

Micronutrient supplementation

Supporting a healthy pregnancy and baby

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MedicineToday 2024; 25(3): 38-47

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GPs play an important role in providing guidance on appropriate nutrient supplement use for women before and during pregnancy and while breastfeeding. Micronutrient supplement use by these women lowers their risk of some adverse pregnancy health outcomes and supports the growth of the developing baby.

Micronutrients have important influences on the health of pregnant women and their children, including lowering the risk of some adverse pregnancy health outcomes and supporting the growth of the developing baby.¹ The recommended dietary intake for micronutrients, such as folate and iodine, is higher during preconception, pregnancy and breastfeeding.² Normal eating habits and the fortification of foods in Australia usually do not meet these increased nutrient needs.³⁻⁵ Therefore, supplementation for some nutrients is recommended to support a healthy pregnancy and baby.^{6,7}

In Australia, GPs are important providers of preconception, antenatal and postnatal care for women. Between 85 and 92% of women of reproductive age (15 to 44 years) report seeing a GP in the previous 12 months, and between 6 and 17% specifically seek care from their GP for preconception or family planning support.⁸ GPs also provide antenatal care to almost 90% of women in early pregnancy and to 28% throughout their pregnancy.⁹ For most pregnant women, GPs are the first point of health care contact,¹⁰ including for the 40% of women who experience an unplanned pregnancy.¹¹ GPs are integral providers of advice and support for nutrient supplement use for women who are planning a pregnancy, during pregnancy and while breastfeeding. However, Australian

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healthcare providers, including GPs, report barriers to providing such care, including uncertainty as to whether supplementation is needed when there is mandatory food fortification (e.g. for folate and iodine) in Australia, and lack of knowledge on what to recommend, including the appropriate dose and duration, and additional considerations required for individualised recommendations.^{12,13}

Studies of GP provision of nutrient supplements for women during pregnancy and breastfeeding report highly variable findings. In three studies that included a total of 142 GPs in Australia, 52% reported recommending folic acid supplements to pregnant women, 66% reported recommending iodine supplements to women planning a pregnancy, 26 to 84% to women during pregnancy and 45% to women who are breastfeeding.¹³⁻¹⁵

This article provides an overview of the latest evidence and clinical practice guidelines to support GPs in providing recommendations on nutrient supplements to women before and during pregnancy and while breastfeeding.

What proportion of women use nutrient supplements before and during pregnancy and while breastfeeding?

In Australia, nutrient supplement use during preconception, pregnancy and breastfeeding is highly variable. Although most pregnant women are aware of the need for nutrient supplements in pregnancy, there are much lower levels of specific knowledge of the recommended nutrients, their dose and timing.¹⁶ Adherence to the recommendations is also low.¹⁶ Although one in three pregnant women in Australia report taking a multinutrient supplement (containing one or more micronutrients),¹⁷ these may not provide the recommended nutrients or doses required for the particular stage of pregnancy or in the context of diagnosed health conditions and nutrient deficiencies.¹⁸

In the Australian Longitudinal Study on Women's Health, self-reported data on nutritional supplement use in 485 women of reproductive age was recorded prospectively.¹⁹ Before conceiving, about half of the women who later became pregnant reported taking a folic acid-containing supplement and 37% took an iodine-containing supplement.¹⁹ Although up to 39% took an iron-containing supplement prior to pregnancy, only 23% reported having a diagnosed iron deficiency,¹⁹ which may indicate a need for iron supplementation.^{6,20}

During pregnancy, about nine out of ten women in Australia report taking a folic acid-containing supplement, and eight out of ten take an iodine-containing supplement.^{16,21} Other supplements often consumed in pregnancy include iron (30%), vitamin D (23%), calcium (13%) and fish oil/omega-3 fatty acids (12%), although it is unclear if supplementation was recommended based on a diagnosed nutrient deficiency, dietary pattern or clinical indication.²²

During breastfeeding, 45% of women in Australia report taking an iodine-containing supplement.²³ Of concern, many women who took iodine supplements during pregnancy ceased taking supplements when breastfeeding.²³ Most women who continue

