Iodized salt in bread improves iodine nutrition in Australia

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Background

There has not been any regular, national surveillance program of iodine nutrition in Australia, but some States, such as Tasmania, have regularly surveyed schoolchildren by testing urinary iodine levels. It has generally been believed that the Australian population was iodine replete, with data showing average urinary iodine levels in excess of 200 µg/L in the early 1990s (1). Since then, we have reported the re-emergence of iodine deficiency in Australia (2). A similar situation pertains in New Zealand where iodine deficiency has also been reported in schoolchildren, infants, toddlers and pregnant women.

In 2003-2004 we conducted the Australia National Iodine Nutrition Study (NINS), examining 2,000 schoolchildren across five mainland States and found that Australian children were mildly iodine deficient, with a weighted national median urinary iodine concentration (UIC) of 96 µg/L. The levels were lowest in the two most populated States on the eastern seaboard, Victoria and New South Wales (3). The UIE in schoolchildren is a proxy indicator of iodine nutrition status of the general population.

The NINS results became the major driver for the development of new public policy on food fortification to correct iodine deficiency in Australia and New Zealand. In October 2008, the Australia Commonwealth Government gazetted a new mandatory iodine fortification policy, stating "iodised salt must be used for making bread where otherwise salt would be used" (4). This mandatory food fortification policy was fully implemented in October 2009. However, it was essential that the national program be monitored for its effectiveness.

The National Health Measures Survey

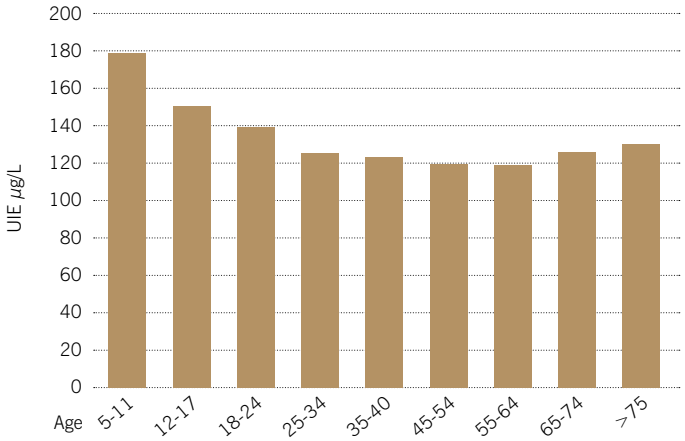
The 2011–13 Australian Health Survey is the largest and the most comprehensive health survey ever conducted in Australia. It consists of the existing National Health Survey (NHS) and two new components, the National Nutrition and Physical Activity Survey (NNPAS) and the National Health Measures Survey (NHMS), aimed to gather information on a broad range of health related issues. People aged ≥ 5 years of age who participated in either the NHS or the NNPAS were invited to participate in the voluntary NHMS between March 2011 and September 2012. Blood and urine samples were collected from over 11,000 participants across Australia. The sample collection started about 18 months after the mandatory iodine fortification commenced. The results from this survey provide a timely snapshot of the current status of iodine intake in the Australian population and the effectiveness of the policy of food fortification with iodized salt.

The iodine nutrition status of Australian population

The NHMS results for iodine showed that Australians now have an adequate iodine intake with the adult population median UIC being 124 µg/L *(Figure 1)* (5).

While there were some variations across different age groups, all were within the optimal UIC range of 100-200 µg/L. In children, particularly the younger group of 5 – 11 year olds, the median UIC level was relatively higher compared with adults. Compared with the Australian National Iodine Nutrition Study data *(Table 1)*, the median UIC of 8-10 year old children in the NHMS has increased significantly as

FIGURE 1 Median urinary iodine excretion (UIE) by age (years) in Australia



Source: Australian Bureau of Statistics, Australian Health Survey: Biomedical Results for Nutrients, 2011-12 cat. no. 4364.0.55.006

TABLE 1 UIE (in µg/L) in 8-10 year old Australian school-children in 2003-04 and 2011-12.

State	2003-04 Median UIE	2011-12 Median UIE
Queensland	136.5	165.9
New South Wales	89.0	177.0
Victoria	73.5	162.6
South Australia	101.0	149.9
Western Australia	142.5	261.3

a result of the mandatory food fortification policy. The NHMS included 2,187 samples of women of childbearing age (16-44 years), weighted to represent the population estimate of 4,671,000 women in this age group. The median UIC for women aged 16-44 years was 121 µg/L, which is in the iodine sufficient range. There was no significant difference between the median UIC for women living in urban or rural areas.

The relatively higher UIC in children, compared with adults, suggests a greater intake of iodine from other food sources such as milk and dairy products. In Australia, despite the reduction of the residual iodine content in milk, it remains an important source of dietary iodine (6). This is similar to what has been found in the US National Health and Nutrition Examination Surveys (7). Therefore, residual milk iodine combined with fortification of bread with iodine has been effective in correcting iodine nutrition of schoolchildren. Iodine nutrition in New Zealand schoolchildren has also reportedly improved as the result of the iodine fortification of bread (8).

As pregnant and breastfeeding women were not specifically targeted in the NHMS, there was a small sample size of pregnant women, and information on women's breastfeeding status was not collected. These exemplify a missed opportunity to monitor iodine nutrition in these two most vulnerable groups. The mandatory fortification of bread with iodine, however, was not designed to provide the extra iodine needs of pregnant and breastfeeding women. The Australia National Health and Medical Research Council recommends a daily iodine supplement of 150 µg for pregnant and breastfeeding women to complement the mandatory iodine fortification policy (9). A recent study reported only pregnant women taking supplements containing iodine had median UIC indicative of iodine sufficiency (10). However, most pregnant women have poor knowledge about the possible adverse effects of inadequate iodine nutrition on their unborn children. While universal salt iodization is not currently an option in Australia, it is the medical practitioners' responsibility to educate women to reach optimal iodine nutrition during pregnancy and lactation to prevent the development of neurocognitive disorders in their babies. The iodine nutrition status in these groups should be monitored as a matter of priority.

Acknowledgement

We would like to thank Juanita Pettit, Director of Health Surveys, Health and Disability Branch, Australian Bureau of Statistics, Australia for reviewing the article.

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