During Pregnancy

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Section 3: During Pregnancy

Aim: Optimal nutrition and healthy lifestyle during pregnancy, including adequate weight gain and meeting increased daily nutrient requirements.

Key points

<table>
<thead>
<tr>
<th>Table 1: Key points</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Promote a healthy diet consistent with the <em>Australian Dietary Guidelines</em>.</td>
</tr>
<tr>
<td>• Recommend 400 μg of folic acid each day for 3 months periconception. This may be taken as a supplement or in the form of fortified foods.</td>
</tr>
<tr>
<td>• Recommend foods high in iron. A total intake of 27 mg/day is required.</td>
</tr>
<tr>
<td>• Recommend 220 μg of iodine in total (150 μg/day should be taken as a supplement).</td>
</tr>
<tr>
<td>• Avoid foods with a high risk of causing listeriosis.</td>
</tr>
<tr>
<td>• Limit fish containing high levels of mercury.</td>
</tr>
</tbody>
</table>

Overview

Good nutrition during pregnancy will help keep a developing foetus and its mother healthy. It is important to choose a wide variety of foods to ensure both maternal and foetal nutritional needs are met. This can be achieved by following the *Australian Dietary Guidelines* in pregnancy.¹ (See Appendices A and B for the dietary guidelines and the recommended serves and serving sizes for pregnancy.)

There is an increased need for certain nutrients such as iron, iodine and folate, however, only a small increase in energy (kilojoules = kJ) is required. There is no need to ‘eat for two’ – the emphasis is on increasing the quality not the quantity of food. Pregnant women should ‘eat to appetite’ and monitor their weight. Body adaptations during pregnancy mean that many nutrients are better absorbed and used more efficiently. A healthy weight gain is around 11 -16 kg for women who are at a healthy Body Mass Index (BMI) pre-conception.²

Recommendations for practice

Important nutrition advice for women during pregnancy:

- Choose a wide variety of foods to ensure the nutritional needs of both mother and baby are met. Eat a healthy diet consistent with the *Australian Dietary Guidelines*.¹ Aim for a healthy weight gain.
- Extra nutrients required in pregnancy are best obtained from food sources opposed to supplements. The three exceptions to this are;
Folate, where daily supplementation of 400 µg of folic acid is recommended to prevent neural tube defects.

Iron, when iron stores are inadequate.

Iodine, where a daily supplementation of 150 µg is recommended for brain and nerve development.

- Monitor and maintain iron stores.
- Monitor and maintain vitamin D status of those particularly at risk of deficiency, including veiled and dark-skinned women.
- Avoid restrictive vegetarian diets, crash dieting and fad diets.
- Take precautions in food selection, preparation, storage and handling to reduce the risk of bacterial infection, e.g., Listeriosis, *Salmonella* infection.
- Limit fish likely to be high in mercury, e.g., shark, sea perch and orange roughy.
- Alcohol should be avoided.

Common problems during pregnancy that could be reduced by making dietary changes include:

- heart burn
- morning sickness
- changes in appetite and taste
- constipation
- excessive weight gain.

**Dietary considerations during pregnancy**

**Energy (kilojoules)**

Individual energy requirements (kJ = kilojoules) are difficult to predict and are best determined by hunger. In general, pregnant women only need a small amount of extra energy.\(^2\) Table 2 below outlines the additional energy requirements during pregnancy. However it is the nutritional quality, not the kilojoule intake that is important.

**Table 2: Additional energy requirements during pregnancy\(^3\)**

<table>
<thead>
<tr>
<th>Trimester</th>
<th>Additional energy requirements (kJ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>No additional kilojoules required</td>
</tr>
<tr>
<td>Second and third</td>
<td>Kilojoule intake could increase by about 10%</td>
</tr>
<tr>
<td></td>
<td>(approximately 600kJ a day).</td>
</tr>
</tbody>
</table>
Vitamins

There are extra needs for most vitamins and minerals during pregnancy, and this is reflected in the Recommended Dietary Intakes (RDI) for pregnant women.\(^1\) Some nutrients which require special attention are discussed below.

**Folate**

Folate (also called folic acid) is a B vitamin needed to form and maintain body cells. It is especially important during times of rapid cell production and growth such as during pregnancy, particularly in the first weeks – often before the pregnancy is confirmed. During this time, folate plays an important role in preventing neural tube defects (NTDs), such as spina bifida and anencephaly, which are common congenital abnormalities occurring in about 1 in 600 live births per year.\(^1\)

In 1995, the National Health and Medical Research Council (NHMRC) Expert Panel on Folate Fortification concluded that up to 70% (about 500 a year) of NTDs could be prevented if all women of childbearing age had a daily intake of 400 μg of folate.\(^5\) These findings led to a variety of public health programs in the 1990s aimed at increasing folic acid intake among women of childbearing age, however, these programs did not result in the majority of women consuming adequate folate.

In September 2009, the Australian Government mandated the use of wheat flour fortified with folic acid in bread making (with the exception of flour used in ‘organic’ bread. Hence, most bread sold in Australia will contain added folic acid (a form of folate). The aim of this initiative is to reduce the number of neural tube defects in the Australian population.\(^5,\, 6\)

Any woman planning a pregnancy should eat folate-rich and folate-fortified foods or take a 400 μg folic acid tablet daily for at least one month before pregnancy, and for the first three months of pregnancy.\(^3,\, 4,\, 7\)

**Folate recommendations**

- Folate RDI (woman planning a pregnancy) = 400μg (or 0.4mg)/day
- Folate RDI (pregnancy) = 400μg/day
- Folate RDI (high risk woman) = 5mg (or 5000μg)/day\(^7\)

Any woman planning a pregnancy should eat folate-rich and folate-fortified foods and/or take a 400μg folic acid tablet daily for at least one month before pregnancy, and for the first three months of pregnancy.\(^4,\, 7,\, 8\)

Folate is found in most plant foods, especially green leafy vegetables, wholegrain breads, folate-fortified cereals, legumes (peas, beans and lentils), nuts and spreads like vegemite and marmite. Folate is easily destroyed by prolonged storage and cooking thus it is best to eat fresh, raw or only lightly cooked fruit and vegetables. For a list of common dietary sources, see Appendix C: Food Sources – folate.