KEY POINTS

- Key opportunities to discuss nutrient supplements with women are at the preconception visit, first antenatal visit and first postnatal visit.
- Although most pregnant women are aware of the need for nutrient supplements in pregnancy, there are much lower levels of specific knowledge of the recommended nutrients and their dose and timing.
- Some multinutrient pregnancy-specific supplements do not contain the recommended combination of micronutrients or doses for all women (without additional nutrient needs) before and during pregnancy, or while breastfeeding.
- Only folic acid and iodine supplements are recommended for all women before and during pregnancy. Iodine supplementation should be continued while breastfeeding.
- Other nutrient supplements, such as iron, calcium, vitamin B12, vitamin D and omega-3 fatty acids, may also be recommended depending on a woman's individual needs, dietary deficiencies and health.
- Screen for iron-deficiency anaemia routinely at the first antenatal visit and at 28 weeks' gestation to determine if iron supplementation is required.

to take nutrient supplements while breastfeeding report consuming a multivitamin that contributes only half the recommended dose of iodine.²³

Adherence to the correct dose and duration of supplements across preconception, pregnancy and breastfeeding is low. In a 2013 Australian study of 857 women, only one in five fully adhered to recommendations on both the dose and duration of folic acid and iodine supplementation specific to the stage of pregnancy.¹⁶ Women who were aware of the recommended duration of supplements and who planned their pregnancy were more likely to adhere to the recommendations.¹⁶

There is limited information on the use of nutrient supplements among Aboriginal and Torres Strait Islander women who are pregnant or breastfeeding. This may be a consequence of not including Aboriginal and Torres Strait Islander people in designing and conducting research which could ensure that culturally appropriate research methods are used.²⁴⁻²⁶ In a 2014-19 cohort study of 152 Aboriginal and Torres Strait Islander pregnant women or pregnant women carrying an Aboriginal and Torres Strait Islander baby in rural NSW, 51% of women reported taking a folic acid supplement during pregnancy.²⁷ Barriers to accessing health care for Aboriginal and Torres Strait Islander women, including historical trauma arising from colonisation, systemic racism and socioeconomic disadvantage, are well documented.²⁸ These factors, along with cost and access to nutrient supplements, may contribute to lower rates of supplement use by Aboriginal and Torres Strait Islander women.²⁸ General multinutrient supplements may be chosen by women over pregnancy-specific nutrient supplements due to concerns about cost; however, these general multinutrient supplements often have

TABLE 1. KEY NUTRIENT SUPPLEMENTS AND THEIR ASSOCIATION WITH THE PREVENTION OF ADVERSE HEALTH OUTCOMES DURING PRECONCEPTION, PREGNANCY AND BREASTFEEDING⁶

Nutrient supplement*	Health effect	Adverse effect	Systematic review evidence summary
Folic acid	<ul style="list-style-type: none"> Reduced risk of neural tube defects 	None reported	<ul style="list-style-type: none"> Reference: De-Regil, et al. 2015³⁴ Quality of evidence:[†] high quality Time period: preconception and/or the first 3 months of pregnancy Dose: ≥400 mcg/day (alone or with other vitamins or minerals)
Iodine	<ul style="list-style-type: none"> Reduced risk of postpartum hyperthyroidism Lower likelihood of adverse child health outcomes (congenital anomalies, neonatal goitre, lower neonatal thyroid volume) Higher child mental development score 	Increased likelihood of gastrointestinal intolerance	<ul style="list-style-type: none"> Reference: Harding, et al. 2017³⁵ Quality of evidence:[†] low or very-low quality Time period: preconception, pregnancy and/or postpartum (mild-moderate iodine deficiency settings) Dose: varied dose
Iron	<ul style="list-style-type: none"> Reduced risk of maternal anaemia and iron-deficiency anaemia 	Increased likelihood of gastrointestinal intolerance	<ul style="list-style-type: none"> Reference: Pena-Rosas, et al. 2015^{36,37} Quality of evidence:[†] low or very-low quality Time period: pregnancy Dose: varied dose
Omega-3	<ul style="list-style-type: none"> Reduced risk of low birth weight, early preterm birth and preterm birth 	None reported	<ul style="list-style-type: none"> Reference: Middleton, et al. 2018³⁸ Quality of evidence:[†] high quality Time period: pregnancy Dose: varied dose
Vitamin D	<ul style="list-style-type: none"> Reduced risk of pre-eclampsia, gestational diabetes and low birth weight 	None reported	<ul style="list-style-type: none"> Reference: Palacios, et al. 2019³⁹ Quality of evidence:[†] moderate quality Time period: pregnancy Dose: varied dose
Calcium	<ul style="list-style-type: none"> Reduced risk of gestational hypertension, pre-eclampsia and pre-term birth 	None reported	<ul style="list-style-type: none"> Reference: Hofmeyr, et al. 2018⁴⁰ Quality of evidence:[†] low quality Time period: pregnancy Dose: high (≥1 g/day) and low dose (<1 g/day)

* There is insufficient certainty of evidence to draw conclusions on the benefits of other vitamins or mineral supplementation such as magnesium, selenium or vitamin B12 during pregnancy. However, for specific population groups at higher risk of nutrient deficiencies (e.g. women who have undergone bariatric surgery, women who are vegetarian or vegan, there may be additional health benefits to taking nutrient supplements beyond those presented in this Table. Please see Table 2 for these recommendations.

