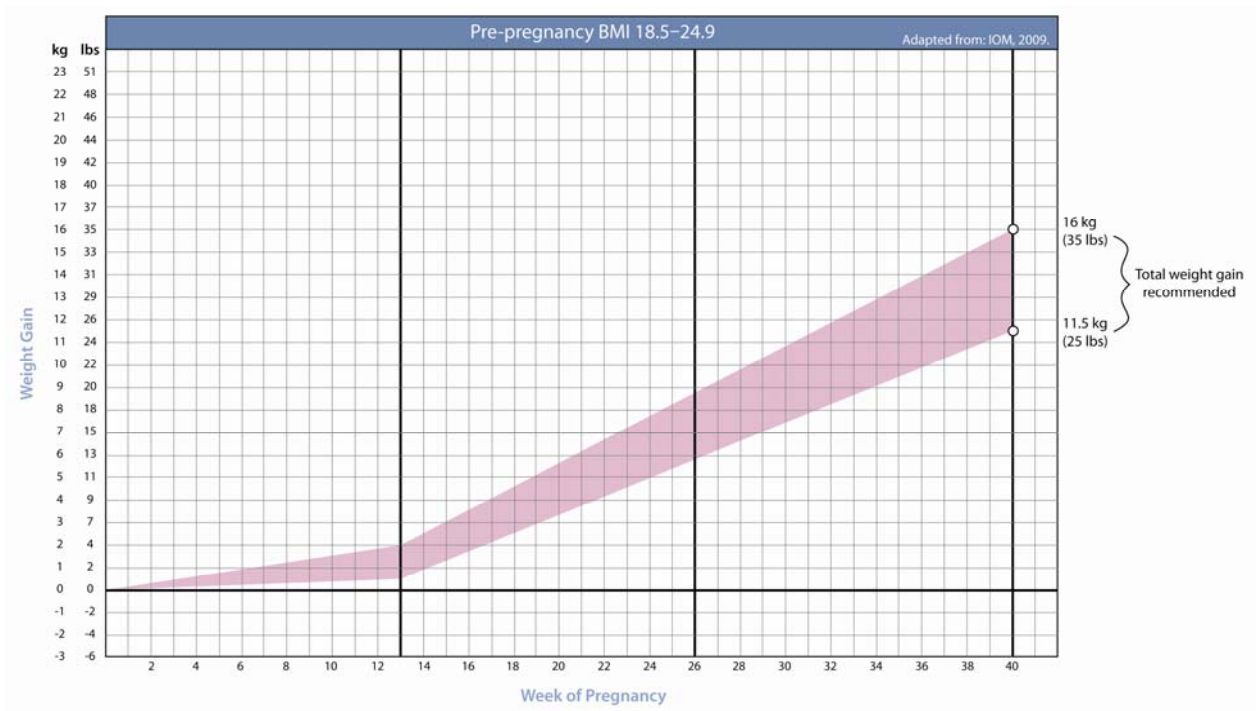


figure b2: Normal weight

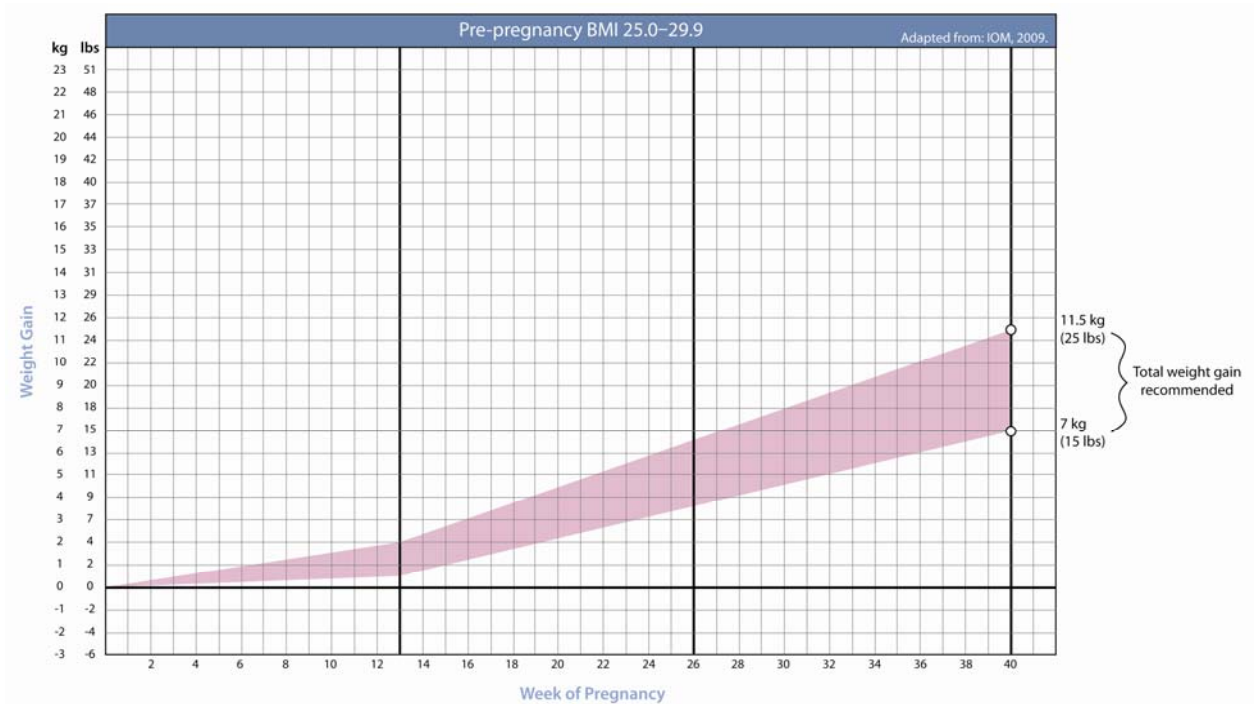


figure b3: Overweight

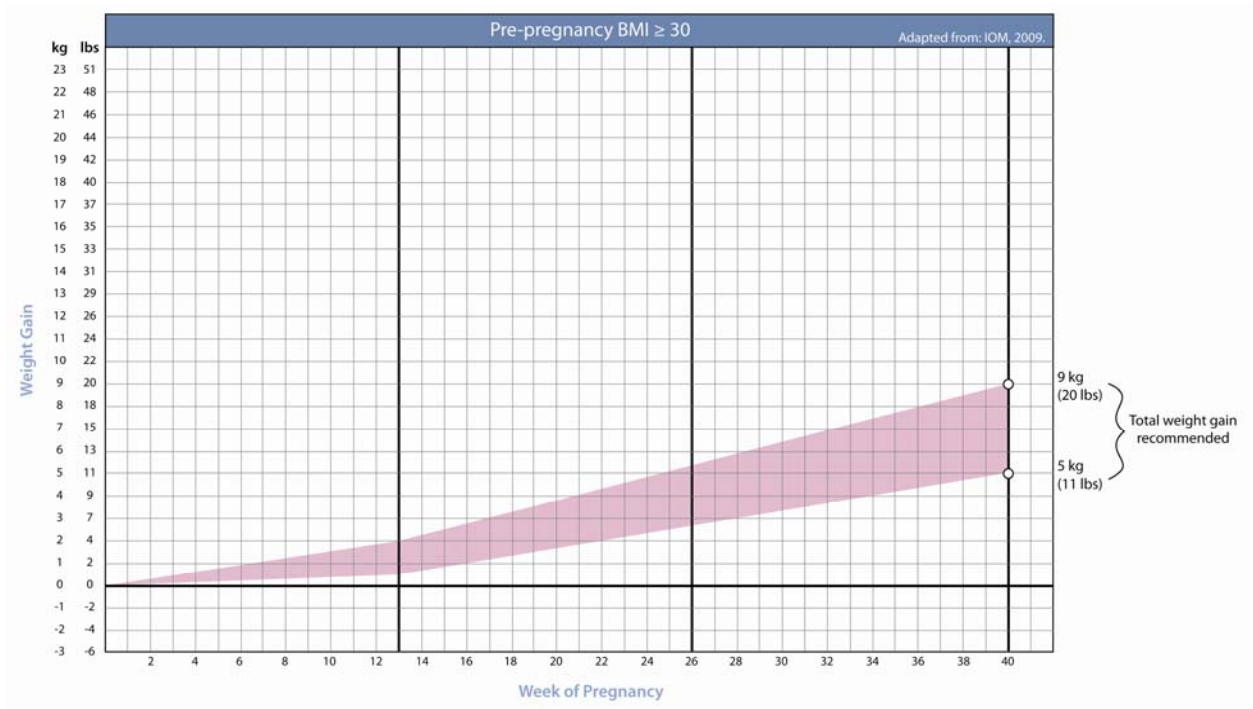


figure b4: Obese



figure b5: Underweight

figure c: BMI nomogram