**NB:** Three slices of fortified bread (100g) contains an average of 120μg of folic acid.
Some women are at higher risk than the average woman of having a baby with NTDs. These women require more than 5000µg (5mg) of folate daily before and throughout pregnancy.\(^8\)

Women are at increased risk if they:

- have had a baby with spina bifida, anencephaly or other neural tube defect
- themselves were born with a neural tube defect
- have a close relative who was born with a neural tube defect
- take medicine for epilepsy or seizures as some medicines affect the absorption of folate
- have a metabolic disorder such as type 1 or type 2 diabetes or with a history of gestational diabetes.\(^4,9\)

### Folate recommendations for women with a family history of NTDs

Women with a family history of neural tube defect need a higher daily level of folate supplement of 5000µg (or 5 mg).\(^4,9\) For these women, dietary folate alone is not sufficient.\(^9\)

Women with metabolic disorders, type 1 or type 2 diabetes or with a history of gestational diabetes need a higher daily level of folate supplement of 5000 µg (or 5 mg.).\(^9\)

### Vitamin D

Vitamin D is required for bone and muscle development and enhances the body’s ability to absorb calcium. Vitamin D deficiency is common in women commencing a pregnancy.\(^8\) Vitamin D deficiency has re-emerged recently as a significant maternal and paediatric health issue in specific population groups. Women at risk of vitamin D deficiency include: those with reduced sunlight exposure, e.g. veiled women; those who use sunscreen on a regular basis and dark-skinned women.\(^10\)

In these circumstances, the Royal Australian and New Zealand College of Obstetricians and Gynaecologists recommend testing women in these groups and initiating supplementation where needed. Vitamin D deficiency is known to be an important risk factor for the development of osteoporosis in later life.\(^8\)

The best source of the vitamin D comes from UV radiation from the sun (direct sunshine onto bare skin). Safe sun exposure needs to be considered to minimise cancer risk. Fatty fish, eggs, fortified margarine and milk all contain small amounts of vitamin D but not in sufficient quantities.

### Vitamin D recommendation during pregnancy

Adequate intake for vitamin D during pregnancy = 5µg/day \(^7\)

The Australian and New Zealand Bone and Mineral Society and Osteoporosis Australia position statement on vitamin D, which is supported by RANZCOG, recommends that targeted measurement of 25(OH)D levels be conducted for infants,
children and adolescents with at least one risk factor for low vitamin D and for pregnant women with at least one risk factor for low vitamin D at the first antenatal visit.¹⁰

NB: King Edward Memorial Hospital (KEMH) is screening at risk women for vitamin D deficiency. For more information on screening for and treatment of vitamin D, see the KEMH policy listed in the Related policies, procedures and guidelines at the end of this chapter.

**Other vitamin supplementation**

There is little evidence to support ‘routine’ supplementation of other vitamins in pregnancy such as vitamins A, C and E and, not unexpectedly, excessive quantities of fat soluble vitamins may be harmful.⁸ For this reason, if multivitamins are taken, they should be pregnancy-specific.

**Minerals**

**Iodine**

Iodine is stored in the thyroid and during pregnancy there is an increased need for iodine. The mother requires additional iodine due to the increased production of thyroid hormones, while the foetus requires iodine for brain and nervous system development and thyroid function (production of thyroid hormones). If intake is insufficient prior to pregnancy, the mother’s stores may become low and insufficient to meet the needs of the baby later in pregnancy.⁸ Women with pre-existing thyroid conditions should seek medical advice prior to taking iodine supplements.

**Iodine recommendations**

<table>
<thead>
<tr>
<th>Category</th>
<th>RDI (µg/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-pregnant adult woman</td>
<td>150</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>220</td>
</tr>
</tbody>
</table>

NB: Dietary intake will not meet the additional needs of pregnancy and breastfeeding, therefore NHMRC recommends pregnant women take an iodine supplement of 150 µg/day.

Australia has recently seen high rates of iodine deficiency due to changes in the sanitiser used on milking equipment in dairies, reduced household use of iodised salt in processed foods and increased consumption of commercially processed food containing non-iodised salt.¹¹

In 2009, the Australian Government mandated the fortification of iodine (via iodised salt) into bread and bread products (with the exception of ‘organic’ and unleavened bread). Hence, most bread sold in Australia contains added iodine.¹¹

Food sources of iodine include fortified bread, dairy foods (cheese, yoghurt, milk), seafood (including canned salmon), eggs, iodised salt.¹¹

NHMRC recommend that women who are pregnant have 220 µg of iodine per day. Pregnant and breastfeeding women need to top up their dietary iodine intake.
because they are unlikely to get enough from their diet and mandatory fortification of foods.\textsuperscript{11}

NB: NHMRC recommend that pregnant women do not take kelp/seaweed supplements as the iodine levels are variable and may be contaminated with mercury.\textsuperscript{11}

**Iron**

The iron demands of pregnancy and lactation are particularly pronounced due to the expanded red blood cell volume, blood loss around the time of delivery and the demands of the developing foetus and placenta. The developing foetus draws iron from the mother to last it through the first five or six months after birth.\textsuperscript{3}

Iron is a part of haemoglobin in red blood cells and helps to transport oxygen in the blood. The iron component of enzymes is necessary for the production of energy from glucose, which is the main fuel for the brain and the rest of the body.\textsuperscript{12,13} Iron in foods come in two forms: haem (from animal sources) and non-haem (mainly from plant sources). The haem form of iron is more easily absorbed by the body than non-haem iron. The presence of vitamin C can increase the absorption of non-haem iron when consumed in the same meal. Consumption of meat, fish and poultry can also increase non-haem iron absorption from plant foods consumed at the same time.\textsuperscript{7} A list of iron rich foods is shown in Table 3 below.

### Iron recommendation

Iron RDI for pregnant women = 27mg/day (9 more mg/day than for non-pregnant women).\textsuperscript{7}

#### Table 3: Iron content of foods\textsuperscript{7}

<table>
<thead>
<tr>
<th>Food</th>
<th>Iron (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast cereal (iron fortified) 1 cup</td>
<td>3.0</td>
</tr>
<tr>
<td>Lean beef (cooked) 100 g</td>
<td>2.0-3.0</td>
</tr>
<tr>
<td>Lean lamb (cooked) 100 g</td>
<td>2.0 - 2.5</td>
</tr>
<tr>
<td>Legumes – cooked ½ cup</td>
<td>2.0 -2.5</td>
</tr>
<tr>
<td>Baked beans (small can 130g)</td>
<td>1.66</td>
</tr>
<tr>
<td>Salmon (canned or grilled) 100 g</td>
<td>1.1 - 1.3</td>
</tr>
<tr>
<td>Tuna (canned in water) 100 g</td>
<td>1.0 -1.3</td>
</tr>
<tr>
<td>Egg – large 65-70g</td>
<td>1.0</td>
</tr>
<tr>
<td>Lean pork (cooked) 100 g</td>
<td>0.6 – 1.0</td>
</tr>
<tr>
<td>Skinless chicken breast (cooked, no skin) 100g</td>
<td>0.4 - 0.9</td>
</tr>
</tbody>
</table>

NB: Other sources of iron can be found in the WA Women’s Health and Family Services pamphlet ‘High Iron Foods’.
Iron deficiency

Iron supplementation will generally be recommended for women at particular risk of iron deficiency. This includes:

- vegetarians
- women with multiple pregnancies
- women with a history of iron deficiency
- women with severe morning sickness
- women with poor diets.