[†]Quality of evidence is from the Grading of Recommendations Assessment, Development and Evaluation (GRADE) assessment undertaken as part of each Cochrane systematic review. The GRADE specifies four levels of certainty of evidence: high, moderate, low and very low. GRADE assessments consider: risk of bias, inconsistency, indirectness, imprecision and publication bias.⁴¹

insufficient quantities of nutrients recommended for pregnancy.²⁹

About 90% of pregnant women in Australia want support and advice from their healthcare providers, including their GPs, on which nutrient supplements are required for a healthy pregnancy and while breastfeeding.^{16,21,30} Of concern, women often report seeking advice on supplements from the internet; however, over 40% of websites with information on pregnancy nutrient supplements have been shown to be inaccurate or misleading.³¹ Systematic review evidence shows that advice and support from healthcare providers, including GPs, during

the preconception and antenatal periods improves women’s adherence to nutrient supplement recommendations.^{32,33}

What are the impacts of nutrient supplements on the pregnancy, mother and child?

Supplementation of some nutrients (e.g. folic acid and iodine) before conception, during pregnancy and while breastfeeding is associated with a range of positive pregnancy and health outcomes. In the absence of a diagnosed deficiency or medical need, the current available evidence suggests that other nutrient supplements provide no

benefit and may have adverse consequences. Evidence from systematic reviews and meta-analyses on the association between supplementation of key micronutrients and positive health outcomes during preconception, pregnancy and breastfeeding is summarised in Table 1.³⁴⁻⁴¹

The association between micronutrients and other pregnancy and health outcomes has recently been investigated. For example, emerging research has examined the association between vitamin D deficiency and autism spectrum disorders.⁴²⁻⁴⁵ The current evidence base is primarily from animal studies or observational studies in humans

TABLE 2. RECOMMENDATIONS FOR NUTRIENT SUPPLEMENTS FOR ALL WOMEN DURING PRECONCEPTION, PREGNANCY AND BREASTFEEDING

Nutrient	Population	Duration	Dose	Additional considerations
Folic acid*	<ul style="list-style-type: none"> All women (without other considerations) 	1 month before conception until 12 weeks' gestation	400 mcg/day ⁶ 400–500 mcg/day ⁴⁶ 500 mcg/day ^{20,48}	<ul style="list-style-type: none"> Women at increased risk of folate deficiency (e.g. multiple pregnancy, haemolytic anaemia) should have full blood count monitored and be treated if evidence of folate deficiency²⁰ Routine measurement of serum or red cell folate is not indicated except as part of red cell investigation for macrocytosis and gastrointestinal tract pathology (e.g. coeliac pathology, Crohn's disease, gastric bypass)⁴⁸ Women who have had bariatric surgery should be screened to identify deficiencies and guide individual supplementation⁴⁷
	<ul style="list-style-type: none"> Women with known increased risk of NTDs, such as those: <ul style="list-style-type: none"> with a personal or family history of NTDs^{20,46,48} with 5-methyltetrahydrofolate deficiency⁴⁶ taking anticonvulsant medication^{20,46} taking medicines that are folate antagonists (e.g. carbamazepine, lamotrigine)⁴⁸ with prepregnancy diabetes mellitus^{20,46} with a BMI of 30 kg/m² or more^{20,46} who have had bariatric surgery⁴⁷ with risk of malabsorption^{20,46} with chronic haemolytic conditions (e.g. beta thalassaemia minor)⁴⁸ 	1 month before conception until 12 weeks' gestation	5 mg/day ^{20,46-48}	
	<ul style="list-style-type: none"> Women with known increased risk of NTDs, such as those with: <ul style="list-style-type: none"> pregnancy diabetes mellitus⁴⁹ BMI of 30 kg/m² or more⁴⁷ 	3 months before conception until 12 weeks' gestation	2.5–5 mg/day ^{47,49}	
Iodine	<ul style="list-style-type: none"> All women 	Preconception, pregnancy and breastfeeding	150mcg/day ^{6,20,46,47,50}	<ul style="list-style-type: none"> People with pre-existing thyroid conditions should seek advice from their medical practitioner before taking a supplement^{6,50} Women who have had bariatric surgery should be screened to identify deficiencies and guide individual supplementation⁴⁷ Kelp and seaweed-based supplements are not recommended as they contain varying amounts of iodine⁵¹