A woman's weight status before pregnancy (her pre-pregnancy body mass index or BMI) should be used to determine an appropriate gestational weight gain goal.

Calculate a woman's pre-pregnancy BMI using this formula:

$$\text{BMI} = \frac{\text{pre-pregnancy weight* in kilograms}}{(\text{height in metres})^2}$$

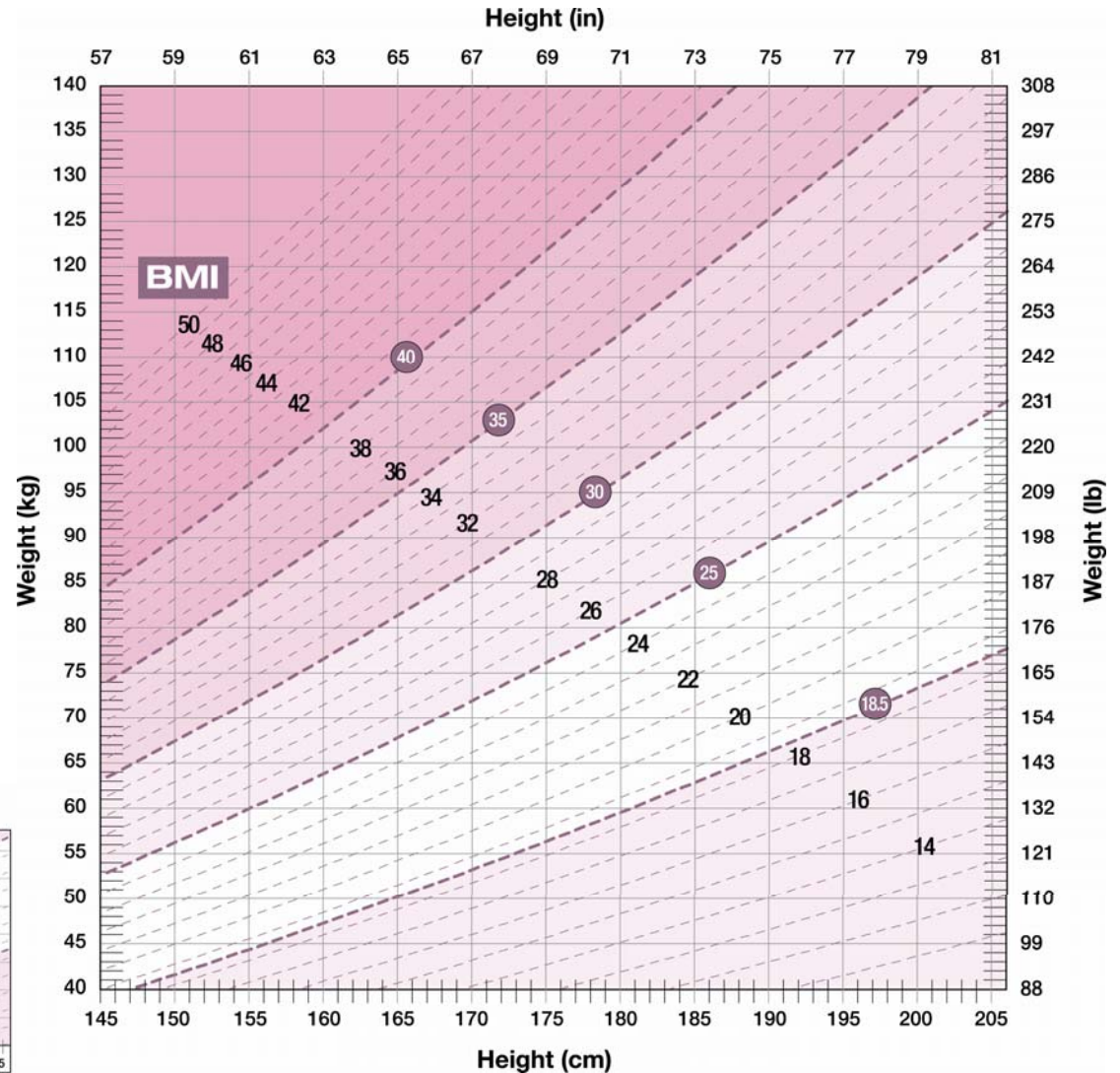
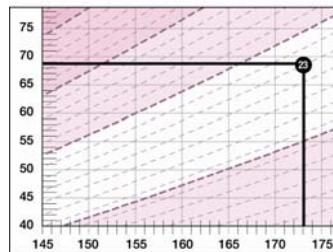
*In absence of accurate pre-pregnancy weight, use a woman's weight in the first trimester as an estimate.

