

# Position Statement for Healthcare Professionals

## *Eggs and Pregnancy*

*Updated June 2012*

Pregnancy and lactation increase a woman’s nutritional requirements for key nutrients such as energy, protein, omega-3 fatty acids and most vitamins and minerals including folate, iron and zinc. Adequate nutrition during pregnancy is essential to optimise both maternal health and that of the developing child [1]. Eating a healthy well balanced diet is therefore important throughout pregnancy and lactation.

### **Energy**

Kilojoule intake throughout pregnancy must be sufficient to allow optimal weight gain of the developing foetus. Energy requirements for pregnancy increase by 1400 kilojoules per day in the second trimester and 1900 kilojoules per day in the third trimester [2]. During pregnancy, many women experience morning sickness and heartburn, which can lead to a reduction in the variety of foods eaten and/or frequent vomiting. As a result, nutrient availability and absorption may be reduced. Consumption of nutrient dense foods that are easily tolerated is important at this time and eggs may play a useful role.

Women who are overweight prior to pregnancy are encouraged to gain less weight than women of a healthy body weight [3]. While there are no recommendations for optimal weight gain for women during pregnancy in Australia, Table 1 outlines the US recommendations for women with various body weights at the beginning of pregnancy. Total food quantity may be limited in order to reduce the rate of weight gain in overweight and obese women [3].

**Table 1 Suggested weight gain during pregnancy for various BMIs [1]**

<b>BMI</b>	<b>Total recommended weight gain</b>	<b>Weight gain per week after 12 weeks</b>
<19.8	12.5 to 18 kg	0.5 kg
19.8 to 26.0	11.5 to 16 kg	0.4 kg
>26.0 to 29.0	7 to 11.5 kg	0.3 kg
>29.0	at least 7.0 kg	
Twin pregnancy	15.9–20.4 kg	0.7 kg
Triplet pregnancy	overall gain of 22.7 kg	

It is therefore particularly important for overweight women to consume nutrient dense foods during pregnancy within a kilojoule-controlled diet. Eggs provide 11 vitamins and minerals along with high quality protein and are therefore considered a nutrient dense food. One serve of eggs\* provides 581kJ, 31-42% of the additional kilojoule requirements during pregnancy and 28-29% during lactation, while providing up to 200% or more of the additional requirements for a selection of vitamins and minerals. Table 2 shows the extra nutrients required during pregnancy, and the amount provided by one serve of eggs\*.

**Table 2 Additional Nutrient Requirements During Pregnancy [2]**

Nutrient	Additional requirements during pregnancy	% additional RDI provided by one serve of eggs*
Protein	14g	91%
Iron	9mg	18%
Zinc	3mg	17%
Folate	200µg	49%
Iodine	70µg	61%
Vitamin B12	0.2µg	>200%
Vitamin A	100µg	>200%

### Protein

Pregnant and lactating women require additional dietary protein to support the growth and development of the infant. Recommendations for protein are increased by 14 grams a day during pregnancy, and an extra 21 grams a day is recommended during lactation [2]. A serve of eggs\* provides 12.7grams of protein, accounting for almost 100% of the additional protein requirements during the 2<sup>nd</sup> and 3<sup>rd</sup> trimesters of pregnancy. The protein in eggs provides all the essential amino acids and is of a high bioavailability [4], which makes them a particularly useful source of protein during pregnancy and lactation.

### Iron

Many women have difficulty maintaining iron stores during pregnancy [1]. The demand for iron significantly increases during the second trimester and peaks in the third when foetal demands are greatest [5]. The recommended dietary intake (RDI) of iron for pregnant women is 27mg/day [2], one third higher than the RDI for non-pregnant women of 18mg. Lactating women have a lower RDI for iron than non-pregnant women with the recommendation being 9-10mg/day [2]. One serve of eggs\* provides 1.7mg of iron.

### Zinc

Zinc plays a vital role in the development of genetic material [5]. Zinc requirements during pregnancy and lactation increase by 3mg and 4mg/day respectively [2]. Obtaining sufficient amounts of zinc during pregnancy is important as maternal zinc deficiency is associated with growth retardation, preterm delivery, abnormality in the foetus, pregnancy-induced hypertension and birth complications in the mother [5]. One serve of eggs\* provides 0.5mg zinc, 17% of the additional zinc required in pregnancy.