Ref 6: Australian Government Department of Health; Ref 20: The Royal Australian and New Zealand College of Obstetricians and Gynaecologists; Ref 46: Royal Australian College of General Practitioners; Ref 47: Queensland Government Queensland Health; Ref 48: The Royal Women's Hospital; (Victoria); Ref 49: Australian Diabetes in Pregnancy Society; Ref 50: National Health and Medical Research Council; Ref 51: Food Standards Australia and New Zealand.

Abbreviations: BMI = body mass index; NTD = neural tube defect.

* Differences exist between the guidelines for recommended dose and duration of folic acid supplementation for women with prepregnancy diabetes mellitus and a pre-pregnancy BMI ≥30 kg/m².

with small sample sizes with inconsistent evidence of an association or causal relationship.⁴²⁻⁴⁵ Currently, there is insufficient evidence to recommend vitamin D supplements to all pregnant women to reduce the risk of autism spectrum disorders in children.⁴⁵

What nutrient supplements are recommended?

The Australian Government Department of Health and Aged Care, The Royal Australian College of General Practitioners and The Royal Australian and New Zealand

College of Obstetricians and Gynaecologists (as well as other Australian state, hospital and medical body guidelines) recommend folic acid and iodine supplementation for all women who are planning a pregnancy or are pregnant, and iodine supplementation for breastfeeding women (Table 2).^{6,20,46-51}

Other nutrient supplements, such as iron, calcium, vitamin B12, vitamin D and omega-3 fatty acids, may also be recommended depending on a woman's individual needs, dietary deficiencies and health.^{6,20,47} In the absence of a diagnosed

deficiency, nutrient supplements of vitamin A, C and E are not recommended because they provide little or no benefit and may have adverse health consequences.^{6,20} The specific populations for whom additional nutrient supplements are recommended according to key national, state, hospital and medical/professional body guidelines are included in Table 3.^{6,20,46,47,49,52-54} Some guidelines currently differ with regards to recommendations for dose, duration, routine screening and populations for whom nutrient supplementation are recommended.