You can also use the BMI chart provided here.

Method:

- 1) Use a straight-edge to help locate the point on the chart where height (in or cm) and pre-pregnancy weight (lbs or kg) intersect.
- 2) Read the number on the dashed line closest to this point.

Example: A woman whose weight is 69 kg before pregnancy and is 173 cm tall has a pre-pregnancy BMI of approximately 23.



REFERENCES

- Abrams, B., Carmichael, S., Selvin, S. (1995). Factors associated with the pattern of maternal weight gain during pregnancy. *Obstetrics and Gynecology* 86(2):170-176.
- Amir, L.H., Donath, S. A. (2007). Systematic review of maternal obesity and breastfeeding intention, initiation and duration. *BMC Pregnancy Childbirth*. 4(7):9.
- Berkman, N. D., Bulik, C. M., Brownley, K. A., Lohr, K. N., Sedway, J. A., Rooks, A., Gartlehner, G. (2006). Management of eating disorders. *Evidence report/technology Assessment* (135):1-166.
- Best Start Resource Centre (2002). *Reducing the impact: Working with pregnant women who live in difficult life situations*. Publication number G01-E.
- Canadian Institute for Health Information (2006). *Improving the Health of Canadians: Promoting Healthy Weights*. (Ottawa: Canadian Institute for Health Information).
- Carmichael, S., Abrams, B., Selvin, S. (1997). The pattern of maternal weight gain in women with good pregnancy outcomes. *American Journal of Public Health* 87(12):1984-8.
- Chu, S. Y., Callaghan, W. M., Bish, C. L., D'Angelo, D. (2009). Gestational weight gain by body mass index among US women delivering live births, 2004-2005: Fueling future obesity. *American Journal of Obstetrics and Gynaecology* 200(3):271.e1-7.
- Chu, S.Y., Schmid, C.H., Dietz, P.M., Callaghan, W.M., Lau, J., Curtis, K.M. (2007). Maternal obesity and risk of caesarean delivery: A meta-analysis. *Obesity Reviews* 8(5): 385-94.
- Crane, J. M. G., White, J., Murphy, P., Burrage, L., Hutchens, D. (2009). The effect of gestational weight gain by body mass index on maternal and neonatal outcomes. *Journal of Obstetrics and Gynaecology Canada* 31(1):28-35.
- Davies, G. A., Maxwell, C., McLeod, L., Gagnon, R., Basso, M., Bos, H., Delisle, M. F., Farine, D., Hudon, L., Menticoglou, S., Mundle, W., Murphy-Kaulbeck, L., Ouellet, A., Pressey, T., Roggensack, A., Leduc, D., Ballerman, C., Biringer, A., Duperron, L., Jones, D., Lee, L. S., Shepherd, D., Wilson, K.; Society of Obstetricians and Gynaecologist of Canada. (2010). Obesity in pregnancy. *Journal of Obstetrics and Gynaecology Canada* 32(2):165-73.
- Davies, G. A. L., Wolfe, L. A., Mottola, M. F., MacKinnon, C., Society of Obstetricians and gynecologists of Canada Clinical Practice Obstetrics Committee. (2003). Joint SOGC/CSEP clinical practice guideline: Exercise in pregnancy and the postpartum period. *Canadian Journal of Applied Physiology* 28(3):330-41.
- Garriguet, D. (2004). Overview of Canadians' Eating Habits. Catalogue no. 82-620-MIE (Ottawa : Statistics Canada).
- Goldenberg, R. L., Culhane, J. F. (2007). Low birth weight in the United States. *The American Journal of Clinical Nutrition* 85(2):584S-90S.
- Harder ,T., Rodekamp, E., Schellong, K., Dudenhausen, J. W., Plagemann, A. (2007). Birth weight and subsequent risk of type 2 diabetes: A meta-analysis. *American Journal of Epidemiology* 165(8):849–57.
- Health Canada. (2003). *Canadian guidelines for body weight classification in adults*. (Ottawa: Health Canada).
- Health Canada. (2009a). *Prenatal nutrition guidelines for health professionals - Folate contributes to a healthy pregnancy*. Available online <http://www.hc-sc.gc.ca/fn-an/pubs/nutrition/folate-eng.php>.
- Health Canada. (2009b). *Prenatal nutrition guidelines for health professionals - Background on Canada's Food Guide*. Available online <http://www.hc-sc.gc.ca/fn-an/pubs/nutrition/guide-prenatal-eng.php>.
- Health Canada. (2009c). *Prenatal nutrition guidelines for health professionals - Fish and omega-3 fatty acids*. Available online <http://www.hc-sc.gc.ca/fn-an/pubs/nutrition/omega3-eng.php>.