All women should have their haemoglobin level checked at their first antenatal visit and again at approximately 28 week’s gestation and any anaemia investigated and treated. Routine iron supplementation is not recommended in every pregnancy.\textsuperscript{14}

Treatment of iron deficiency anaemia

Dietary modification is the main treatment of iron deficiency in pregnancy, with an emphasis on iron-rich food sources, especially sources of haem iron (such as red meat, chicken and fish). It is best to avoid drinking tea and coffee with meals. Rather, drink tea and coffee between meals as they contain tannins that can reduce iron absorption. Oxalates in spinach and phytates in cereals and legumes can inhibit iron absorption from these foods.

Calcium

Until 2006, Australian dietary recommendations advised increased calcium intake during pregnancy and breastfeeding. This advice has since been revised. Although there is a large ‘shift’ of calcium to the foetus during the third trimester of pregnancy (as it starts to develop and strengthen its bones), the mother’s increased capacity to absorb dietary calcium makes up for the loss without the need for extra intake.\textsuperscript{3}

The recommended dietary intake of calcium per day for pregnant women is 1300 mg/day (ages 14-18 years) and 1000 mg/day (19-50 years). If a woman avoids milk and milk products in her usual diet (e.g. lactose intolerant) and does not consume alternative high calcium food (e.g. calcium enriched soya milk), calcium supplementation is recommended at 1000 mg/day.\textsuperscript{8}

Calcium RDI (pregnant women) = 1300 mg/day (ages 14-18 years) and 1000 mg/day (19-50 years)\textsuperscript{7}

High calcium sources include cow’s milk, yoghurt, custard, cheese and calcium-fortified soy beverage. Other sources include legumes, some vegetables, fortified soy products and breakfast cereals. See Appendix D for specific high calcium food sources.\textsuperscript{7, 15}
Some factors that can reduce calcium in the bones and lower bone density include:

- high salt diet
- more than six caffeine containing drinks per day (coffee, tea, cola)
- high intakes of fibre (more than 50 g/day)
- low levels of vitamin D – people at increased risk include those with naturally very dark skin or little or no sun exposure.
- smoking.\(^\text{16}\)

In populations where calcium intake is low, calcium supplementation as part of antenatal care is recommended for the prevention of eclampsia among pregnant women, particularly those at higher risk of hypertension.\(^\text{8,17}\)

Other minerals

There is little evidence to support ‘routine’ supplementation of other minerals in pregnancy, such as magnesium, fluoride, zinc or rare minerals.\(^\text{8}\)

Weight gain in pregnancy

Total weight gain during pregnancy varies widely among women, even with similar ages, stature, ethnic backgrounds and socioeconomic status. Weight gain should not be considered in isolation from other aspects of maternal diet. The nutritional quality of the diet is critical.

Although many overweight and obese women conceive naturally and have healthy pregnancies, obesity is associated with increased infertility and significant pregnancy co-morbidities compared with women in the healthy weight range.\(^\text{18}\)

Women who gain more than the recommended weight in pregnancy are at increased risk of developing gestational diabetes mellitus (GDM), hypertension and having a large for gestational age infant. These infants are at greater risk of becoming overweight as they grow.\(^\text{19}\)

Obesity is defined as a Body Mass Index (BMI) equal or greater than 30. This definition applies to women in the first trimester of pregnancy and is assessed using pre-pregnancy or first trimester weight. Allowing for gestational weight gain, a BMI of 32 or greater in the second trimester of pregnancy defines obesity.\(^\text{19}\)

BMI is calculated by dividing the weight (kg) by the height (m) squared:

\[
\text{Body Mass Index (BMI)} = \frac{\text{Weight (kg)}}{\text{Height (m)}^2}
\]

The earlier and more positively maternal obesity is addressed by the health professional, the more empowered the woman will feel toward making lifestyle changes and having some control over the issue.\(^\text{18}\)

Table 4 (on the next page) shows the average weight gained in pregnancy, excluding the additional fat masses.
Table 4: Components of pregnancy weight gain²⁰

<table>
<thead>
<tr>
<th>Weight gain component</th>
<th>Approximate or average weight (grams)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foetus</td>
<td>3400</td>
</tr>
<tr>
<td>Placenta</td>
<td>600</td>
</tr>
<tr>
<td>Amniotic fluid</td>
<td>600</td>
</tr>
<tr>
<td>Uterus</td>
<td>900</td>
</tr>
<tr>
<td>Breast tissue</td>
<td>500</td>
</tr>
<tr>
<td>Fat stores</td>
<td>3500</td>
</tr>
<tr>
<td>Blood</td>
<td>1500</td>
</tr>
<tr>
<td>Extracellular fluid</td>
<td>1000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12000 (12kg)</strong></td>
</tr>
</tbody>
</table>

Health professionals should consider the current Institute of Medicine (IOM) guidelines (see Table 5) for weight management during pregnancy when assisting women to set goals.

These IOM guidelines are used widely throughout Australia and New Zealand and supported by the Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG).²,²¹

Table 5: Guidelines for total and rate of weight gain during pregnancy²

<table>
<thead>
<tr>
<th>BMI (kg/m²)</th>
<th>Classification</th>
<th>Singleton pregnancy total weight gain range (kg)</th>
<th>Rate of weight gain in 2nd and 3rd trimester (kg/week)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;18.5</td>
<td>Underweight</td>
<td>12.5 - 18</td>
<td>0.51</td>
</tr>
<tr>
<td>18.5-24.9</td>
<td>Healthy weight</td>
<td>11.5 - 16</td>
<td>0.42</td>
</tr>
<tr>
<td>25-29.9</td>
<td>Overweight</td>
<td>7 - 11.5</td>
<td>0.28</td>
</tr>
<tr>
<td>BMI ≥ 30</td>
<td>Obese</td>
<td>5 - 9</td>
<td>0.22</td>
</tr>
</tbody>
</table>

Footnotes to table:

- The above calculations assume a 0.5–2 kg weight gain in the first trimester.

- The BMI figures in the above table are derived from the World Health Organization’s “The International Classification of adult underweight, overweight and obesity according to BMI”.²

The provisional guidelines from RANZCOG for a woman with multiple foetuses (twins), gestational weight gains are in the following ranges²:

- healthy BMI: 17 - 25 kg total weight gain
Health professionals who measure, document and communicate weight gained during pregnancy should encourage women to gain weight within the recommendations. If women are gaining excessive weight in early pregnancy a referral to an accredited practising dietitian or other support may be effective. The earlier weight issues are addressed, the easier they are to manage.\textsuperscript{2}

**Excessive gestational weight gain**

Making better food choices without compromising nutrient intake can assist in reducing excessive gestational weight gain.

