



# Iodine Supplementation

## FOR PREGNANT AND BREASTFEEDING WOMEN



### What is iodine and why do we need it?

Iodine is an essential nutrient that humans need in very small quantities. A small gland in the neck, known as the thyroid, uses iodine to produce thyroid hormones.<sup>1</sup> These hormones are vital to ensure normal development of the brain and nervous system before birth, in babies and young children.<sup>2,3</sup> For this reason, it is very important that pregnant and breastfeeding women get enough iodine.



Humans store iodine in the thyroid.<sup>1</sup> As only small amounts can be stored, any excess is excreted.<sup>4</sup>

### How much iodine do pregnant and breastfeeding women need?

NHMRC and the New Zealand Ministry of Health recommend that women who are pregnant have 220µg of iodine per day. Women who are breastfeeding should have 270µg per day.<sup>1</sup> The World Health Organization (WHO) recommends women who are pregnant or breastfeeding take a daily oral iodine supplement so that the total daily intake is 250µg.<sup>5</sup> Pregnant and breastfeeding women need to top up their dietary iodine intake because of the increased requirements during pregnancy and breastfeeding and the likelihood that they won't get enough from their diet and mandatory fortification.

### What foods contain iodine?

Most foods in Australia contain only small amounts of iodine, making it difficult for pregnant and breastfeeding women to get enough iodine through food alone. The amount of iodine varies greatly based on factors such as changes in season and processing practices. Fortified bread, dairy and seafood are the main dietary sources of iodine in Australia.

## Recommendations

- The National Health and Medical Research Council (NHMRC) recommends that all women who are pregnant, breastfeeding or considering pregnancy, take an iodine supplement of 150 micrograms (µg) each day.
- Women with pre-existing thyroid conditions should seek advice from their medical practitioner prior to taking a supplement.

## Why do pregnant and breastfeeding women need more iodine than other population groups?

Humans store iodine in the thyroid. In pregnancy, the thyroid is particularly active, producing about 50% more thyroid hormones than usual.<sup>3</sup> To produce enough thyroid hormones to support the mother and foetus, the mother needs to increase her iodine intake.

If iodine intake is inadequate before pregnancy, the mother's stores may run low and be inadequate to support the unborn baby in later stages of pregnancy.<sup>6</sup>

The production rate of thyroid hormone returns to normal when breastfeeding. However, NHMRC recommends that breastfeeding women also take an iodine supplement because breast fed infants are completely dependent on milk as a source of iodine and need around 90 to 100µg of iodine per day.<sup>1</sup> Infants use this iodine to build their own reserves of thyroid hormones.<sup>7,8</sup>

## Are pregnant and breastfeeding women getting enough iodine?

No. The weighted results from the National Iodine Nutrition Survey suggest the median urinary iodine concentration in Australia is 96µg/L which, according to WHO, suggests that the Australian population is mildly deficient.<sup>9</sup> There are limited studies specific to the iodine status of pregnant women in Australia, but those available prior to fortification suggest it was inadequate.<sup>9</sup>

*Why has this occurred?* Reasons suggested for the recurrence of iodine deficiency in Australia include reduced use of iodine-based cleaning products by the dairy industry and reduced household use of iodised salt (caused by a gradual increase in consumption of commercially processed foods containing non-iodised salt).<sup>10</sup>

## What happens if pregnant and breastfeeding women do not get enough iodine?

The main health concern of mild iodine deficiency during pregnancy and breastfeeding is its negative effect on the brain and nervous system of unborn children and infants, in particular reduced intelligent quotient (IQ).<sup>11,12,13,14</sup>

When iodine intake falls below recommended levels the thyroid cannot produce enough thyroid hormones and a range of iodine deficiency disorders can occur.<sup>1,15</sup> Iodine deficiency is of particular concern during pregnancy because abnormal function of the mother's thyroid has a negative impact on the nervous system of the unborn baby, and increases the risk of infant mortality.<sup>3</sup> Adverse effects on early brain and nervous system development are generally irreversible and can have serious implications for mental capacity in later life.<sup>16</sup>

## I know bread has recently been fortified with iodine. Do pregnant and breastfeeding women need a supplement as well?

Yes. Mandatory fortification is where food manufacturers are required to add a vitamin or mineral to a food. Mandatory iodine fortification has been introduced in Australia and New Zealand as an initiative to improve public health. Bread made in Australia, where salt is used, except bread represented as organic, is now required to contain iodised salt, instead of non-iodised salt. "Bread" includes not only bread but also rolls and hamburger buns and other bread products.