- Hedderson, M. M., Gunderson, E. P., Ferrara, A. (2010). Gestational weight gain and risk of gestational diabetes mellitus. *Obstetrics and Gynaecology* 115(3):597-604.
- Hinkle, S. N., Sharma, A. J., Dietz, P. M. (2010). Gestational weight gain in obese mothers and associations with fetal growth. *American Journal of Clinical Nutrition* 92(3):644-51.
- Hytten FE. (1991). *Weight gain in pregnancy*. In: Hytten, F.E., Chamberlain, G., eds. *Clinical Physiology in Obstetrics*. (Oxford: Blackwell Scientific).
- Institute of Medicine. (2009). *Weight Gain during Pregnancy: Reexamining the Guidelines*. (Washington DC: National Academies Press).
- Ip, S., Chung, M., Raman, G., Chew, P., Magula, N., DeVine, D., Trikalinos, T., Lau, J. (2007). *Breastfeeding and Maternal and Infant Health Outcomes in Developed Countries. Evidence Report/Technology Assessment No. 153*. AHRQ Publication No. 07-E007. (Rockville, MD: Agency for Healthcare Research and Quality).
- Lowell, H., Miller D.C. (2010). Weight gain during pregnancy: Adherence to Health Canada's Guidelines. *Health Reports* 21(2):31-6.
- Lu, M. C., Lange, L., Slusser, W., Hamilton, J., Halfon, N. (2001). Provider encouragement of breast-feeding : Evidence from a national survey. *Obstetrics and Gynecology* 97(2):290-5.
- Margerison Zilko, C. E., Rehkopf, D. Abrams, B. (2010). Association of maternal gestational weight gain with short- and long-term maternal and child health outcomes. *American Journal of Obstetrics and Gynaecology* 202(6):574.e1-8.
- McDonald, S. D., Han, Z., Beyene, J.; Knowledge Synthesis Group. (2010). Overweight and obesity in mothers and risk of preterm birth and low birth weight infants: Systematic review and meta-analyses. *British Medical Journal* 341:c3428. doi:10.1136/bmj.c3428.
- Mottola, M. F. (2009). Exercise prescription for overweight and obese women: Pregnancy and postpartum. *Obstetrics and Gynecology Clinics of North America*, 36(2):301-16.
- Oken, E., Kleinman, K. P., Belfort, M. B., Hammitt, J. K., Gillman, M. W. (2009). Associations of gestational weight gain with short- and longer-term maternal and child health outcomes. *American Journal of Epidemiology* 170(2):173-80.
- Oken, E., Rifas-Shiman, S. L., Field, A. E., Frazier, A. L., Gillman, M. W. (2008). Maternal gestational weight gain and offspring weight in adolescence. *Obstetrics and Gynaecology* 112(5):999-1006.
- Oken, E., Taveras, E. M., Kleinman, K. P., Rich-Edwards, J. W., Gillman, M. W. (2007). Gestational weight gain and child adiposity at age 3 years. *American Journal of Obstetrics and Gynaecology* 196(4):322.e1-8.
- Public Health Agency of Canada. (2008). *Canadian Perinatal Health Report*. (Ottawa: Public Health Agency of Canada).
- Public Health Agency of Canada. (2009). *What Mothers Say: The Canadian Maternity Experiences Survey*. (Ottawa: Public Health Agency of Canada).
- Rodrigues, S., Robinson, E. J., Kramer, M.S., Gray-Donald, K. (2000). High rates of infant macrosomia: A comparison of a Canadian native and a non-native population. *Journal of Nutrition* 130(4):806-12.
- Schack-Nielson, L., Michaelsen, K. F., Gamborg, M., Mortensen, E. L., Sørensen, T. I. (2010). Gestational weight gain in relation to offspring body mass index and obesity from infancy through adulthood. *International Journal of Obesity* 34(1):67-74.
- Siege-Riz, A. M., Adair, L. S., Hobel, C. J. (1994). Institute of Medicine maternal weight gain recommendations and pregnancy outcome in predominantly Hispanic population. *Obstetrics and Gynecology* 84(4): 535-73.
- Stotland, N. E., Gilbert, P., Bogetz, A. Harper, C. C., Abrams, B., Gerbert, B. (2010). *Journal of Women's Health* 19(4):807-14.