TABLE 3. RECOMMENDATIONS FOR NUTRIENT SUPPLEMENTS FOR SOME WOMEN DURING PRECONCEPTION, PREGNANCY AND BREASTFEEDING

Nutrient	Population	Duration	Dose
Iron*	<ul style="list-style-type: none"> Women with risk of iron deficiency (e.g. vegetarians, multiple pregnancy)²⁰ Women with iron deficiency^{6,20,52} Women with iron-deficiency anaemia^{6,20,52} 	Pregnancy	<p>At risk of iron deficiency</p> <ul style="list-style-type: none"> Guideline does not provide a recommended dose²⁰ <p>Iron deficiency</p> <ul style="list-style-type: none"> Some guidelines do not provide a recommended dose^{6,20} 20–80 mg/day of elemental iron⁵² <p>Iron-deficiency anaemia</p> <ul style="list-style-type: none"> 30–60 mg/day of elemental iron⁶ ≥60 mg/day²⁰ 100–200 mg/day of elemental iron⁵²
	<ul style="list-style-type: none"> Women who have had bariatric surgery 	Preconception, pregnancy and breastfeeding	<p>Preconception</p> <ul style="list-style-type: none"> 45–60 mg/day⁴⁷ <p>Pregnancy and breastfeeding</p> <ul style="list-style-type: none"> 50–80 mg/day⁴⁷
Calcium	<ul style="list-style-type: none"> Women at risk of hypertension or pre-eclampsia^{6,53} Women with low dietary calcium intake^{20,53} 	Pregnancy	<ul style="list-style-type: none"> Guideline does not provide a recommended dose⁶ 1.5 g/day⁵³ 1000 mg/day²⁰
	<ul style="list-style-type: none"> Women with prepregnancy diabetes mellitus 	Pregnancy, from 12 weeks' gestation	<ul style="list-style-type: none"> 1500 mg/day⁴⁹
	<ul style="list-style-type: none"> Women who have had bariatric surgery 	Preconception, pregnancy and breastfeeding	<ul style="list-style-type: none"> 1200–1500 mg/day⁴⁷
Omega-3 fatty acids†	<ul style="list-style-type: none"> Women whose dietary intake is low in omega-3 	Pregnancy	<ul style="list-style-type: none"> 800 mg/day DHA and 100 mg/day EPA⁶ Guideline does not provide a recommended dose²⁰
	<ul style="list-style-type: none"> Women with singleton pregnancies 	From 12 weeks' gestation until birth	<ul style="list-style-type: none"> ≥500 mg DHA/day⁴⁶
Vitamin A	<ul style="list-style-type: none"> Women who have had bariatric surgery 	Preconception, pregnancy and breastfeeding	<ul style="list-style-type: none"> 5000 IU/day⁴⁷
Vitamin B1	<ul style="list-style-type: none"> Women who have had bariatric surgery 	Preconception, pregnancy and breastfeeding	<ul style="list-style-type: none"> ≥12 mg/day⁴⁷
Vitamin B12	<ul style="list-style-type: none"> Women with vegetarian and vegan diets 	Pregnancy and breastfeeding	<ul style="list-style-type: none"> Guidelines do not provide a recommended dose^{6,20}
	<ul style="list-style-type: none"> Women who have had bariatric surgery 	Preconception, pregnancy and breastfeeding	<ul style="list-style-type: none"> 1 mg/day⁴⁷
Vitamin D‡	<ul style="list-style-type: none"> Women with vitamin D levels lower than 50 nmol/L 	Pregnancy	<ul style="list-style-type: none"> Guideline does not provide a recommended dose⁶
	<ul style="list-style-type: none"> All women 	Pregnancy	<ul style="list-style-type: none"> 400 IU/day²⁰
	<ul style="list-style-type: none"> Women who have had bariatric surgery 	Preconception, pregnancy and breastfeeding	<ul style="list-style-type: none"> ≥1000 IU/day⁴⁷
Vitamin K	<ul style="list-style-type: none"> Women with cholestasis 	Late pregnancy	<ul style="list-style-type: none"> Guideline does not provide a recommended dose²⁰
	<ul style="list-style-type: none"> Women who have had bariatric surgery 	Preconception, pregnancy and breastfeeding	<ul style="list-style-type: none"> 90–120 mcg/day⁴⁷
Vitamin E	<ul style="list-style-type: none"> Women who have had bariatric surgery 	Preconception, pregnancy and breastfeeding	<ul style="list-style-type: none"> 15 mg/day⁴⁷
Copper			<ul style="list-style-type: none"> 2 mg/day⁴⁷
Zinc			<ul style="list-style-type: none"> 8–15 mg per 1 mg of copper/day⁴⁷
Selenium			<ul style="list-style-type: none"> 50 mcg/day⁴⁷

Ref 6: Australian Government Department of Health; Ref 20: The Royal Australian and New Zealand College of Obstetricians and Gynaecologists; Ref 46: Royal Australian College of General Practitioners; Ref 47: Queensland Government Queensland Health; Ref 49: Australian Diabetes in Pregnancy Society; Ref 52: National Blood Authority; Ref 53: The Society of Obstetric Medicine Australia and New Zealand; Ref 54: Royal Australian College of General Practitioners.

Additional considerations

Assessment

- Assess all women's haemoglobin levels at the first antenatal visit and at 28 weeks' gestation^{6,20}
- Consider testing ferritin at the first visit in women at risk of iron deficiency anaemia. Diagnostic tests are full blood test, measurement of serum ferritin level and screening for other factors (e.g. folate, vitamin B12, hookworm)^{6,52}

Management

- Weekly supplementation (80–300 mg/week elemental iron) is as effective as daily (30–60 mg/day elemental iron) in preventing (but not treating) iron-deficiency anaemia with fewer side effects⁶
- Oral supplementation is the first-line treatment for iron-deficiency anaemia. Low dose is as effective as high dose, with fewer side effects
- Intravenous iron is recommended for rapid restoration of haemoglobin and iron stores for women who tolerate oral iron poorly, who do not respond to oral supplementation or whose absorption is likely to be impaired^{6,52}
- If intravenous iron is prescribed, consider iron deficit when calculating dose
- Intramuscular iron may be administered if intravenous iron cannot be accessed or administered (i.e. in remote areas)^{6,52}
- Note: At the time of reviewing the Australian Government Clinical Practice Guideline, recommendations for anaemia were under review

- Screen to identify deficiencies and guide individual supplementation. Take separately from calcium supplement and acid-reducing medications⁴⁷

- Assess according to recommended blood pressure and proteinuria testing and diagnosis of pre-eclampsia. If a woman has low intake of calcium, advise to also increase intake of calcium-rich foods. Ongoing surveillance due to increased risk of hypertension^{6,53}

