Clinical Practice Guideline	**Vitamin D deficiency during pregnancy and breastfeeding**
Department	**Women's Health**

Target Audience
Medical, midwifery and nursing staff providing antenatal and postnatal care to women.
Antenatal and postnatal patients.

Purpose
To provide women evidence-based advice on the investigation and management of vitamin D deficiency during pregnancy and breastfeeding.
To improve maternal and neonatal outcomes in women identified as vitamin D deficient.

Guideline

Vitamin D, synthesised in the skin and obtained through diet, is necessary for skeletal growth and development. Vitamin D is also being recognised for roles in "non-bone mineralisation effects" such as glucose metabolism and immune modulation. During pregnancy, vitamin D is transplacentally transferred to the fetus and neonatal levels are reflective of maternal levels.

Risk factors for vitamin D deficiency
Sunlight is our major source of vitamin D, with only 10% of our requirement obtained through diet Women at higher risk of vitamin D deficiency include those with (NICE UK, 2017);

- limited skin-exposure to sunlight, such as veiled women or house-bound
- darker skin (particularly African, African-Caribbean, Asian and South Asian) as their skin is less efficient at synthesising vitamin D.
- an obese pre-pregnancy body mass index (BMI $\geq$ 30 kg/m^2)
- a diet low in vitamin D source foods (e.g. egg yolk, red meat, oily fish, fortified margarine and breakfast cereal).
- malabsorption syndromes (cystic fibrosis, coeliac disease, inflammatory bowel disease)
- certain medications (including isoniazid, rifampicin, anticonvulsants)5
- mothers of infants with rickets (RANZCOG, 2004)

Vitamin D deficiency

- Vitamin *deficiency* is thought to relate to a level of <50nmol/L with *insufficiency* existing at levels from 50-75nmol/L (Holick, 2007)
- Routine screening for vitamin D deficiency is not supported by the available evidence as being clinically or financially effective. If vitamin D levels have been performed by referring practitioners it should be noted that there is a lack of consensus on the ideal level of vitamin D.

Pregnancy and Maternal Implications of Vitamin D deficiency

There are reported **associations** between Vitamin D deficiency and adverse pregnancy outcomes. When counselling women with respect to the impact of Vitamin D on their pregnancy health, one should be cognisant that these are associations only, and there is no

statistically significant evidence of causation to date. Pregnancy outcomes associated with vitamin D deficiency include;

- Pre-eclampsia
- Gestational diabetes
- Caesarean section

Maternal implications for later life include;

- Osteomalacia/osteoporosis
- Schizophrenia
- Insulin dependent diabetes
- Cancer
- Multiple sclerosis

Neonatal and Childhood Implications of Vitamin D deficiency

Vitamin D is available to a developing fetus through transplacental passage and neonatal levels are reflective of maternal levels. Neonatal and childhood consequences of vitamin D deficiency include;

- Preterm birth
- Impaired skeletal development
- Hypocalcaemia and hypocalcaemic seizures
- Osteomalacia
- Diabetes
- Multiple sclerosis
- Atopic illnesses
- Rickets in severe cases

Vitamin D supplementation

- Women should have their risk factors for vitamin D deficiency assessed and documented at their booking visit.
- Vitamin D supplementation should be discussed with women identified as being at high-risk of vitamin D deficiency (see above).
- There is a lack of consensus about the appropriate dose of vitamin D. Guidelines range from 400 IU to 5000 IU per day. It is likely that doses under 4000 IU/day are safe (IoM 2010)
  - Most pregnancy multivitamin supplements contain a daily dose of 500 IU (12.5mcg) eg 'Elevit', 'Blackmores Gold'. This is in keeping with UK guidelines (NICE 2017, 400 IU/day) and the USA Institute of Medicine (IoM 2010, 600 IU/day).
  - Higher doses (1000 IU) are available as single vitamin D supplements (e.g. 'Ostelin Vitamin D', 'OsteVit D' or 'Blackmores Vitamin D3').
- Neonatal supplementation should be discussed with breast-feeding mothers identified as vitamin D deficient;
  - Neonates should be supplemented with 400 IU per day (oral Pentavite 0.45ml; Oste-Vit D: 2 drops contain 400 IU; Ostelin Kids Vitamin D liquid: 1ml contains

400IU) if they are born to mothers who are vitamin D deficient (see above), exclusively breast fed AND have one other risk factor (see above).

- Supplementation should commence within the first few days of life and continue until 12 months of age
- Infants who are formula fed >1000ml per day will not generally require additional supplementation. Most commercial infant formulas in Australia are fortified with 400 IU (10mcg) of vitamin D_3 per litre.
- Once the infant transitions to solids containing vitamin D (for example oily fish, milk and dairy products fortified with vitamin D), as well as increasing sunlight exposure (within current skin cancer recommendations – see reference), supplementation can be ceased.
- The safety of an oral *stoss* dose of vitamin D (cholecalciferol) 50,000 IU is equivocal owing to the potential for toxicity (Huynh et al., 2017; Ketha et al., 2015). A stoss dose can be considered for vulnerable families where adherence to daily dosing of vitamin D is unreliable. If an infant has received a stoss dose and remains exclusively breastfed at four months, supplementation with oral Pentavite 0.45ml daily should be commenced at four months until 12 months old

Key Aligned Documents

- Peninsula Health Clinical Practice Guideline: Vitamin D administration: Paediatrics

Evaluation
Regular document revision and review of relevant VHIMS/RiskMan Reports.

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