Refer obese women and those with an excessive weight gain to online resources:

http://kemh.health.wa.gov.au/services/nutrition/resources.htm


**Weight loss in pregnancy**

Weight loss during pregnancy is *not routinely* recommended. In a proportion of women (BMI > 35), who make significant dietary changes, weight loss will occur and is deemed safe.\textsuperscript{1} A well-balanced diet that provides sufficient carbohydrate to avoid ketonaemia is recommended. Concerns regarding the effect of significant maternal ketonaemia/ketonuria on offspring, relate to a reported relationship with developmental delay.\textsuperscript{19}

For women losing weight during pregnancy, it is important to:

- assess and ensure adequate and appropriate nutrient intake
- encourage regular meals and snacks containing low glycaemic index, high fibre carbohydrates
- provide advice on nutritional supplements to meet any deficits in dietary intake of vitamins or minerals following liaison with a medical professional.\textsuperscript{19}

**Physical activity**

Healthy women with uncomplicated pregnancies can integrate physical activity into their daily living without significant risks either to themselves or to their unborn child. Benefits of such exercise programs include improved aerobic and muscular fitness, promotion of appropriate weight gain, and facilitation of labour. Regular exercise may also help to prevent gestational glucose intolerance and pregnancy-induced hypertension.\textsuperscript{22}

The 2014 *National Physical Activity and Sedentary Behaviour Guidelines* for adults 18 - 64 years of age are\textsuperscript{23}:
Physical Activity Guidelines

- Doing any physical activity is better than doing none. If you currently do no physical activity, start by doing some, and gradually build up to the recommended amount.
- Be active on most, preferably all, days every week.
- Accumulate 150 to 300 minutes (2 ½ to 5 hours) of moderate intensity physical activity or 75 to 150 minutes (1 ¼ to 2 ½ hours) of vigorous intensity physical activity, or an equivalent combination of both moderate and vigorous activities, each week.
- Do muscle strengthening activities on at least 2 days each week.

Sedentary Behaviour Guidelines

- Minimise the amount of time spent in prolonged sitting.
- Break up long periods of sitting as often as possible.

The specific recommendations for pregnant women are:

- Try to do some physical activity every day.
- Accumulate 150 to 300 minutes of moderate-intensity physical activity each week, but check with a health professional regarding the best form of activity for the individual.
- Take care with vigorous intensity physical activity by checking with a doctor or health professional first.

*Sedentary behaviour includes sitting and lying down (except when you are sleeping).

*Moderate intensity physical activity requires some effort, but still allows an individual to speak easily while undertaking the activity. Examples include active play, brisk walking, recreational swimming, dancing, social tennis or riding a bike.

Refer to Appendix E: Physical activity during pregnancy for more detailed information.

Pregnancy in adolescence

Adolescents need additional support to ensure adequate nutrition intake and weight gain during pregnancy as they have high nutrient needs, and often have dietary intakes below the recommended amounts for both pregnant and non-pregnant adolescent girls. As nutrient demands are higher, the consequences of inadequate nutrition are more serious for pregnant adolescents than for pregnant adults.\(^3\)

Deficient intakes of iron, calcium, zinc and folate are commonly reported to be of concern in the diets of pregnant adolescents. This could reflect inadequate intakes of fruit, vegetables, cereals and milk and milk products. Anaemia is more common among adolescents than older women.\(^24\)

Calcium intake is important because young women have not yet reached their peak bone mass and inadequate calcium intake may increase the risk of osteoporosis.
developing later in life. The RDI for calcium for pregnant adolescents aged 14-18 years is 1300 mg/day as compared to a 1000 mg/day for women 19-50 years.3

**Allergy prevention during pregnancy**

Exclusion of allergenic foods from the maternal diet during breastfeeding or pregnancy has not been shown to prevent allergies in infants.12

**Vegetarian pregnancy**26,27

It is possible for vegetarian women to meet the increased nutritional needs of pregnancy if they eat according to current dietary recommendations. See Table 6 for the definitions of different types of vegetarians. In general, both lacto-ovo-vegetarians and vegans can have adequate weight gain during pregnancy. Women who experience difficulty gaining weight should limit their intake of low nutrient foods and eat more foods of higher energy and nutrient density.26

The increased iron requirements of pregnancy mean that vegetarians need to choose iron-rich foods like whole grains, legumes, tofu and green leafy vegetables. These non-haem iron foods should be taken with a vitamin C source to increase iron absorption e.g. citrus fruit. Supplemental iron may be required to meet iron needs as deficiency is common during pregnancy.26

Vegan diets increase the risk of calcium deficiency. Milk and milk product alternatives such as soymilk fortified with calcium are encouraged to meet requirements. Vegans may require supplemental calcium if dietary calcium is inadequate. Women may need to consider vitamin B12 supplementation if levels are low.26 Fruitarian, macrobiotic and other very strict vegetarian diets are **not recommended** during pregnancy as they often omit one or more of the essential food groups in the **Australian Dietary Guidelines.**1

**Table 6: Types of vegetarians**27

<table>
<thead>
<tr>
<th>Vegans</th>
<th>exclude all foods of animal origin. The diet comprises vegetables, vegetable oils, cereals, pulses such as beans and lentils, nuts, fruit and seeds.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lacto-ovo-vegetarians</td>
<td>exclude all meat, poultry, fish and seafood from their diet. Milk, dairy products and eggs are still consumed.</td>
</tr>
<tr>
<td>Lacto-vegetarians and ovo-vegetarians</td>
<td>exclude all meat, poultry, fish and seafood. Lacto-vegetarians still consume milk and dairy products, and ovo-vegetarians still consume eggs.</td>
</tr>
<tr>
<td>Fruitarians</td>
<td>exclude all foods of animal origin as well as pulses and cereals. Diet mainly comprises raw and dried fruits, nuts, honey and olive oil.</td>
</tr>
</tbody>
</table>

**Common problems in pregnancy**

**Morning sickness**

Morning sickness, involving nausea and vomiting is commonly associated with pregnancy and may be related to heightened olfaction sensitivity and increased human chorionic gonadotrophin (HCG) produced in the first 12 weeks. Morning
Sickness is most common in the first trimester and does not necessarily confine itself to the morning. Relief for morning sickness may be aided by:

- getting up slowly and avoiding sudden movements
- eating smaller, more frequent meals
- eating some dry bread, biscuits or cereal before getting up in the morning
- sucking on something sour like a lemon
- drinking liquids and soup between, rather than with meals to avoid bloating that may trigger vomiting
- avoiding large meals and greasy, highly spiced foods
- slowly sipping a fizzy drink
- trying food and drinks containing ginger
- keeping rooms well ventilated and odour-free.
- relaxing, resting and getting into the fresh air as much as possible.

Further treatment and support may be required if continued nausea and vomiting are compromising adequate fluid and nutrient intake.