- Recommend calcium supplements to women with moderate to high risk of pre-eclampsia, particularly those with a low dietary calcium intake. Calcium supplementation should account for dietary calcium.⁴⁹ Supplementation is usually managed with calcium carbonate 600 mg twice daily

- Screen to identify deficiencies and guide individual supplementation. Adjust recommended dose for dietary calcium intake.⁴⁷ May be combined with vitamin D supplement. Avoid taking with iron

- N/A

- Supplement does not need to be more than 1000 mg DHA plus EPA.⁵⁴ Algal oil supplements are an alternative to fish oil supplements for vegetarians

- Screen to identify deficiencies and guide individual supplementation.⁴⁷ Avoid exceeding upper limit of 10,000 IU/day for women aged 19 to 50 years (9300 IU/day for women aged 14 to 18 years) for vitamin A from retinol sources

- Screen to identify deficiencies and guide individual supplementation⁴⁷

- Prolonged inadequate intake or impaired absorption (e.g. due to gastric bypass surgery, pernicious anaemia or gastrointestinal conditions) can result in macrocytic anaemia due to vitamin B12 deficiency and should be investigated⁶

- Screen to identify deficiencies and guide individual supplementation.⁴⁷ Vitamin B12 screening before starting folic acid supplements may increase accuracy of results. Folic acid supplementation may mask underlying B12 deficiency and complications. Adjust dose to normalise serum levels. Dose dependent on frequency and route of administration. Recommended sublingual, subcutaneous or intramuscular administration unless efficacy or oral supplement has been demonstrated and prescribed by specialist

- Routine testing is not recommended for vitamin D status of all pregnant women in the absence of a specific indication⁶

- Testing of vitamin D levels in pregnancy is not recommended as part of routine pregnancy screening, regardless of maternal risk factors.²⁰ Advise all women (irrespective of their skin pigment or sun exposure) to take a vitamin D supplement daily and about safe sun exposure

- Screen to identify deficiencies and guide individual supplementation.⁴⁷ Caution required in pregnancy for vitamin K supplements. Recommend daily vitamin D supplementation (according to level of deficiency) if vitamin D levels are <50 nmol/L. Regular dose dependent on serum levels. Titrate dosage until serum levels of 25-hydroxyvitamin D >50 nmol/L (30 ng/mL), accounting for cumulative content with other supplements. May be combined with calcium supplement

- Supplement may be given orally or parenterally according to patient and clinician preference²⁰

- Screen to identify deficiencies and guide individual supplementation. Caution required in pregnancy for vitamin K supplements⁴⁷

- Screen to identify deficiencies and guide individual supplementation. Caution required in pregnancy for vitamin E supplements⁴⁷

Abbreviations: DHA = docosahexaenoic acid; EPA = eicosapentaenoic acid.

*Differences exist between the guidelines for iron supplementation with regards to population, dose and considerations.

[†]Differences exist between the guidelines for omega-3 fatty acid supplementation for all women with singleton pregnancies or those with low dietary intake of omega-3 fatty acids.

[‡]Differences exist between the guidelines for vitamin D supplementation for all women or those with low vitamin D status.

