Iodine Needs in the Pregnant and Postpartum Woman

American Thyroid Association
Task Force on Thyroid and Pregnancy
Increased thyroid hormone production (↑ 50%),:
- Thyrotropic regulation by hCG
- Estrogen-mediated TBG increase

Increased Maternal Dietary Iodine Requirements in Pregnancy

Iodide transferred to the fetus

Increased renal iodine clearance (↑ 30-50%)
Increased Dietary Iodine Requirements in Lactation

- Normal lactating breast ducts concentrate iodide (via sodium iodide symporter), secreting it into milk

  Tazebay et al Nat Med 2000; 6:859-60

- Only source of iodine nutrition for breastfed infants
Effects of Iodine Deficiency

**Maternal Risks**
- Goiter
- Hypothyroidism

**Risks to Fetus/Child**
- Miscarriage
- Stillbirth
- Congenital anomalies
- Perinatal and infant mortality
- Cretinism
- Reduced IQ
Iodine Deficiency and Reduced IQ

• Worldwide, the leading cause of preventable mental handicap; 30 million children born unprotected annually

www.WHO.int/WHOSIS

• Average 12 point IQ reduction in infants of severely iodine deficient women


• Societal costs: A loss of 1 IQ point reduces the potential income earning capacity of the child by 2.39%

# Recommended U.S. Iodine Intake

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Recommended I₂ intake (μg/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults</td>
<td>150</td>
</tr>
<tr>
<td>Pregnant women</td>
<td>220</td>
</tr>
<tr>
<td>Lactating women</td>
<td>290</td>
</tr>
<tr>
<td>Adolescents</td>
<td>150</td>
</tr>
<tr>
<td>Children 1-8y, 9-13y, &gt;14y</td>
<td>90, 130, 150</td>
</tr>
<tr>
<td>0-6months &amp; 7-12m</td>
<td>110 &amp; 130</td>
</tr>
</tbody>
</table>

Institute of Medicine 2001
Tolerable Upper Limit for Daily Iodine Intake

Adults (including pregnancy) – 1100 ug/day

“the highest average daily nutrient intake level that is likely to pose no risk of adverse health effect to almost all individuals in the general population.”

Institute of Medicine 2001
## Population Urinary Iodine Values and Iodine Nutrition

<table>
<thead>
<tr>
<th>Population group</th>
<th>Median Urinary Iodine Concentration (μg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Optimal</td>
</tr>
<tr>
<td>Non-pregnant adults</td>
<td>100-199</td>
</tr>
<tr>
<td>Pregnant Women</td>
<td>150-249</td>
</tr>
<tr>
<td>Lactating Women</td>
<td>≥100</td>
</tr>
</tbody>
</table>
Median U.S. Urinary Iodine Concentrations: NHANES 1971-2004

Median Urine Iodine Concentration (μg/L)

- Total
- Males
- Females

% of U.S. Population with Urinary Iodine <50μg/L: NHANES I and NHANES III

Hollowell, JCEM 1998; 83:3401-8
U.S. Women of Childbearing Age with Low Urinary Iodine: NHANES

Percent with UI <50 μg/L

- 1971-74
- 1988-94
- 2001-02
- 2003-04

Pregnant
Not Pregnant

Median Urinary Iodine (mg/L)

Urinary Iodine by Quintiles

Urine Iodine in 100 Boston-Area Pregnant Women

Pearce et al. *Thyroid* 2004; 14:327-8

150 μg/L ~220 μg/day dietary intake (RDA for pregnancy)
“Although iodide deficiency is believed to be rare in the United States, some pregnant women may have a low iodide intake. The committee believes that further research is needed to measure more precisely the extent of, and risk factors for, iodide deficiency, particularly in pregnant women and their offspring. However, while studies are being conducted, the committee emphasizes the importance of ensuring that all pregnant women have adequate iodide intake and, as a first step, recommends that consideration be given to adding iodide to all prenatal vitamins.”
“Until additional physiologic data are available to make a better judgment, the American Thyroid Association recommends that women receive 150 mcg iodine supplements daily during pregnancy and lactation and that all prenatal multivitamin/mineral preparations contain 150 mcg of iodine.”
Proportion of U.S. Prenatal Multivitamins Containing Iodine

Sources of Iodine in U.S. Prenatal Multivitamins

Iodine from Kelp
• Measured iodine content in 25 brands: 33 – 610 μg/daily dose.
• 14 had iodine levels ≥50% discordant with labeled values

Potassium Iodide
• Mean measured iodine content per daily dose in 35 brands was 119.0 ± 13.6 (SE) μg, equivalent to 76% of the labeled KI.