Iodine Needs in the Pregnant and Postpartum Woman

American Thyroid Association
Task Force on Thyroid
and Pregnancy

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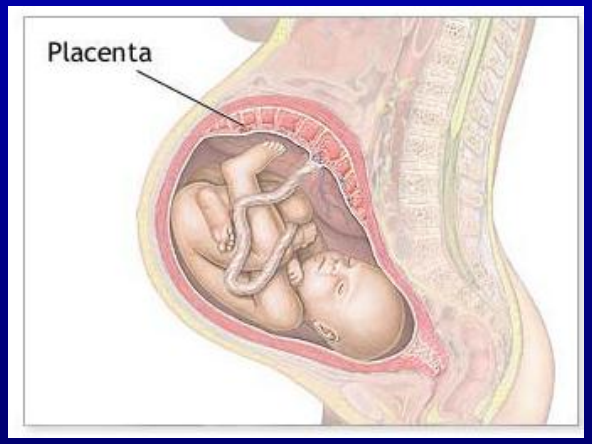
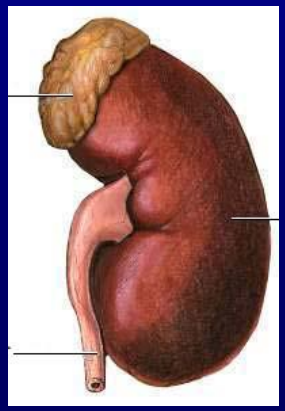
Increased thyroid hormone production (↑ 50%),:
- Thyrotropic regulation by hCG
- Estrogen-mediated TBG increase

Increased Maternal Dietary Iodine Requirements in Pregnancy



Iodide transferred to the fetus

Increased renal iodine clearance (↑ 30-50%)



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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

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Effects of Iodine Deficiency

- **Maternal Risks**
  - **Goiter**
  - **Hypothyroidism**
- **Risks to Fetus/Child**
  - **Miscarriage**
  - **Stillbirth**
  - **Congenital anomalies**
  - **Perinatal and infant mortality**
  - **Cretinism**
  - **Reduced IQ**

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ICCIDD/UNICEF/WHO

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**

M Qian et al. *Asia Pac J Clin Nutr* 2005;14:32-42.

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

Lisa et al. *Public Health Rep* 2005; 120: 607–613.

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Recommended U.S. Iodine Intake

Age Group	Recommended I_2 intake (µg/day)
Adults	150
Pregnant women Lactating women	220 290
Adolescents	150
Children 1-8y, 9-13y, >14y	90, 130, 150
0-6months & 7-12m	110 & 130

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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."

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Population Urinary Iodine Values and Iodine Nutrition

Population group	Median Urinary Iodine Concentration (µg/L)	
	Optimal	Excessive
Non-pregnant adults	100-199	>299
Pregnant Women	150-249	≥500
Lactating Women	≥100	