- Stuebe, A. M., Oken, E., Gillman, M. W. (2009). Associations of diet and physical activity during pregnancy with risk for excessive gestational weight gain. *American Journal of Obstetrics and Gynecology* 201(1):58.e1-58.e8.
- Tjepkema, M. (2005). *Adult obesity in Canada: Measured height and weight*. Catalogue no. 82-620-MWE2005001 (Ottawa: Statistics Canada).
- Torloni, M. R., Betrán, A. P., Horta, B. L., Nakamura, M. U., Atallah, A. N., Moron, A. F., Valente, O. (2008). Prepregnancy BMI and the risk of gestational diabetes: A systematic review of the literature with meta-analysis. *Obesity Reviews: An Official Journal of the International Association for the Study of Obesity* 10(2):194-203.
- Viswanathan, M., Siega-Riz, A. M., Moos, M. K., Deierlein, A., Mumford, S., Knaack, J., Thieda, P., Lux, L. J., Lohr, K. N. (2008). *Outcomes of Maternal Weight Gain, Evidence Report/Technology Assessment No. 168*. AHRQ Publication No. 08-E009. (Rockville, MD: Agency for Healthcare Research and Quality).
- Wrotniak, B. H., Shults, J., Butts, S., Stettler, N. (2008). Gestational weight gain and risk of overweight in the offspring at age 7 y in a multicenter, multiethnic cohort study. *American Journal of Clinical Nutrition* 87(6):1818–24.
- Zhang, X., Decker, A., Platt, R. W., Kramer, M. S. (2008). How big is too big? The perinatal consequences of fetal macrosomia. *American Journal of Obstetrics and Gynecology* 198(5):517.e1-517.e6.