1. KEY RESOURCES AND GUIDELINES FOR MORE INFORMATION TO GUIDE CLINICAL DECISIONS FOR EACH NUTRIENT SUPPLEMENT

- Australian Government, Department of Health. Clinical Practice Guidelines: Pregnancy Care – 2020 Edition⁶
– <https://www.health.gov.au/resources/publications/pregnancy-care-guidelines>
- National Health and Medical Research Council. Iodine supplementation for Pregnant and Breastfeeding Women⁵⁰
– <https://www.nhmrc.gov.au/about-us/publications/iodine-supplementation-pregnant-and-breastfeeding-women#block-views-block-file-attachments-content-block-1>
- Royal Australian College of General Practitioners. Guidelines for preventive activities in general practice: Preventive activities prior to pregnancy⁴⁶
– www.racgp.org.au/getattachment/1ad1a26f-9c8b-4e3c-b45b-3237272b3a04/Guidelines-for-preventive-activities-in-general-practice.aspx
- Royal Australian College of General Practitioners. Omega-3 fatty acid addition in pregnancy to reduce the risk of preterm birth⁵⁴
– <https://www.racgp.org.au/clinical-resources/clinical-guidelines/handi/handi-interventions/nutrition/omega-3-fatty-acid-addition-in-pregnancy-to-reduce>
- The Royal Australian and New Zealand College of Obstetricians and Gynaecologists. Vitamin and mineral supplements and pregnancy²⁰
– <https://ranzocg.edu.au/wp-content/uploads/2022/05/Vitamin-and-Mineral-Supplementation-and-Pregnancy.pdf>
- Australasian Diabetes in Pregnancy Society 2020 guideline for pre-existing diabetes and pregnancy⁴⁹
– <https://obgyn.onlinelibrary.wiley.com/doi/full/10.1111/ajo.13265>
- National Health and Medical Research Council. Nutrient Reference Values for Australia and New Zealand⁵²
– <https://www.nhmrc.gov.au/about-us/publications/nutrient-reference-values-australia-and-new-zealand-including-recommended-dietary-intakes>
- Australian Government Department of Health and National Health and Medical Research Council. Australian Dietary Guidelines
– <https://www.eatforhealth.gov.au/guidelines>
- Food Standards Australia and New Zealand. Iodine and pregnancy⁵¹
– <https://www.foodstandards.gov.au/consumer/generalissues/pregnancy/pages/iodineandpregnancy.aspx>
- National Blood Authority. Patient Blood Management Guidelines: Module 5 – Obstetrics and Maternity⁵²
– <https://blood.gov.au/system/files/documents/pbm-mod-5-qrg.pdf>
- Society of Obstetric Medicine of Australia and New Zealand. Guideline for the Management of Hypertensive Disorders of Pregnancy⁵³
– <https://ranzocg.edu.au/wp-content/uploads/2022/05/Guideline-for-the-Management-of-Hypertensive-Disorders-of-Pregnancy.pdf>
- Queensland Government, Queensland Health. Queensland Clinical Guidelines. Obesity and pregnancy (including post bariatric surgery)⁴⁷
– <https://www.health.qld.gov.au/qcg>
- The Royal Women's Hospital, Victoria, Australia Guideline: Folate in pregnancy⁴⁸
– https://thewomens.r.worldssl.net/images/uploads/downloadable-records/clinical-guidelines/folate-in-pregnancy_280720.pdf
- World Health Organization. WHO recommendations on antenatal care for a positive pregnancy experience⁷
– <https://www.who.int/publications/i/item/9789241549912>
- World Health Organization. WHO recommendation on daily oral iron and folic acid supplementation
– <https://www.who.int/tools/elena/interventions/daily-iron-pregnancy>

Possible reasons for these differences are that guidelines may not have been updated to reflect the most recent evidence, low- or varying-quality evidence has been interpreted differently and clinical judgement has been used when interpreting the evidence or contextualising to the Australian population. Some guidelines also do not cover all preconception, pregnancy and breastfeeding periods. The full list of guidelines reviewed for this article are included in Box 1 and provide more information on recommended assessment, management and monitoring for each nutrient supplement.

Many women take multinutrient supplement(s) before or early in pregnancy and although these supplements contain many of the individual vitamins and minerals presented in Table 2 and Table 3, the dose may be insufficient or exceed nutrient supplement recommendations.¹⁸ It is important to ask what nutrient supplements (including the brand, dose and timing) the women is already taking or planning to take in pregnancy, to inform the provision of advice on nutrient supplementation.⁶

What is the GP's role in supporting women to take nutrient supplements?

The Australian Department of Health Clinical Practice Guidelines for Pregnancy recommend the following three elements of care to support women to take nutrient supplements (Box 2).⁶

- Assess current nutrient supplement intake and any health and dietary considerations required to guide clinical decisions on individualised recommendations.
- Advise and discuss recommended nutrient supplements and benefits for the pregnancy and baby.
- Refer to a specialist, such as a dietitian, obstetrician or obstetric medicine specialist, if further advice and support is needed.

In the primary care setting, a collaborative conversation that invites the views of a patient, with tailored discussions based on question-answer sequences and joint

decision-making when planning actions to overcome barriers, is more likely to lead to patient behaviour change compared with advice-giving only.⁵⁵ Pregnant women commonly cite forgetting to take supplements and not knowing the recommended type, dose and timing of nutrient supplements required (or which supplement brand types provide their nutrient requirements) as barriers to adhering to supplement recommendations.^{21,56} Supporting women to identify their personal barriers to supplement use and checking that they have correctly understood what is being recommended (including the dose, timing, frequency and duration of therapy) may support adherence.