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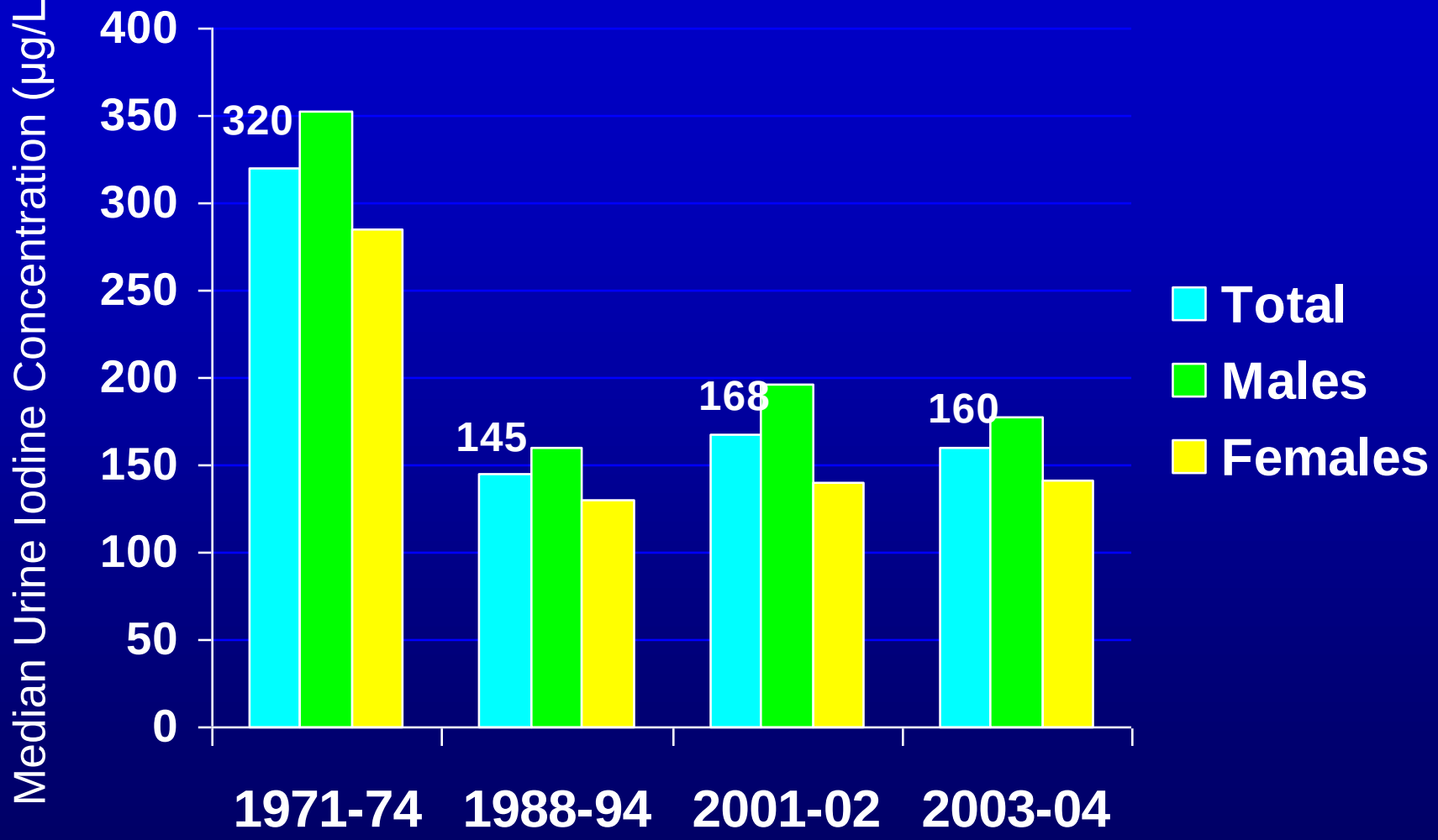
WHO *Public Health Nutr* 2007

