

# IODINE SUPPLEMENTATION: The benefits for pregnant and lactating women in Australia and New Zealand

**A health education campaign is needed in Australia and New Zealand to encourage all pregnant women, those contemplating a pregnancy, and breastfeeding mothers to take iodine supplements to increase iodine intake by 100 to 200ug per day. Requesting the manufacturers of prenatal and lactation vitamin and mineral supplements to include appropriate quantities of iodine in their preparations will assist in achieving the desired outcome of preventing the adverse effects of iodine deficiency on the fetus and developing infant.**

## **Recommendation For Iodine Supplements During Pregnancy and Lactation**

Urgent action is needed because there is evidence of significant and increasing iodine deficiency in pregnant and lactating women in both Australia and New Zealand. Similar recommendations have recently been made for European women (Zimmermann and Delange, 2004). The only exception to this recommendation for iodine supplementation is women with pre-existing thyroid disease who should be individually managed to ensure normal thyroid function during pregnancy.

## **Adverse Effects of Maternal Iodine Deficiency on the Offspring**

The brain of the fetus and infant is particularly vulnerable to damage from decreased circulating maternal levels of thyroxine (T4), be it from environmental iodine deficiency or thyroid disease. Indeed, even borderline low normal maternal serum free T4 levels early in pregnancy may compromise fetal neuropsychological development (Toft, 2004).

Iodine deficiency during pregnancy is the commonest worldwide cause of preventable intellectual impairment. In areas where iodine deficiency is severe, IQ scores in children are decreased by ten to 15 points, psychomotor deficits are more common, hearing may be impaired, and there is a markedly increased prevalence of attention deficit hyperactivity disorder (ADHD).

In general, these adverse effects on the central nervous system are irreversible and are compounded by continuing iodine deficiency during infancy. The World Health Organisation (WHO) recognises iodine deficiency as one of the major public health problems in the world and gives it high priority for elimination in affected countries. No country can afford to stand by and ignore the harmful consequences of iodine deficiency on the developing brains of future generations.

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## **Iodine Deficiency in Australia and New Zealand**

There is now irrefutable evidence that iodine deficiency is widespread in Australia and New Zealand. Several studies have shown the re-emergence of mild to moderate iodine deficiency in school-age children, healthy adults and pregnant women in Tasmania, Victoria, New South Wales and New Zealand (Li, 2001). Median urinary iodine concentrations of less than 100 ug/l indicate mild to moderate iodine deficiency.

Why has this occurred? First, our population is at risk because most households (more than 80 per cent) do not use iodised edible salt and the food industry rarely uses iodised salt. Second, work practice changes in the dairy industry have seen replacement of iodine-containing sanitisers (iodophores) by chlorine-based compounds. As milk and milk-based products have been the major source of iodine in our diets since the early 1960s, iodine intake has

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more than halved over the past decade (Eastman, 1999). Unless we adopt the WHO recommended practice of iodising all salt for human and animal consumption, a practice known as Universal Salt Iodisation (USI), it is unlikely that this situation will be corrected.

### **Iodine Requirements and Intake During Pregnancy and Lactation**

More iodine is required during pregnancy to ensure maternal thyroid hormone (T4) production can be maintained at almost double that of the non-pregnant state. The fetus is entirely dependent on T4 transferred from the mother during the first and second trimesters and on iodine transfer for fetal thyroid hormone synthesis during the last trimester. Any compromise in the placental transfer of T4 or iodine to the developing fetus prejudices normal central nervous system organisation and maturation. It is well established that the normal euthyroid adult requires on average a minimum intake of 150ug of iodine per day to maintain optimal thyroid function. Therefore, to meet the demands of pregnancy where thyroid hormone production is increased by 50 per cent early in the first trimester the pregnant woman needs to increase iodine intake by at least 75ug per day.

Allowing for a small amount of direct transfer of iodine to the fetus (15ug) and increased wastage by the kidney (ten to 15 ug) of iodine during pregnancy, a rounded figure would be approximately an extra 100ug per day above the recommended daily intake of 150ug. Therefore, one can estimate the recommended daily iodine intake during pregnancy to be 250ug. A similar figure has been calculated for the breastfeeding mother, being the recommended daily intake of 150ug for an adult plus the recommended daily intake for a newborn infant of 90ug to 100ug per day. These figures are the basis of soon to be published recommendations of an expert technical working party convened by the WHO in Geneva in January 2005.

### **Iodine Supplementation**

Urinary iodine excretion is an accurate indicator of dietary iodine intake as less than 90 per cent of ingested iodine is excreted in the urine. Using data from published median urinary iodine excretion levels in pregnant Australian women (80ug/l) (Li *et al*), and assuming an average daily urine output of 1.5 litres, the estimated

daily iodine intake is approximately 130ug. This is about half the recommended daily requirement.

The WHO working party has strongly recommended iodine supplementation for all pregnant and lactating women where USI is not established and where median urinary iodine excretion levels in pregnancy are less than 150ug/l. There are no concerns about the safety of iodine supplements at these dosages but the WHO committee does not recommend an intake above 500ug per day as there are no demonstrable benefits to mother and child above 250ug per day and there is little data on safety at intakes of more than 1000ug per day. We can conclude that pregnant and lactating women in Australia and New Zealand should be taking iodine supplements in doses of between 100ug and 200ug per day. The only exceptions to this recommendation are women with known thyroid disease or high iodine intakes from other sources.

### **References**

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