**Constipation**

Constipation can occur during pregnancy and may be due to:

- the effect of progesterone on muscle tone
- increased pressure on the bowel from the growing foetus
- iron tablets taken in pregnancy
- insufficient dietary fibre
- insufficient physical activity levels
- insufficient fluid intake.

Constipation may be improved by implementing these few strategies:

- **Fibre** – increase it. Aim for at least 30g/day
- **Exercise** – do more regularly. Aim for at least 30 minutes daily.
- **Water** – drink more. Aim for 6-8 glasses/day.

High fibre diets include wholemeal and wholegrain breads and cereals, fresh fruit and vegetables and dried fruit and nuts. Unprocessed bran should not be used routinely as it can decrease the absorption of essential minerals. Laxatives should not be used unless prescribed by a medical practitioner. High fibre foods are outlined in Table 7.
Table 7: Fibre content of selected foods

<table>
<thead>
<tr>
<th>Sources of fibre</th>
<th>Fibre (g)</th>
<th>Sources of fibre</th>
<th>Fibre (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baked beans, 220g</td>
<td>10.5</td>
<td>Banana, 1 small</td>
<td>2.5</td>
</tr>
<tr>
<td>Wholemeal pasta, 1 cup</td>
<td>8.5</td>
<td>Dried apricot, 6 small</td>
<td>2.5</td>
</tr>
<tr>
<td>Corn on cob</td>
<td>5.0</td>
<td>Peanut paste, 20gms</td>
<td>2.0</td>
</tr>
<tr>
<td>Prunes, 6 medium</td>
<td>4.5</td>
<td>Shredded wheatmeal, 2 biscuits</td>
<td>2.0</td>
</tr>
<tr>
<td>Strawberries, ½ punnet</td>
<td>4.5</td>
<td>Wholemeal bread, 1 slice</td>
<td>2.0</td>
</tr>
<tr>
<td>Peas, ½ cup</td>
<td>4.5</td>
<td>High-fibre white bread</td>
<td>1.5</td>
</tr>
<tr>
<td>Porridge, ½ cup</td>
<td>4.0</td>
<td>Pumpkin, no skin 100gms</td>
<td>1.5</td>
</tr>
<tr>
<td>Brown rice, 1 cup</td>
<td>3.0</td>
<td>Broccoli ½ cup</td>
<td>1.5</td>
</tr>
<tr>
<td>Apple, 1 medium</td>
<td>3.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To prevent constipation, drinking water is recommended in preference to sugary drinks, such as juice, cordial and soft drinks, to prevent tooth decay and excess energy (kilojoule) intake.

Implementing these strategies early in pregnancy will help to reduce constipation. If constipation persists, refer to a medical practitioner or dietitian.

Heartburn / indigestion

Heartburn and indigestion are often caused by a combination of factors. When the muscle tone of the sphincter at the top of the stomach is relaxed and the foetus places pressure on the stomach, stomach acid is able to enter the oesophagus.

The following may help relieve heartburn and indigestion:

- smaller, more frequent meals
- eating slowly
- upright positioning during and after meals
- avoid bending, lifting or prone positions one to two hours after eating
- avoid caffeine containing drinks such as coffee, tea, cocoa, cola and energy drinks with guarana
- avoid eating late at night
- avoid spicy or fatty foods.
Changes in appetite and taste

Many women find their appetite and taste for food changes during pregnancy. Coffee and alcohol are commonly found to be unpleasant, whereas salty or sugary foods are often craved. There does not seem to be any physiological reason for craving, for example a craving for salty foods does not indicate a lack of sodium. However, food cravings are real and need to be taken seriously if they interfere with a nutritious diet. 

A referral to a medical practitioner or accredited practicing dietitian should be considered if food cravings cause concern.

Food safety

Some foods contain bacteria or substances that may be harmful during pregnancy. One of these is *Listeria*.

*Listeria*

*Listeria* are bacteria carried in some foods that may cause a disease called *listeriosis*, which is a fairly uncommon form of foodborne illness in Australia. The illness causes few or no symptoms in most people, but it can be very dangerous for pregnant women, their unborn child or newborn baby. A *listeria* infection can be treated with antibiotics however prevention is the best approach.

The bacteria may be present in raw foods or may contaminate food after it has been cooked or processed. High risk foods for *Listeria* are outlined in Table 8.

### Table 8: High risk foods for *Listeria*  

<table>
<thead>
<tr>
<th>Food Type</th>
<th>Examples</th>
</tr>
</thead>
</table>
| Cold meats                 | Unpackaged ready-to-eat from delicatessen counters, sandwich bars, etc.  
Packed, sliced ready-to-eat |  
| Cold cooked chicken        | Purchased (whole, portions or diced) ready-to-eat                                                                                         |
| Pate                       | Refrigerated pate or meat spreads                                                                                                         |
| Salads (fruit & vegetables)| Pre-prepared or pre-packaged salads, e.g., from salad bars, smorgasbords, juice from juice bars                                            |
| Chilled seafood            | Raw (e.g. oysters, sashimi or sushi)  
Smoked ready-to-eat  
Prawns (ready-to-eat peeled, cooked) as in prawn cocktails, sandwich fillings and prawn salads |
| Cheese                     | Soft, semi-soft and surface ripened cheeses (pre-packaged and delicatessen) e.g. brie, camembert, ricotta, feta and blue                 |
| Ice cream                  | Soft serve                                                                                                                               |
| Other dairy products       | Unpasteurised dairy products (e.g. raw goats milk)                                                                                         |
Salmonella

*Salmonella* are bacteria that can cause diarrhoea with fever, cramping, and occasional vomiting. Raw eggs can be a source of *Salmonella*. Pregnant women should not consume foods that contain raw eggs due to their increased risk of developing illness due to *Salmonella*.¹

**Food safety precautions**

During pregnancy, care should be taken to:

- Prepare, store and handle food hygienically.
- Keep kitchen surfaces clean.
- Avoid foods with a higher risk of *Listeria* contamination, including foods that are not adequately heat-treated, stored for long periods or made where appropriate food hygiene practices are neglected.
- Be aware of food prepared by others.³⁰

Practising appropriate **food hygiene** will reduce the risk of disease. Appropriate food hygiene includes:

- Thoroughly washing and drying hands before preparing food.
- Keep the refrigerator clean and below 5°C.
- Washing knives, cutting boards and kitchen appliances and dry thoroughly before and after handling raw food to prevent contamination of cooked and ready-to-eat food.
- Thoroughly washing and drying raw fruit and vegetables before eating or juicing.
- Thawing ready-to-eat frozen food in the refrigerator or microwave. Do not thaw at room temperature.
- Thoroughly cook all raw meat, chicken and fish.
- Do not leave food to cool on the bench or stovetop. Place food in the refrigerator after the steam has gone.
- If food is being kept hot, keep over 60°C. Store cold food below 5°C.
- Keeping stored foods covered.
- Keeping pets away from kitchen surfaces.
- Storing raw meat in the bottom shelf in the refrigerator, separate from cooked and ready-to-eat food.³ ³⁰

**Safe foods**

If appropriate food hygiene is practised during preparation and storage, the following foods are safe to eat during pregnancy:
- Freshly cooked foods. Store in the fridge and use within a day of cooking.
- Freshly washed vegetables and fruit. Store freshly prepared salads in the fridge and use within a day of preparation.
- Hard cheeses, cheese spreads, plain cream cheese, plain cottage cheese. Store in the fridge.
- Pasteurised dairy products, e.g. milk, yoghurt, custard, dairy dessert, and packaged frozen ice cream.
- Canned and similarly packaged foods. Store unused portions in the fridge in clean, sealed containers and use within a day.