Conclusion

GPs play an important role in providing guidance on appropriate nutrient supplement use for women before and during pregnancy and while breastfeeding. Nutrient supplement use around the pregnancy life stage is effective in optimising health outcomes for pregnant women and their babies. Recommendations for universal and selective supplementation are included in a range of resources (Box 1), but management needs to consider the woman's nutritional and health status and be individualised and based on clinical judgement.

Further considerations

In this article, we refer to pregnant 'women' to reflect research evidence, while acknowledging that transgender and gender-diverse people can also become pregnant. Engaging with partners and families is important in supporting women to meet their nutrient supplement needs and should be considered when providing care. This article summarises current recommendations on nutrient supplements from a range of national, state, hospital and medical/professional body guidelines at the time of writing the article. Other guidelines with nutrient supplement recommendations may exist and should be considered where clinically and locally relevant. Recommended care for dietary food intake, including the five food groups,

2. GP'S ROLE IN ASSESSING AND MANAGING HEALTH RISK FACTORS RELATED TO NUTRIENT SUPPLEMENTS IN WOMEN BEFORE, DURING AND AFTER PREGNANCY⁶

ASSESS

- Identify a woman's future pregnancy intention (if not pregnant, and if appropriate).
- Ask what nutrient supplements the woman is already taking or planning to take.
- Collect clinical information required to determine a woman's individual nutrient supplement needs, including pre-existing health conditions (e.g. previous bariatric/weight loss surgery, obesity, diabetes mellitus), personal or family history of adverse pregnancy outcomes (e.g. neural tube defects), clinical tests (e.g. blood test), medication use, nutrient deficiencies and dietary intake patterns (e.g. vegetarian/vegan) (see Table 2 and Table 3 and individual guidelines for more information on clinical considerations).

ADVISE

Based on the above assessment.

- Discuss recommended supplement intake (including nutrients, dose and timing), taking into account which supplements the woman is already taking or planning to take.
- Discuss how the recommendation will change before and during pregnancy and while breastfeeding.
- Discuss how taking the recommended supplements will support a healthy pregnancy, mother and baby.
- Advise that in the absence of an identified deficiency, taking high-dose supplements (e.g. vitamin A, C or E) is of little or no benefit in pregnancy and may cause harm.
- Discuss the importance of eating food from the five food groups (grains and cereals, vegetables, fruit, meat and alternatives, and dairy and alternatives), in addition to taking supplements (i.e. supplements enhance, but do not 'replace', healthy eating). Discuss foods rich in the relevant nutrient(s) if intake can be enhanced through dietary choices.
- Discuss potential barriers to taking recommended nutrient supplements, acknowledging the role of the wider determinants of health in people meeting the nutrient supplement recommendations (e.g. availability/access, cost, and cultural practices and preferences).
- For women taking iron supplements, explore culturally appropriate, low-cost ways for women to increase their fibre and fluid intake if they are experiencing constipation. For women diagnosed with iron-deficiency anaemia, providing ongoing follow up, including further investigation if anaemia does not resolve throughout or following pregnancy.
- For women taking iron supplements, advise to avoid taking with calcium supplements or milk, coffee, tea, cola or chocolate to maximise the amount of iron absorbed by the body.

REFER

If additional individual advice and support regarding nutrient supplements is needed, referral of the patient to an appropriate specialist health service can be offered.

- Dietitian
- Obstetrician or obstetric medicine specialist
- Culturally appropriate services (e.g. dietitian at Aboriginal Community Controlled Health Services)

probiotics, food safety and weight during pregnancy⁵⁷ are outside the scope of this article and will be summarised in other articles in *Medicine Today*. **MT**

References

A list of references is included in the online version of this article (www.medicinetoday.com.au).

COMPETING INTERESTS: Dr Hollis is a Clinical and Health Service Research Fellow funded by Hunter New England Local Health District Partnerships, Innovation and Research through the HNELHD

Clinical and Health Service Research Fellowship Scheme. Associate Professor de Jersey is an Associate Professor in the Centre for Health Services Research at the University of Queensland funded through the Metro North Health Clinician Research Fellowship Scheme. Professor Elliott was supported by a Medical Research Futures Fund Next Generation Fellowship (APP1135959) and a National Health and Medical Research Council of Australia Leadership Fellowship (No 2026176). Dr Kingsland is Research Fellow with the University of Newcastle funded through a grant from The Australian Prevention Partnership Centre (TAPPC) and a Program Manager with Hunter New England Population Health. Dr Cannon, Dr Kimura, Dr Guppy, Dr Delaney: None.

Micronutrient supplementation

Supporting a healthy pregnancy and baby

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