Median U.S. Urinary Iodine Concentrations: NHANES 1971-2004



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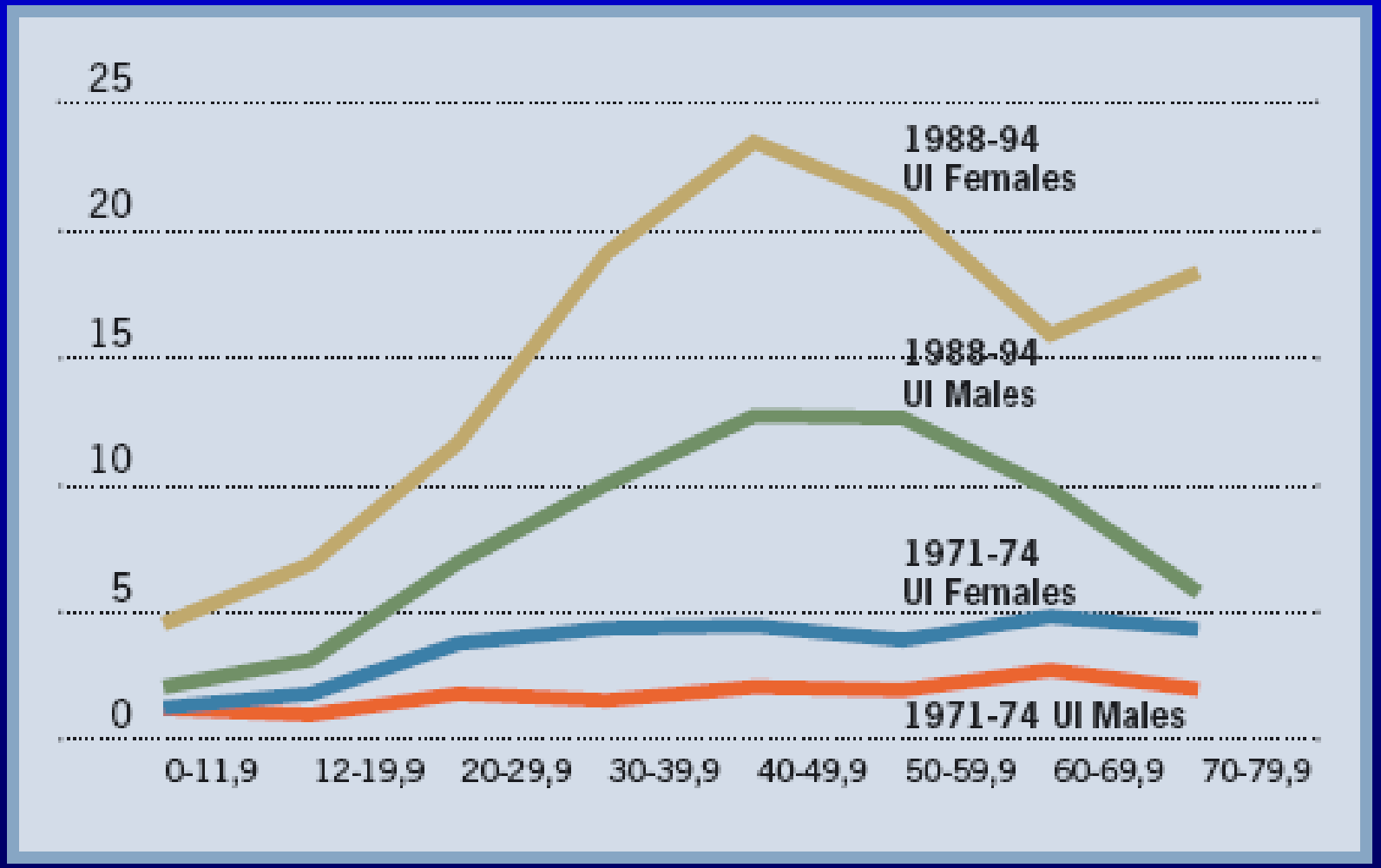
Hollowell et al. *JCEM* 1998; 83:3401-8; Caldwell et al. *Thyroid* 2005; 15: 692-9 & 2008;18:1207-14.

