

# Nutritional considerations for dietitians

## Iodine

A more sustainable diet does not necessarily have to exclude red meat or dairy altogether – therefore meat and dairy nutrient intakes need not be compromised.

This information sheet provides some additional information on nutritional considerations which dietitians may take into account. References and information sources are available as a separate download from [www.bda.uk.com/onebluedot](http://www.bda.uk.com/onebluedot).

Iodine is a major component of thyroid hormones and is especially important during pregnancy as deficiency during foetal life can result in irreversible brain damage,<sup>1,2</sup> therefore, the iodine status of pregnant mothers, especially within the first trimester is critical.<sup>2</sup> Additionally, iodine deficient populations exhibit lower intelligence quotient (IQ) scores when compared to replete populations,<sup>3</sup> whilst excessive iodine intakes will lead to thyroid dysfunction.

### Measuring iodine status

Due to the significant iodine variability in food, urinary iodine concentrations (UIC) of 24-hour urine collections are most accurate, however, at population level this is highly impractical and median spot-check UIC are standardly used.<sup>2-4</sup> The WHO has set clear cut off points for deficiency for different age groups and specific levels for pregnant women (see table below).<sup>5</sup> A median UIC between 150-249mcg/L is considered adequate status for pregnant women. Additionally, iodine-to-creatinine ratio of spot-check UIC can be performed to reduce the intra-individual daily variability with mean levels at or above 150mcg iodine per 1g creatinine during pregnancy considered adequate.<sup>6</sup>

### WHO median UIC levels and associated iodine status / iodine intakes<sup>5</sup>

#### 6 years and older

Median UIC (mcg/L)	Iodine intake	Iodine status
<20	Insufficient	Severe deficiency
20-49	Insufficient	Moderate deficiency
50-99	Insufficient	Mild deficiency
100-199	Adequate	Adequate status
200-299	Above requirements	May pose slight risk.
≥300	Excessive	Risk of iodine-induced hyperthyroidism & autoimmune thyroid disease



**Pregnant & breastfeeding mothers and children below 2 years**

Median UIC (mcg/L)	Iodine Intake
<b>Pregnant women</b>	
<150	Insufficient
150-249	Adequate
250-499	Above requirements
≥300	Excessive
<b>Lactating women &amp; children &lt;2 years</b>	
<100	Insufficient
≥100	Adequate

**Mean urinary iodine to creatinine ratio for pregnant women<sup>6</sup>**

mcg iodine / g creatinine	Iodine status
≤50	Severe deficiency
50-150	Mild-moderate deficiency
≥150	Adequate

It is important to note that neither UIC or I-C ratio can be used to confirm individual iodine deficiency and only a 24-hour urinary assessment or at least 10 urinary spot-checks over a day need to be undertaken.<sup>4</sup>

**Status**

The WHO classifies general populations with median UIC levels of 100-199µg/L and fewer than 20% below 50µg/L as replete. For pregnant women, a median UIC levels between 150-249µg/L is classified as adequate status.

The most recent NDNS found good iodine status (i.e. median UIC levels between 100-199µg/L and fewer than 20% of the population with values <50µg/L) across all age groups and sexes, including women of child-bearing age.<sup>7</sup> Median UIC for women of childbearing age (16 to 49 years) was 102µg/L with 17% of the population below 50µg/L. While these values met the WHO criterion for adequate intake for the general population, they do not meet the criterion for iodine sufficiency in pregnant women. Unfortunately, a population sub-group the NDNS does not include is pregnant women. A handful of observational studies across the UK have investigated UIC in pregnant women and have found median UIC levels to be indicative of mild-moderate iodine deficiency – be it some studies’ methodologies were questionable.<sup>4</sup> As iodine is critical to foetal brain and neurodevelopment, it is important for this population sub-group to be better assessed for status.



The most recent study by Bath and colleagues using old ALSPAC data (from the 1990's) found that children with lower IQ scores for verbal skills and lower reading ability were more likely to be the offsprings of mothers whose UIC was insufficient (<150mg/L).<sup>6</sup> However, there was no correlation with the mother's UIC and children's overall IQ scores and despite considering numerous confounding factors, the children's UIC was not measured nor was the level of 'educational encouragement' at home. Other studies investigating children's IQ status with the mother's UIC during pregnancy have yielded mixed results for mild-moderate iodine deficiency.<sup>4</sup> Additionally, the value of IQ tests in children has been questioned. It is clear that more robust studies will need to be undertaken to identify causality and iodine status of pregnant women and very young children needs to be optimised and better assessed in the UK.

The WHO has established the iodised-salt programme across many countries to help eradicate iodine deficiency and results thus far demonstrate this to be a successful intervention.<sup>3,8,9</sup> The UK did not subscribe to this practice, however, the use of iodised salt especially by food manufacturers (key source of sodium intakes in the UK diet) may help reduce incidence of iodine deficiency whilst still achieving lower overall salt intake targets of 6g per day for adults.<sup>8</sup> Recommended daily intakes of iodine in the UK increase progressively from 50mg/day in infants to 140mg from 15 years through to adulthood with no increase for pregnant or lactating women. This is contrary to WHO recommendations which are higher across all age groups and significantly heightened intakes are recommended during pregnancy and lactation.

	Recommend daily intakes mcg Iodine	
	UK <sup>10</sup>	WHO <sup>3</sup>
<b>0-3 months</b>	50	90
<b>4-12 months</b>	60	90
<b>1-3 years</b>	70	90
<b>4-6 years</b>	100	90 up to age 5 years 120 from 6 years
<b>7-10 years</b>	110	120
<b>11-14 years</b>	130	120 up to 12 years 150 from 12 years
<b>15 years +</b>	140	150
<b>Pregnancy</b>	-	250
<b>Lactation</b>	-	250

In the UK intakes are exceptionally low (below the LRNI) in 27% of teenage girls and 15% of women aged 19-64 years old.

**Sources**



The key iodine source in the UK diet is milk due to the change in farming practice where iodine-containing sterilisers and iodine-enriched feeds for cattle is now used.<sup>1,11,12</sup> Fish and seaweed is a rich source of iodine and to a much lesser degree eggs, yogurt, cheese, meat and cereal products.<sup>13</sup> Only a couple of plant-based drinks are fortified with iodine, with the leading manufacturer adding iodine to its top selling soya drink<sup>14</sup> and its specialised soya drink for 1-3 years old.<sup>15</sup>

**The One Blue Dot 'Practical guide for dietitians: other source of iodine' sheet gives information on DRV for iodine and key sources [bda.uk.com/onebluedot](http://bda.uk.com/onebluedot)**

## References

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