Mercury in fish

The nutrients provided in fish have important benefits for maternal and foetal health and development. Fish is an excellent source of protein and iodine; low in saturated fats and high in unsaturated fat and essential omega-3 fatty acids. Therefore, it is important to continue to eat fish during pregnancy.

The Australian Dietary Guidelines advise eating fish regularly (about 2 times/week) for good health. Women planning a pregnancy can safely follow these guidelines provided they choose the type of fish carefully.

Eating too much fish with high mercury levels could have harmful effects on the foetal nervous system, particularly brain development. The foetus appears to be most sensitive to the effects of mercury during the third and fourth months of a pregnancy. The effects on the brain and nervous system may not be noticed until developmental milestones, such as walking and talking, are delayed. Memory, language and attention span may also be affected.

All fish contain a small amount of mercury but larger, predatory deep-sea fish tend to have higher levels. The Food Standards Australia New Zealand (FSANZ) released advice on fish consumption for the Australian population, taking into account the usual dietary intake and fish consumption.

Fish lower in mercury include canned tuna, salmon (atlantic and canned), mackerel, shellfish (including prawns), lobsters and oysters.

Mercury recommendations

- Eat one or two meals with fish every week for good health.
- Women can safely consume 2-3 serves* per week of any fish and seafood, except for deep-sea perch, catfish, shark (also known as flake) or any billfish (e.g. Swordfish/Broadbill or Marlin).
- Limit deep-sea perch and catfish to no more than one serve per week with no other fish to be consumed that week.
- Limit shark and billfish to no more than one serve per fortnight with no other fish being consumed that fortnight.
Lifestyle considerations

Caffeine

Caffeine intake should be limited during pregnancy. Caffeine is a chemical stimulant found in coffee, tea, cola and some other soft drinks, chocolate and chocolate drinks. While having large amounts of caffeine (more than 200 mg/day) does not appear to cause birth defects, it may increase the risk of a miscarriage or having a baby with low birth weight.\(^3\)  \(^3\)\(^3\)  \(^4\) As there is uncertainty about the safe level during pregnancy, limiting coffee, tea or cola drinks to less than 200 mg/day is recommended, e.g. maximum of 2 cups of coffee or 3 cups of tea per day. See Table 9 for caffeine content in common beverages.\(^3\)

Table 9: Caffeine content in beverages\(^3\)

<table>
<thead>
<tr>
<th>Food</th>
<th>Caffeine content (approximate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percolated coffee</td>
<td>60-120 mg/250ml</td>
</tr>
<tr>
<td>Formulated caffeinated beverages or ‘energy’ drinks</td>
<td>80 mg/250ml</td>
</tr>
<tr>
<td>Instant coffee</td>
<td>60-80 mg/250ml</td>
</tr>
<tr>
<td>Tea</td>
<td>10 – 50 mg/250ml</td>
</tr>
<tr>
<td>Coca cola</td>
<td>49 mg/375 ml</td>
</tr>
<tr>
<td>Milk chocolate</td>
<td>20 mg/100g</td>
</tr>
</tbody>
</table>

Alcohol

Alcohol consumption not only affects fertility but can also harm the foetus, particularly in the first few weeks after conception.\(^3\)\(^5\)\(^6\)

The NHMRC recommend that women do not drink alcohol during pregnancy or while breastfeeding. Drinking alcohol during pregnancy can affect the unborn child by damaging the development of the baby’s brain and slowing physical growth. Babies affected by alcohol tend to have lower birth weights. They may also have physical and behavioural problems at birth and throughout childhood.\(^3\)\(^6\)

Alcohol entering a woman’s bloodstream also enters that of the foetus. Drinking in excess increases the risk of spontaneous abortion, stillbirth, premature birth, low birth weight, cognitive defects and congenital malformations, including Foetal Alcohol Syndrome.\(^3\)\(^6\)

Alcohol is known to have teratogenic effects. All pregnant women, and those planning a pregnancy, should be given information of the risks associated with
drinking alcohol during pregnancy, as the safe level of consumption is unknown. No alcohol is the best and safest choice.

When a woman has been advised on the risks of alcohol consumption in pregnancy and is not able to consider abstinence, health professionals may assist her in a non-judgemental way to reduce her consumption as much as possible and avoid intoxication, and arrange for further support by planning additional consultations or by referral to specialist services and support groups.  

**Alcohol recommendations**

The *Australian Alcohol Guidelines* recommend that women who are pregnant, planning a pregnancy or breastfeeding consider not drinking is the safest option. In addition, the guidelines state that:

- The risk of harm to the foetus is highest when there is high, frequent, maternal alcohol intake.
- The risk of harm to the foetus is likely to be low if a woman has consumed only small amounts of alcohol before she knew she was pregnant or during pregnancy.
- The level of risk to the individual foetus is influenced by maternal and foetal characteristics and is hard to predict.

**Drugs and medications**

All prescription and over the counter medicines, as well as herbal medicines, should be checked with a medical practitioner before conception and throughout pregnancy. Women with chronic health conditions, such as epilepsy, asthma and diabetes, should also be referred to a medical practitioner, as they may need to continue taking their medications during pregnancy.

Drugs can be harmful throughout pregnancy, especially in the first three months when organs and limbs are forming. All drugs taken during pregnancy reach the foetus through the placenta however there are large variations in drug exposure response. Drugs have the potential to cause birth defects, irreversible pharmacological effects at the time of birth and the potential to cause problems such as cancer in later life.


The West Australian Obstetric Drug Information (ph: (08) 9340 2723) is a statewide service for health professionals and consumers on
- drug use during pregnancy
- drug use during breastfeeding
- drug effects on the foetus and neonate
- neonatal drug therapy and infant doses.

### Drugs and medications recommendations

- All prescription and over the counter medicines, as well as herbal medicines, should be checked with a general practitioner before conception and throughout pregnancy.
- The use of recreational or illicit drugs should be avoided.