### Folate

Folate is required for foetal cell division and growth and is vital in preventing foetal neural tube defects such as spina bifida. Folate needs are therefore highest prior to conception and during the first few weeks of pregnancy [2], and a 400-500µg folate supplement at these times is recommended [6]. The RDI for folate during pregnancy is 600µg/day and 500µg/day in lactating women [2]. One serve of eggs\* provides 16% of the RDI for pregnant women and 19% of the RDI during lactation.

### **Vitamin B12**

Vitamin B12 is required for growth and development, manufacturing DNA, functioning of the nervous system and producing red blood cells. Vitamin B12 requirements are increased during pregnancy and lactation to ensure adequate maternal levels and breast milk content (1µg per litre) [5]. The RDI during pregnancy is 2.6µg/day and 2.8µg/day in lactating women [2]. Eggs provide a valuable source of vitamin B12 during pregnancy, particularly for ovo-vegetarian women, with one serve\* providing over 30% of the RDI for pregnancy (0.8µg/serve). Research shows that both lacto and lacto-ovo vegetarians during pregnancy have low vitamin B12 levels [7]. Studies have shown that vitamin B12 deficiency symptoms are present in 92% of vegan women and 72% of lacto and lacto-ovo vegetarians [8]. Considering this high rate of vitamin B12 deficiency, it is essential to encourage vegans to take supplemental vitamin B12 and for lacto and lacto-ovo vegetarians to be consuming sufficient quantities of animal derived foods in their diet.

### **Vitamin A**

Vitamin A requirements are increased by 100µg retinol equivalents (RE) per day during pregnancy for women aged over 19 years, and all lactating women are advised to increase their vitamin A intakes by 400µg RE/day [2]. Vitamin A is a fat-soluble vitamin, and animal products contain a preformed type of vitamin A that is highly bioavailable and best absorbed from foods that contain fat [5]. Eggs contain this preformed vitamin A within a matrix that naturally contains fat, therefore it is expected that vitamin A from eggs is highly bioavailable. A serve of eggs\* provides 239µg retinol (30% RDI during pregnancy and 22% RDI for lactation). The safe upper limit for pregnancy and lactating women is 3000µg for women aged over 19 years [2]. It is recommended that women be encouraged to obtain vitamin A from the diet rather than supplementation [9, 10].

### **Vitamin D**

Vitamin D is important for bone health, and poor intakes during pregnancy can cause adverse outcomes to the newborn [11]. Research suggests that vitamin D may be important in pregnancy in order to prevent respiratory infections during infancy and wheezing during early childhood [12]. Vitamin D is obtained from exposure of the skin to sunlight, as well as a few dietary sources including fortified margarines and milk, eggs, fish and fish oils [13]. Supplementation may therefore be necessary during pregnancy for women with low vitamin D intake and poor sun exposure [11, 14]. In 2011, the Royal Australian and New Zealand College of Obstetrics and Gynaecology released guidelines recommending all obese pregnant women should be screened for vitamin D deficiency [15] given obesity is a risk factor for low vitamin D status. The requirements during pregnancy and lactation are 5µg/day and eggs contribute 16% of the dietary requirements of vitamin D [2]. A study in Irish pregnant women revealed eggs as one of the main dietary contributors of vitamin D during pregnancy [16].

### **Omega-3s**

Research has shown that regular inclusion of omega-3 enriched eggs in the diets of breastfeeding mothers can significantly improve the omega-3 status of the infants [17]. This in turn may have significant benefits for development of visual and brain function [18]. Lactating mothers who consumed two omega-3 enriched eggs per day for six weeks after birth increased the omega-3 content of their plasma and breast milk, resulting in higher infant plasma omega-3, and without adversely affecting cholesterol levels [18]. Another study showed that infants fed baby food enriched with egg yolk and DHA had an increase in red blood cell DHA levels [19] which resulted in a significant increase in visual acuity in infants from six to twelve months compared to control infants not receiving the DHA enriched egg yolk [19].



There is also evidence to suggest that the intake of omega-3 fats during pregnancy may play an important and modifiable role in gestational duration and parturition [20], and the consumption of high-DHA eggs can improve blood phospholipid DHA levels in pregnant women [21].

