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Letter to the Editor

Revisiting the Iodine Global Network's definition of iodine status by country

The Iodine Global Network (IGN, formerly the ICCIDD) published an updated Global Iodine Scorecard and a corresponding map of global I deficiency in August 2015[1,2]. The updated scorecard now defines the New Zealand population as being of adequate status with a population urinary I concentration (UIC) of 113 μg/l, from a study of 8–10-year-old children throughout New Zealand[3]. The same report defines the UK as now being mildly I deficient, when previously it was defined as adequate. The population UIC for the UK is quoted as 80 μg/l, from a study of UK school girls aged between 14 and 15 years[4]. We would like to draw attention to fact that the I statuses of the populations of both New Zealand and UK are very similar (see Table 1).

New Zealand has low levels of I naturally occurring in the food supply, and in the early twentieth century endemic goitre was seen throughout New Zealand. Iodised salt was introduced in New Zealand in 1920s and 1930s, which contributed to a significant reduction in rates of goitre until the 1980s[5]. In the 1990s and 2000s, a number of studies in New Zealand identified that I deficiency had re-emerged throughout the New Zealand population – in adults[6], pregnant and breast-feeding women[7–9], school children[10] and breast-fed infants and toddlers[11].

Two initiatives were introduced to combat I deficiency in New Zealand. The mandatory fortification of all bread (except organic) with iodised salt was introduced in September 2009[12]. This was predicted to improve the I intake of the majority of the population (73–100 %), but it was acknowledged that this would be insufficient for 63 % of pregnant women[13] and also lactating women who have even higher requirements. In July 2010, the New Zealand Ministry of Health made a subsidised I supplement (150 μg) available to all pregnant and breast-feeding women[14]. New Zealand studies subsequent to these government initiatives have found that I intakes and statuses have improved[3,15–17]. However, intakes are by no means adequate for the all population groups.

A study of children aged between 8 and 10 years (*n* 147) in 2010–2011 in two New Zealand cities found a median UIC of 113 μg/l[3], within the range of 100–199 μg/l, defined by the World Health Organization[18] as indicating adequate status. Correspondingly, a recent study of children of the same age in three UK centres found a UIC of 161 μg/l in winter (*n* 134) and 127 μg/l in summer (*n* 31)[19], classifying these children as I sufficient with a higher median UIC than that seen in the New Zealand study.

A New Zealand pilot study in 2011 demonstrated that, despite the initiatives, I status was not adequate for pregnant and breast-feeding women[15]: median UIC was 85 μg/l in pregnant and 74 μg/l in breast-feeding women, both below the recommended levels of sufficiency of 150 and 100 μg/l, respectively[18]. Pregnant women using I supplements had a higher median UIC than non-supplement users (126 *v.* 66 μg/l, respectively). A UK study of 100 pregnant women found a similar median UIC of 85·3 μg/l, being higher in I supplement users than in non-supplement users (111 *v.* 61 μg/l, respectively)[20].

A UK study of educated women of childbearing age (*n* 57) found a median UIC of 63·1 μg/l[21], remarkably similar to a comparable New Zealand study in 2010 of fifty highly educated women who had a median UIC of 65 μg/l[17]. A more comprehensive study of New Zealand adults in 2012 found a median UIC of 67 μg/l for women aged between 18 and 64 years[16]. The WHO range for I sufficiency in school children is 100–199 μg/l, and this is currently recommended for use in adults. However, this range is based on children with a mean urinary volume of 1·0 litre; thus, this range is not appropriate for adults with a higher urinary volume excretion (i.e. 1·5–2 litres). Zimmerman & Andersson[22] propose an adequate range in adults (non-pregnant and non-lactating) to be >60–70 μg/l. This would suggest that both the UK and New Zealand populations of adult women are within the adequate range, although at the lower end.

It appears that the UK being defined as having mild I deficiency relies on findings from the large study of 14–15-year-old girls (*n* 737 urine samples) with a median UIC of 80·1 μg/l. This seems to be the only difference between New Zealand and the UK. Therefore, here lies the problem – do we categorise these teenagers as children or adults? It is unlikely that urine excretion increases sharply from 1·0 to 1·5–2·0 litre at 18 years of age, but rather there is a gradual increase in urine volume with age. Thus at 14–15 years of age, daily urine excretion is likely to exceed the 1·0 litre assumed for younger children. However, it seems unlikely that the WHO cut-off of 100 μg/l would apply to adolescents aged 14–15 years.

We suggest that, for consistency, the IGN should define I status using children of the same age groups across countries, and that the 2016 IGN scorecard should define the UK as having sufficient I status among children based on the UIC of 161 μg/l found in 8–10-year-old children[19]. However, adequate status among children does not mean that the whole population has a sufficient intake, as seen in both the UK and New Zealand, where intakes for adults and children are adequate but pregnant and lactating women have insufficient intakes. The first 1000 d of a child's life (from conception to the age of 2 years) are critical to a child's future health and life outcomes; thus, it is

Table 1. Comparison of urinary iodine concentration (UIC) data from New Zealand after mandatory fortification of bread with iodised salt with UK data from similar populations
(Numbers and median values)

	UK data			New Zealand data		
	n	Median UIC (μg/l)	References	*n*	Median UIC (μg/l)	References
Children of 8–10 years of age	134 31	161-winter 127-summer	Bath *et al.*[19]	147	113	Skeaff *et al.*[3]
Adolescent girls of 14–15 years of age	737	80·1	Vanderpump *et al.*[4]			
Pregnant women	100	85·3-whole group 111-supplement users 61-non-supplement users	Bath *et al.*[20]	34	85-whole group 126-supplement users 66-non-supplement users	Brough *et al.*[15]
Women of childbearing age	57	63·1	Bath *et al.*[21]	50	65	Shukri *et al.*[17]
Women of 18–64 years of age				155	67	Edmonds *et al.*[16]

important that we consider this vulnerable group when defining a country's I status. We therefore suggest that the IGN scorecard considers the I status of both children and pregnant women for each country, rather than considering solely children. This would overcome the inconsistencies seen in the current scorecard, and thus both the UK and New Zealand I intakes would be defined as sufficient for children, but inadequate for pregnant women.

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