Through mandatory fortification, most of the Australian population will get enough iodine<sup>17</sup>, meaning women of child bearing age should enter pregnancy with adequate iodine intake. However, the extra iodine available through bread is not enough to meet the additional needs of pregnancy and during breastfeeding.<sup>18</sup>

Therefore, NHMRC recommends that women who are pregnant, breastfeeding or considering pregnancy take an iodine supplement of 150µg each day. Supplements of 150µg/d of iodine are safe and effective for pregnant and breastfeeding women.

## Are iodine supplements safe for all women?

Women with pre-existing thyroid conditions should seek advice from their medical practitioner prior to taking a supplement.

## Is it possible that by taking an iodine supplement pregnant and breastfeeding women will have too much iodine?

No. In Australia, where the population is only mildly iodine deficient, taking an iodine supplement at the recommended dose of 150µg/day will not lead to an excessive iodine intake. However, monitoring of intake to ensure levels don't exceed the recommendation is included in the mandatory iodine fortification monitoring framework and will be conducted by the Australian Institute of Health and Welfare.

## Are there any benefits of taking supplements with more than 150µg iodine?

No. NHMRC recommends supplementation of 150µg/day to ensure that all women who are pregnant, breastfeeding or considering pregnancy have adequate iodine status.

As only small amounts of iodine can be stored, any excess is excreted.

## How was the level of supplementation determined?

The level of supplementation was determined using data on average iodine intakes post mandatory bread fortification, based on knowledge that the Australian population is now classified by WHO as mildly iodine deficient.<sup>19, 20</sup>

## Are there some iodine supplements that women who are pregnant, breastfeeding or planning pregnancy should not take?

Yes. Women should not take kelp (seaweed) supplements or kelp based products because they contain varying levels of iodine<sup>21</sup> and may be contaminated with heavy metals such as mercury. In addition, a survey of 15 prenatal supplements available in Australia found iodine contents of between 150 and 270µg, with one leading brand containing no iodine.<sup>22</sup> Pregnant and breastfeeding women are advised to check that their vitamin and

mineral supplements include the recommended amount of iodine and should consider taking supplements designed specifically for pregnancy and breastfeeding.

## When should women start and finish taking iodine supplements?

Women should take iodine supplements from the point of planning pregnancy through the full duration of pregnancy and breastfeeding. If pregnancy is not planned, women should start taking an iodine supplement as soon as possible after finding out that they are pregnant.

## How was this statement developed?

NHMRC developed this Statement via a review of the literature and consultation with an expert group. The review, *Iodine supplementation during pregnancy and lactation*, is available at [www.nhmrc.gov.au](http://www.nhmrc.gov.au). The evidence supporting this Statement will be reviewed in time and the Statement revised as necessary. Members of the expert group were Professor Katrine Baghurst, Professor Colin Binns, Professor Peter Davies, Professor Creswell Eastman and Dr Dorothy Mackerras.

## References

- 1 National Health and Medical Research Council and New Zealand Ministry of Health (2006). *Nutrient Reference Values for Australia and New Zealand including Recommended Dietary Intakes*. Commonwealth of Australia. Available online at <http://www.nhmrc.gov.au>.
- 2 World Health Organization (2004). *Review of iodine deficiency disorders in the South-East Asia Region: information document for the fifty-seventh session of the Regional Committee for South East Asia*. Available online at <http://searo.who.int>.
- 3 Zimmermann MB (2009) Iodine deficiency in pregnancy and the effects of maternal iodine supplementation on the offspring: a review. *The American Journal of Clinical Nutrition*: 89; 668S-672S.
- 4 Lamberg B (1993) Iodine deficiency disorders and goitre. *European Journal of Clinical Nutrition*: 47; 1-8.
- 5 World Health Organisation Secretariat (2007) World Health Organisation Technical Consultation on the Prevention and control of iodine deficiency. *Public Health Nutrition*: 10; 1606-1611.