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



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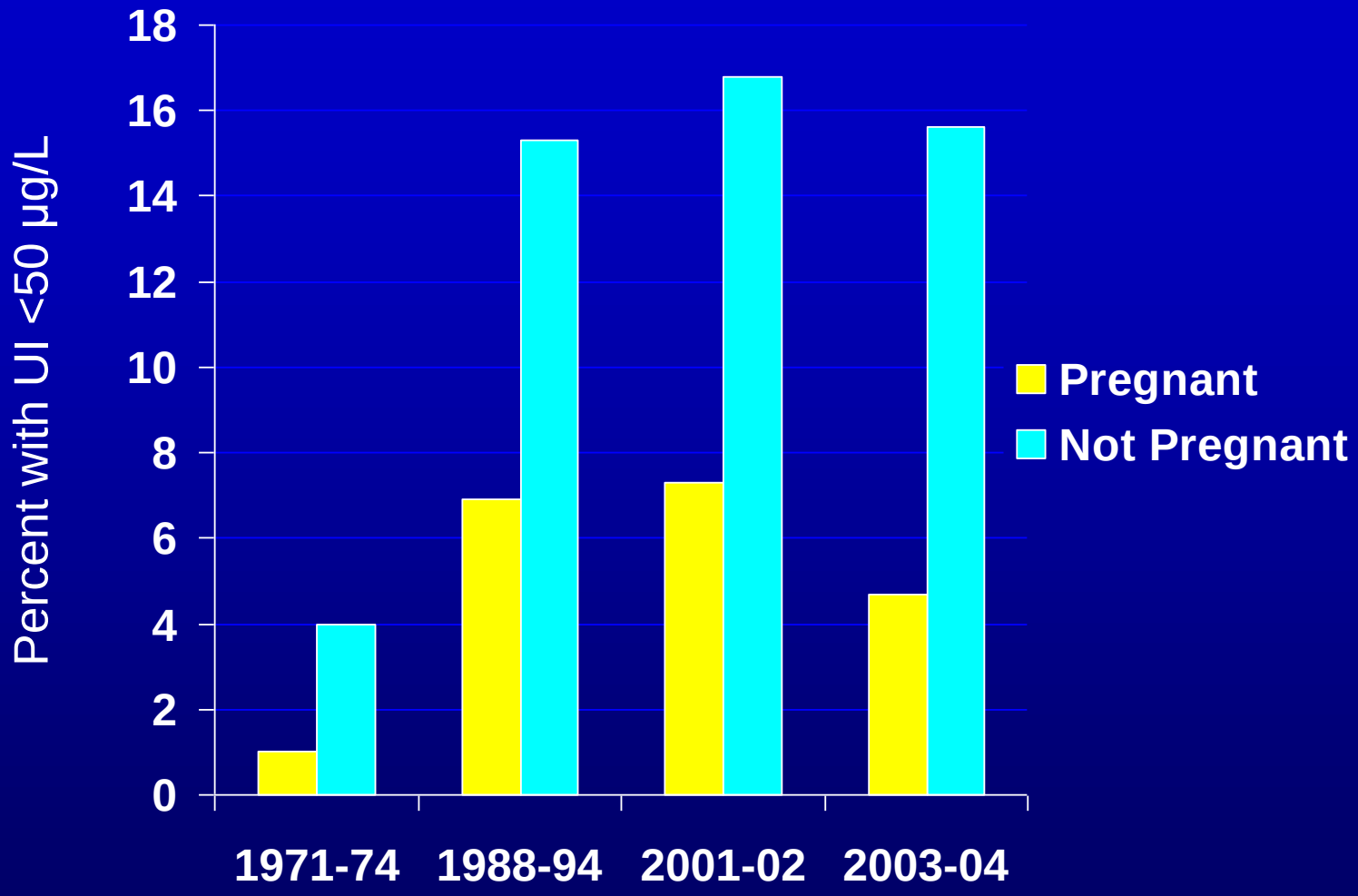
Hollowell, *JCEM* 1998; 83:3401-8

