Has the UK really become iodine sufficient?

In December, 2016, the Iodine Global Network published its new map of global iodine nutrition. Notably, the status of the UK, which was classified as mildly iodine deficient in 2014–15, had become adequate by 2016. The reason for this apparently rapid improvement lies in the different data sources used; data that showed mild deficiency in 2014–15 came from spot-urine samples from 737 girls aged 14–15 years from nine UK centers, with a median urinary iodine concentration (mUIC) of 80.1 μg/L, whereas the 2016 data were based on spot-urine samples from 458 boys and girls aged 4–18 years, which were collected in year 6 of the UK National Diet and Nutrition Survey (NDNS). The result from the group aged 4–18 years (mUIC 138 μg/L) is within the adequate range, as defined by WHO. However, these new mUIC data should not lead to complacency; indeed, the new figures might mask the presence of deficiency in some population subgroups.

Considerable disparity exists between the conclusions based on the mUIC measurements in spot-urine samples from year 6 and those based on iodine-intake data (from 4-day food diaries) in years 5 and 6 of the NDNS. Although the limitations of food-diary analysis for iodine-intake estimation are recognized, they are less of a concern in the UK than in countries that have iodized salt (salt intake is hard to quantify in dietary surveys). We would therefore expect mUIC and dietary-intake data to tell broadly the same story. Yet, the mUIC of children aged 4–18 years is 138 μg/L, which implies adequacy, whereas 6–21% of children have an iodine intake below the lower reference nutrient intake (LRNI), which implies deficiency, especially in older children. The LRNI is based on the intake required to avoid goiter, and is between 50 and 70 μg per day in children aged 4–18 years.

Where possible, IGN maps of global iodine nutrition are based on mUIC data from boys and girls aged 6–12 years, since WHO thresholds are intended for use in school-aged children. In 2014–15, in the absence of such data for the UK, the classification was based on a UK study of girls aged 14–15 years. However, girls tend to have a lower iodine intake (and thus status) than boys, and older children (adolescents) have a lower iodine intake than younger children. This difference in intake might partly explain why the 2014–15 IGN map showed mild iodine deficiency in the UK, whereas the 2016 IGN map, based on boys and girls from the age of 4 years, showed adequacy. The difference in iodine intake by age and sex can probably be explained by the considerably lower intake of milk, the principal source of iodine in the UK, in teenage girls than in younger children (e.g., 110 g per day in girls aged 11–18 years vs 196 g per day in boys and girls aged 4–10 years).

To some extent, this disparity highlights the fact that children aged 6–12 years might not be the most appropriate group to represent population status. This fact is especially true in countries such as the UK where intake of the main source of iodine (milk) varies with age. Furthermore, pregnant women are often susceptible to iodine deficiency, even in countries in which the general population is iodine sufficient. IGN has recognized this issue by producing, for the first time in 2016, a separate map of iodine status in pregnant women, again based on mUIC. Unfortunately, pregnant women are not sampled in the NDNS, but on the strength of accumulated evidence from the past 10 years, the map shows that pregnant women in the UK are iodine deficient. This deficiency in pregnancy is consistent with the NDNS data that show that 11% of women aged 19–64 years have an intake of iodine that is below the LRNI.

Although measurement of mUIC is the method recommended by WHO to describe the iodine status of a population, it is acknowledged to have substantial limitations because the median value does not give any indication of the proportion of the population that is iodine deficient. Collection of a second urine sample in a subset, enables adjustment for intra-individual variation and the estimation of the proportion of the population with usual intake below the estimated average requirement—the so-called estimated average requirement cut-point method. This method enables assessment of the prevalence of iodine deficiency in a population and, together with the mUIC, gives a more complete picture of nutritional status. Therefore, we would urge the NDNS investigators to collect a repeat urine sample, at least in a subset, in future surveys.

Pregnant women in the UK may be iodine deficient