### Smoking

It is best to stop smoking before falling pregnant. Smoking is associated with many risks for those planning a pregnancy and pregnant women. There is no safe level of smoking.

Smoking can have a negative effect on fertility. It affects gamete quality, impairs fertilisation and can result in early spontaneous abortion. Smoking during pregnancy increases the risk of premature birth and a low birth weight infant. The chances of complications after birth such as difficulty maintaining body temperature, lack of energy and the risk of Sudden Infant Death Syndrome (SIDS) are also increased. These babies are at greater risk of infection and breathing complications in early life. Asthma is also more common among children with mothers who have been exposed to passive smoke.

### Smoking recommendations

To prevent harm, women planning a pregnancy and their partners are advised to stop smoking.

### References


6. Food Standards Australia New Zealand. Mandatory Fortification of Bread with Folic Acid and Iodine. Food Standards Australia New Zealand. (no date)


Date Issued: 1997
Date Reviewed: May 2014
Next Review: May 2017
NSQHS Standards: 1.7


Related policies, procedures and guidelines
The following can be read in conjunction with this document.

| Screenign for and treatment of vitamin d deficiency in pregnancy (KEMH policy 1.1.9) |
| CAN Manual chapter - Overweight and obesity |
| CAN Manual chapter - Planning for pregnancy |

Professional resources
- King Edward Memorial Hospital (KEMH) Genetic Counselling Services, Ph: (08) 9340 1525 Senior Dietitian, Ph: (08) 9340 2795
- WA Department of Health - Office of Population Health Genomics
King Edward Memorial Hospital for Women’s Obstetric Drug Information Service on Phone: (08) 9340 2723

Expert, current practice information on: Drug use during pregnancy; Drug use during breastfeeding; Drug effects on the foetus & neonate; Neonatal drug therapy & infant doses.

Resources for families

- Search your topic on HealthInsite, a government gateway to reliable health information
  www.healthinsite.gov.au
- Child and Youth Health, South Australia
  www.cyh.com.au
- Better Health Channel, State of Victoria Health
- King Edward Memorial Hospital for Women Preparation for childbirth and parenting courses
  Parent Education Service
  Ph: (08) 9340 2222
- Ngala – Ngala is a provider of early parenting and early childhood services for supporting families with young children through the journey of parenting - www.ngala.com.au
Appendix A: Dietary Guidelines for Australians

Guideline 1
To achieve and maintain a healthy weight, be physically active and choose amounts of nutritious food and drinks to meet your energy needs.

Guideline 2
Enjoy a wide variety of nutritious foods from these five food groups every day:
- Plenty of vegetables of different types and colours, and legumes/beans
- Fruit
- Grain (cereal) foods, mostly wholegrain and/or high cereal fibre varieties, such as breads, cereals, rice, pasta, noodles, polenta, couscous, oats, quinoa and barley
- Lean meats and poultry, fish, eggs, tofu, nuts/seeds and legumes/beans
- Milk, yoghurt, cheese and/or their alternatives, mostly reduced fat
And drink plenty of water.

Guideline 3
Limit intake of foods containing saturated fat, added salt, added sugars and alcohol.
- Limit foods high in saturated fat and moderate total fat intake.
- Choose foods low in salt and do not add salt to food at the table or in cooking.
- Limit intake of foods and drinks with added sugars.
- Limit your alcohol intake if you choose to drink. For women who are pregnant, planning a pregnancy or breastfeeding, not drinking alcohol is the safest option.

Guideline 4
Encourage, support and promote breastfeeding.

Guideline 5
Care for your food: prepare and store it safely.
## Appendix B: Recommended serves and serving sizes for pregnant women aged 19 to 50 years

<table>
<thead>
<tr>
<th>Food group</th>
<th>Daily serves</th>
<th>Recommended serve size…</th>
<th>Approximate energy per serve (kJ/serve)</th>
</tr>
</thead>
</table>
| Grain (cereal) foods, mostly wholegrain and/or high fibre cereal varieties | 8½ | = 1 slice (40g) of bread  
= 1/2 medium bread roll  
= 1/2 cup (75 - 120g) cooked rice, pasta, noodles  
= 1/2 cup (120g) porridge  
= 2/3 cup (30g) breakfast cereal flakes  
= 1/4 cup (30g) muesli | 500 |
| Vegetables and legumes/beans | 5 | = ½ cup (75g) cooked vegetables  
= ½ cup (75g) cooked or canned beans, lentils, chick peas or split peas  
= 1 cup salad vegetables  
= 1 small potato | 100-350 |
| Fruit | 2 | = 1 medium (150g) piece, e.g. apple, banana, orange, pear  
= 2 small (150g) pieces, e.g. apricots, kiwi fruit, plums  
= 1 cup diced pieces or canned fruit  
= ½ cup (125ml) 100% juice  
= dried fruit, e.g. 4 dried apricot halves, 1 ½ tbsp sultanas | 350 |
| Milk, yoghurt, cheese and/or alternatives, mostly reduced fat | 2½ | = 1 cup (250ml) milk  
= ½ cup evaporated milk  
= 2 slices (40g) cheese  
= 1 small carton (200g) yoghurt | 500 - 600 |
| Lean meats and poultry, fish, eggs, tofu, nuts and seeds and legumes/beans | 3½ | = 65g cooked lean meat or chicken, e.g. ½ cup mince, 2 small chops, 2 slices of roast  
= ½ cup cooked or canned beans, lentils, chick peas or split peas  
= 100g cooked fish fillet  
= 2 large eggs  
= 1/3 cup peanuts or almonds  
= ¼ cup sunflower seeds or sesame seeds | 500 - 600 |
| Unsaturated spreads and oils | 2 | = 10g polyunsaturated spread  
= 10g monounsaturated spread  
= 7g monounsaturated or polyunsaturated oil, for example olive, canola or sunflower oil | 250 |

For taller or more active women, additional serves of foods from the five food groups and/or unsaturated spreads and oils and/or discretionary food choices may be consumed to meet increased energy needs. For women pregnant women 19-50 years, the approximate number of additional serves is 0-2½.
Examples of discretionary choices

<table>
<thead>
<tr>
<th>Discretionary choices* (foods which should only be consumed sometimes and in small amounts)</th>
<th>Recommended serve size</th>
<th>Approximate energy per Serve (kJ/serve)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 scoops (75g) ice-cream</td>
<td>500-600</td>
<td></td>
</tr>
<tr>
<td>2 slices (50-60g) processed meats, salami or mettwurst</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1½ thick or 2 thinner (50-70g) regular sausages</td>
<td></td>
<td></td>
</tr>
<tr>
<td>½ snack-size packet (30g) salty crackers or crisps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-3 (35g) sweet plain biscuits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (40g) doughnut</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 slice (40g) plain cake/small cake-type muffin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-6 (40g) sugar confectionary/small lollies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 tblsp (60g) jam or honey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>½ small bar (25g) chocolate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 tblsp (60g) cream</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 tblsp (20g) butter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 can (375ml) soft drink (sugar-sweetened)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/3 (60g) commercial meat pie or pastie (individual size)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 (60g) fried hot chips</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discretionary food are usually high in saturated fat, added sugar, added salt or are low in fibre, and are low in essential nutrients. Overweight women trying to lose weight should avoid these foods.
## Appendix C: Food sources – folate