U.S. Women of Childbearing Age with Low Urinary Iodine: NHANES



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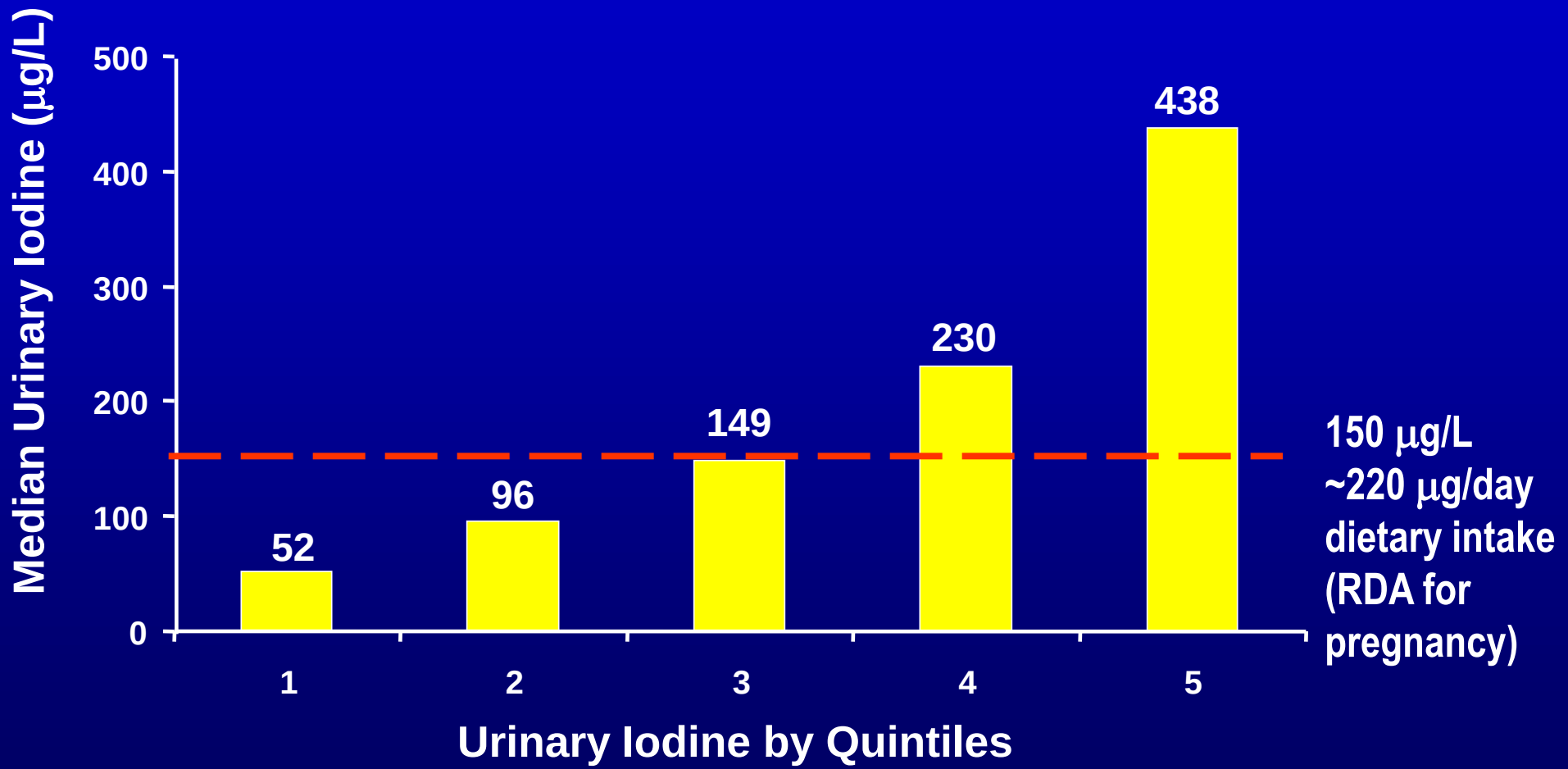
Hollowell et al. *JCEM* 1998; 83:3401-8; Caldwell et al. *Thyroid* 2005; 15: 692-9 & 2008;18:1207-14.

Urine Iodine in 100 Boston-Area Pregnant Women



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

National Academy of Science

"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."

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National Research Council, *Health Implications of Perchlorate Ingestion*, 2005

American Thyroid Association Recommendations 2006

- **"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."**

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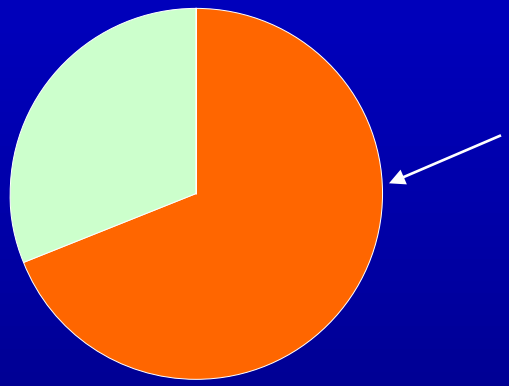
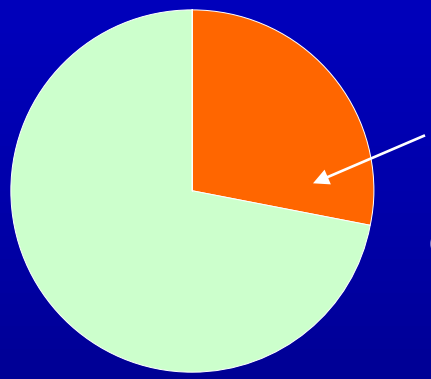
Thyroid 2006;16:949-51

Proportion of U.S. Prenatal Multivitamins Containing Iodine



69%
(n=87) contain iodine

Non-prescription prenatal multivitamins (n = 127)



28%
(n=27) contain iodine

Prescription prenatal multivitamins (n = 96)

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Leung et al. *N Engl J Med* 2009;360:939-40

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.

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Leung et al. *N Engl J Med* 2009;360:939-40