Fortifying bread with iodized salt improves iodine status in New Zealand

New Zealand has a history of iodine deficiency due to the naturally low levels of iodine in the soil. Thanks to early introduction of iodized salt, by the 1950s the iodine status in New Zealand had improved and goiter virtually disappeared. Iodine intakes further increased in the 1960s when the dairy industry began using iodophors as a sanitizer, which contaminated milk thereby increasing the iodine content of dairy products. However, the replacement of iodophors in the dairy industry and a change in consumer food habits (e.g., decreasing use of discretionary salt and rising popularity of non-iodized rock and sea salts) led to a decline in iodine intake (1). In response, Food Standards Australia New Zealand (FSANZ) mandated the use of iodized salt in bread in 2009. Standard 2.1.1 requires that “iodized salt be used for making bread where salt would otherwise be used.”

Thanks to fortified bread, children in New Zealand are iodine sufficient

A cross-sectional study was conducted from March to April 2015 in two New Zealand cities: Christchurch in the South Island and Auckland in the North Island. The study measured UIC and thyroglobulin (Tg) in 415 schoolchildren aged 8–10 years from 20 schools. All children completed a questionnaire consisting of socio-demographic questions and an iodine-specific food frequency questionnaire (FFQ).

The median UIC (IQR) was 116 (82–156) µg/L, which is almost double the median reported before the mandatory fortification (68 µg/L in 2002) (2). The Tg concentration prior to fortification was 12.9 µg/L (2), which declined to 10.8 µg/L in 2011, and in the current study was 8.7 µg/L, which indicates iodine sufficiency (Table 1). New Zealand is the only country that has sequentially measured Tg in children during the transition from iodine deficiency to sufficiency over a 15 year timespan. Together, the UIC and Tg data confirm that the iodine status of New Zealand children has improved since the mandatory fortification of bread.

Interestingly, socio-economic status, salt type, and consumption of fortified bread were not significant predictors of UIC, whereas ethnicity and sex were. The higher UIC in boys observed in this study is likely a result of boys having higher energy intakes than girls. According to the 2002 CNS, the main source of energy in this age group is bread (17%) (3). Therefore, not only are boys consuming more energy and thus more likely to have higher iodine intakes, but a higher proportion of their energy is likely to come from fortified bread. Of particular interest was that children of Asian ethnicity had the highest UIC, which has not been noted in previous studies. Little is known about the dietary patterns of Asian children, and the group is unlikely to be homogeneous. However, these children may consume more seaweed, fish, and seafood, which are rich sources of iodine.

### Contribution of bread and salt to iodine intakes

The 2002 CNS estimated that only 1% of dietary iodine was supplied from bread, with milk and dairy products making the largest contribution (40%) to iodine intakes in children (3). FSANZ predicted that bread would supply ~48% of total dietary iodine after fortification. In 2011, 47% of the total iodine intakes was found to come from bread, which increased to 51% in this study. Of note was the difference between the mean iodine intakes from the food-only and food-plus-iodized salt models (65 µg/day vs. 101 µg/day) which suggests that iodized salt is still likely to be a key contributor to iodine in the diet, highlighting the importance of including a measure of iodized salt when assessing dietary iodine intake.

### References