<table>
<thead>
<tr>
<th>Food source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Excellent sources</strong></td>
</tr>
<tr>
<td>Asparagus, raw</td>
</tr>
<tr>
<td>Broccoli, raw</td>
</tr>
<tr>
<td>Brussel sprouts, raw</td>
</tr>
<tr>
<td>Chick peas, canned</td>
</tr>
<tr>
<td>Lentils, dried &amp; cooked</td>
</tr>
<tr>
<td>Spinach, raw</td>
</tr>
<tr>
<td>Wheat bran flakes</td>
</tr>
<tr>
<td><strong>Very good sources</strong></td>
</tr>
<tr>
<td>Cabbage, raw</td>
</tr>
<tr>
<td>Cauliflower, raw</td>
</tr>
<tr>
<td>Leek</td>
</tr>
<tr>
<td>Oranges, raw</td>
</tr>
<tr>
<td>Orange juice, commercial</td>
</tr>
<tr>
<td>Parsley</td>
</tr>
<tr>
<td>Peas, raw</td>
</tr>
<tr>
<td>Wheat germ</td>
</tr>
<tr>
<td>Wholegrain bread</td>
</tr>
<tr>
<td><strong>Good sources</strong></td>
</tr>
<tr>
<td>Banana</td>
</tr>
<tr>
<td>Beetroot, raw</td>
</tr>
<tr>
<td>Cashews, roasted, salted</td>
</tr>
<tr>
<td>Green beans, raw</td>
</tr>
<tr>
<td>Hazelnuts</td>
</tr>
<tr>
<td>Parsnip, baked</td>
</tr>
<tr>
<td>Peanut butter/paste</td>
</tr>
<tr>
<td>Potato, baked</td>
</tr>
<tr>
<td>Salmon, pink, canned</td>
</tr>
<tr>
<td>Strawberry</td>
</tr>
<tr>
<td>Tomato</td>
</tr>
<tr>
<td>Unsalted peanuts</td>
</tr>
<tr>
<td>Vegemite/Marmite</td>
</tr>
<tr>
<td>Walnuts</td>
</tr>
</tbody>
</table>
Appendix D: Calcium content of selected foods\textsuperscript{15}

<table>
<thead>
<tr>
<th>Best sources of calcium</th>
<th>Calcium (mg)</th>
<th>Other calcium sources</th>
<th>Calcium (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sardines, canned in water with bones (100g)</td>
<td>540</td>
<td>Salmon, canned in water with bones (100g)</td>
<td>310</td>
</tr>
<tr>
<td>Plain yoghurt, 200g serve (1 small tub)</td>
<td>437</td>
<td>Full cream milk (4%), 1 cup (250ml)</td>
<td>300</td>
</tr>
<tr>
<td>Cheese, cheddar, reduced fat, 40g</td>
<td>380</td>
<td>Dark green leafy veg cooked (1 cup)</td>
<td>138</td>
</tr>
<tr>
<td>Reduced fat milk (2%), 1 cup (250ml)</td>
<td>313</td>
<td>Dark green leafy vegetables, cooked (1 cup)</td>
<td>138</td>
</tr>
<tr>
<td>Custard, reduced fat, 250ml</td>
<td>338</td>
<td>Dried figs, 3</td>
<td>114</td>
</tr>
<tr>
<td>Skim milk powder, ¼ cup</td>
<td>312</td>
<td>Almonds – 20 raw</td>
<td>60</td>
</tr>
<tr>
<td>Soy beverage calcium- fortified, 1 cup (250ml)</td>
<td>312</td>
<td>Legumes cooked (½ cup)</td>
<td>43-65</td>
</tr>
</tbody>
</table>
Appendix E: Physical activity during pregnancy

In the absence of contraindications, pregnant women should also engage in regular, moderate intensity physical activity to achieve the same associated health benefits as they did pre-pregnancy.\textsuperscript{41} Consideration should be given to the frequency, intensity, time and type of exercise necessary to achieve optimal health benefits, whilst avoiding the potential risks to both mother and foetus.

The specific recommendations for pregnant women are:

- Try to move as often as you can and make it enjoyable; every little bit counts, including incidental activities (i.e. cleaning, walking to and from work, taking the stairs).
- The second trimester is the best time for gradual exercise progression as pregnancy-related risks and discomforts are minimised at this time.
- Begin each session with a 10-15 minute warm-up and finish with a 10-15 minute cool-down period of low-intensity aerobic activity, range of motion and static stretching of all major muscle groups and relaxation exercises. \textbf{DO NOT over stretch}.
- Aim to exercise for a minimum of 15 minutes per session, 3 times per week and progress to 30 minute sessions, 4 times per week at the appropriate intensity.
- It is important to condition all major muscle groups during both prenatal and postnatal periods but do not over exert. Know the safety considerations for exercise in pregnancy.
- Use the FITT principle as a guide for exercise during pregnancy:
  - \textbf{F} (frequency) – begin 3 times per week and progress to 4 times per week
  - \textbf{I} (intensity) – exercise within an appropriate rating of perceived exertion and/or target heart rate zone.
  - \textbf{T} (time) – attempt 15 minute blocks (even if it means reducing the intensity). Include rest intervals when required.
  - \textbf{T} (type) – Non-weight bearing/low-impact endurance exercises that use large muscle groups (i.e. walking, stationary cycling, swimming, aquatic exercises, low impact aerobics).
- It is important not to over exert, use the ‘talk test’ as a final check – the intensity of the activity is excessive if you cannot carry on a verbal conversation while exercising.

Precautions for exercise during pregnancy are:\textsuperscript{41}

- Avoid exercise in warm/humid environments, especially during the first trimester.
- Avoid straining while holding your breath (emphasis must be placed on continuous breathing throughout exercise).
- Maintain adequate nutrition and hydration before and after exercise.
- Avoid exercises on your back after the fourth month of pregnancy.
- Avoid activities which involve physical contact or risk of falling.
- Know your limits. Pregnancy is not a good time to train for athletic competition.
- Know the reasons to stop exercise and consult a qualified health care provider immediately if they occur:
  - excessive shortness of breath
  - chest pain
  - painful uterine contractions (more than 6-8 per hour)
  - vaginal bleeding
  - any ‘gush’ of fluid from vagina (premature rupture of membranes)
  - dizziness or faintness.