- 6 Smyth PP (2006) Dietary iodine intakes in pregnancy. *Irish Medical Journal*: 99(4); 103.
- 7 Perez-Lopez FR (2007) Iodine and thyroid hormones during pregnancy and postpartum. *Gynaecological Endocrinology*: 23(7); 414-428.
- 8 World Health Organisation Secretariat, Andersson M, de Benoist B, Delange F and Zupan J (2007) Prevention and control of iodine deficiency in pregnant and lactating women and in children less than 2-years-old: conclusions and recommendations of the Technical Consultation. *Public Health Nutrition*: 10(12A); 1606-1611.
- 9 Australian Population Health Development Principal Committee (2007) *The Prevalence and Severity of Iodine Deficiency in Australia*. Report Commissioned by the Australian Health Ministers Advisory Committee.
- 10 Seal JA, Doyle Z, Burgess JR, Taylor R and Cameron AR (2007) Iodine status of Tasmanians following voluntary fortification of bread with iodine. *Medical Journal of Australia*: 186 (2); 69-71.
- 11 Morreale de Escobar G, Jesús Obregón M and Escobar del Rey F (2007) Iodine deficiency and brain development in the first half of pregnancy. *Public Health Nutrition*: 10; 1554-1570.
- 12 Aghini Lombardi FA, Pinchera A, Antonangeli L, Rago T, Chiovato L, Bargagna S, Bertucelli B, Ferretti G, Sbrana B, Marcheschi M (1995) Mild iodine deficiency during fetal/neonatal life and neuropsychological impairment in Tuscany. *Journal of Endocrinological Investigation*: 18; 57-62.
- 13 Vermiglio F, Lo Presti VP, Moleti M, Sidoti M, Tortorella G, Scaffidi G, Castagna MG, Mattina F, Violi MA, CrisÃ A, Artemisia A, Trimarchi F (2004) Attention deficit and hyperactivity disorders in the offspring of mothers exposed to mild-moderate iodine deficiency: a possible novel iodine deficiency disorder in developed countries. *Journal of Clinical Endocrinology and Metabolism*: 89; 6054-6060.
- 14 Choudhury N, Gorman KS (2003) Sub-clinical prenatal iodine deficiency negatively affects infant development in Northern China. *Journal of Nutrition*: 133; 3162-3165.
- 15 World Health Organization /United Nations Children's Fund /International Council for Control of Iodine Deficiency Disorders (2007) *Assessment of iodine deficiency disorders and monitoring their elimination: a guide for programme managers*. – 3rd ed, WHO.
- 16 World Health Organization: Regional Office for the Western Pacific (2005-2009). *Micronutrient deficiencies*. Available online at <http://www.wpro.who.int/>.
- 17 Food Standards Australia New Zealand (2008) *Approval Report Proposal P1003 – Mandatory Iodine Fortification for Australia*. Commonwealth of Australia. Available online at <http://www.foodstandards.gov.au>.
- 18 Burgess JR, Seal JA, Stilwell GM, Reynolds PJ, Taylor ER and Parameswaran V (2007) A case for universal salt iodisation to correct iodine deficiency in pregnancy: another salutary lesson from Tasmania. *Medical Journal of Australia*: 186; 574-576.
- 19 Li M, Eastman CJ, Waite KV, Ma G, Zacharin MR, Topliss DJ, Harding PE, Walsh JP, Ward LC, Mortimer RH, Mackenzie EJ, Byth K and Doyle Z (2008) Are Australian children iodine deficient? Results of the Australian National Iodine Nutrition Study. *Medical Journal of Australia*: 188(11); 674.
- 20 Eastman, C (2009) Personal communication at expert group meeting, 28 August 2009, NHMRC Canberra.
- 21 Teas J, Pino S, Critchley A, and Braverman LE (2004) Variability of Iodine Content in Common Commercially Available Edible Seaweeds. *Thyroid*: 14(10); 836-41.
- 22 Food Standards Australia New Zealand (2009) *Iodine Supplements Available in Australia*, unpublished survey data provided by FSANZ, Canberra.