The major source of omega-3s in the Australian diet is fish, which can often be limited in the diet during pregnancy due to concerns about mercury content. To ensure an adequate intake of all types of omega-3 fatty acids, including DHA, EPA and alpha-linolenic acid, pregnant women should be encouraged to consume a variety of omega-3 rich foods. Such foods include fish, leafy green vegetables, some nuts and vegetables and eggs. The recommended Adequate Intake (AI) for long chain omega-3 during pregnancy is 115mg per day. A serve of regular eggs contains 114mg of long chain omega-3, which represents 99% of the daily AI.

### **Iodine**

Iodine is a mineral essential for normal thyroid function and production of thyroid hormones. Iodine deficiency during pregnancy can cause miscarriage, stillbirth and mental impairment [11]. Even subclinical hypothyroidism in the mother, occurring as a consequence of iodine deficiency, can cause irreversible brain damage in the foetus making it essential to avoid iodine deficiency in pregnancy [22]. Iodine is found in foods such as kelp and seafood, but the highest dietary source is iodised salt. Research has confirmed a high proportion of pregnant women in Australia are moderately to severely iodine deficient [22]. Suggested reasons include variations in iodine levels of fortified foods, and consuming rock or sea salt varieties which are not iodised [23]. The Australian RDI for iodine increases from 150µg/day to 220 and 270µg/day during pregnancy and lactation respectively, while the World Health Organisation recently recommended pregnant women consume 250µg iodine per day [24]. A serve of eggs contains 43µg of iodine, 20% of the RDI during pregnancy. Pregnant women who already use salt are advised to use iodized salt [25]. Others may benefit from an iodine supplement to improve their iodine status throughout their pregnancy [26].

### **Choline**

Requirements for choline are increased during pregnancy and lactation as choline is transported through the placenta and mammary gland to the developing infant [27]. A review [28] highlighted the increased demands for choline in both the prenatal and postnatal stages of development. During pregnancy, in particular the third trimester, foetal growth is extremely rapid and large amounts of choline are required for growth. Newborns are born with blood choline levels three times higher than maternal blood concentrations and this is maintained throughout the next 12-24 months. Choline is required for the normal development of brain tissue in infants and plays an important role in maternal nerve and brain functioning. The adequate intake (AI) for choline is 440mg/day when pregnant and 550mg/day when lactating [2]. Eggs, soy and other animal based foods are the main food sources of choline [29]. Eggs provide more choline per kilojoule than most other foods with research showing that adding an egg to the diet each day could increase the number of pregnant women meeting the AI for choline from 10% to more than 50% [30]. Therefore as choline is particularly useful in the diet of pregnant and lactating women, eggs are highly recommended at this time of life.



### **Other Important Nutrients during Pregnancy**

**Calcium** is a mineral essential for building bone in the developing foetus. Food sources of this nutrient include dairy products, calcium-enriched soy products and fish with bones [5]. Although the component of eggs normally consumed (the yolk and the white) is deficient in calcium, the egg shell is a rich source in the form of calcium carbonate. By grinding the egg shell to a powdered form, it can be consumed by humans to provide a significant source of calcium. However this is not a common practice in Australia as calcium can be found from a variety of other foods [31]. The RDI for calcium during pregnancy and lactation does not increase, however the mean daily calcium intake of Australian women of child bearing age is 750-762mg [32], well below the target of 1000mg/day [2]. Particular attention to achieving calcium intakes during pregnancy is therefore required.

### **Conclusions**

Pregnancy is a time of increased nutritional requirements with only a moderate increase in total kilojoule requirements. It is therefore essential to consume a nutrient dense diet, which includes a variety of foods from the core food groups. Including eggs in the diet is an excellent way of assisting pregnant and lactating women to meet their increased nutritional requirements without exceeding daily energy requirements. One serve of eggs\* provides almost 100% of the additional protein requirements and around a third of the extra kilojoules required during pregnancy and lactation. They also provide useful amounts of nutrients that assist in reaching the increased nutritional requirements of pregnancy such as iodine, zinc, folate and iron. Eggs are recommended as part of a healthy eating pattern that also includes sufficient amounts of wholegrain breads and cereals, fruits, vegetables, low fat dairy foods, lean meat, fish and poultry and unsaturated fats.

This statement is for healthcare professionals only.

*\*One serve = 2x60g eggs (104g edible portion)*

### **Useful links:**

Food Standards Australia New Zealand Fact Sheets

<http://www.foodstandards.gov.au/foodmatters/pregnancyandfood.cfm>



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