Thyroid and Pregnancy: To Screen or Not to Screen?

Bijay Vaidya
Department of Endocrinology,
Royal Devon & Exeter Hospital,
Exeter, UK
The Talk Today…

• Effects of pregnancy on the thyroid & factors affecting thyroid function in pregnancy

• Consequences of maternal hypothyroidism in pregnancy

• Criteria for and against screening thyroid function during pregnancy
Effects of Pregnancy on the Thyroid

- Thyroxine-binding Globulin (TBG)
- Human chorionic gonadotrophin (HCG)
- Immune system
- Iodine metabolism
- Placental deiodinases
Iodine Metabolism in Pregnancy

- Increase in GFR during pregnancy
- Increased urinary excretion of iodine
- Decreased plasma iodine concentration
- Relative or absolute iodine deficiency
- Iodine-deficient areas: goitre, raised TSH & thyroglobulin during pregnancy
Iodine & Thyroid Volume in Pregnancy

Glinoer et al., JCE&M 1995

Increase in thyroid vol (%)

Placebo
N=60
30%

KI
N=60
15%

KI+LT4
N=60
8%

P<0.05

P<0.001

Glinoer et al., JCE&M 1995
Thyroid Function during Pregnancy: The Effect of HCG

Burrow et al., NEJM 1994
Trimester-specific TSH Reference Range for Pregnant Women

Median and 95% TSH confidence limits (Hong Kong)


Weeks Gestation

1st. Trimester 2nd. Trimester 3rd. Trimester

TSH mIU/L

0.4 0.8 2.3 3.5

0.03 1.1 0.03 0.13

10 20 30 40
Smoking: Effect on Thyroid Function in Pregnancy

Shields et al., JCE&M 2009
PDE8B gene & Thyroid Function in Pregnancy

Shields et al., JCE&M 2009

TSH >4.21μIU/L

Shields et al., JCE&M 2009
Thyroid Hormones are Important for Neurological Development of the Fetus
Severe Iodine Deficiency & Cretinism

Observations on Endemic Cretinism in the Chitral and Gilgit Valleys
R. McCarrison, M.B., B.Ch. R.U.I.
Lancet, ii, 1275-80, 1908
Maternal Thyroid Hormone Levels & Fetal Neurological Development

• Low IQ in children of mothers with inadequately treated hypothyroidism (*Man ’69*)

• In rats, thyroxine cross placenta (*Morreale de Escobar ’87*)

• The presence of thyroid hormones in fetal tissues at early gestation (*Contempre ’93, Calvo ’00*)

• New-borns with congenital hypothyroidism look normal & have detectable thyroid hormone
Serum Thyroxine Levels After Birth In Neonates with Congenital Hypothyroidism

Total Organification Defect

Thyroid Agenesis

Vulsma et al., NEJM 1989
Correlation between Maternal FT4 at Third Trimester & Fetal Cord FT4 at Birth

Every 10% rise in maternal FT4=0.18pmol/l rise in cord FT4

Shields et al., JCE&M, 2011
MATERNAL THYROID DEFICIENCY DURING PREGNANCY AND SUBSEQUENT NEUROPSYCHOLOGICAL DEVELOPMENT OF THE CHILD

JAMES E. HADDOW, M.D., GLENN E. PALOMAKI, B.S., WALTER C. ALLAN, M.D., JOSEPHINE R. WILLIAMS, GEORGE J. KNIGHT, PH.D., JUNE GAGNON, M.A., CHERYL E. O’HEIR, M.ED., ED.S., MARVIN L. MITCHELL, M.D., ROSALIE J. HERMOS, M.P.H., SUSAN E. WAISBREN, PH.D., JAMES D. FAIX, M.D., AND ROBERT Z. KLEIN, M.D.
The Haddow Study

- TSH measured in >25,000 pregnant women
- 62 hypothyroidism (48 not on T4); 124 controls
- Children’s IQ tested aged 7-9 years
- Mean TSH 13.2 (Hypo) vs. 1.4 (Controls) mu/L
Low Maternal FT4 & Psychomotor Development of Infants

Pop et al., Clin Endocrinol 1999

$R = 0.46, p = 0.03$
Screening

Is a strategy used in a population to detect a disease in individuals without signs or symptoms of the disease.
PRINCIPLES AND PRACTICE
OF SCREENING FOR
DISEASE

J. M. G. WILSON
Principal Medical Officer, Ministry of Health,
London, England

G. JUNGNER
Chief, Clinical Chemistry Department, Sahlgren’s Hospital,
Gothenburg, Sweden

WORLD HEALTH ORGANIZATION
GENEVA
1968
UK National Screening Committee
Criteria for Screening

• The Condition
  – Important health problem
  – Epidemiology & natural history understood
  – Cost-effective primary prevention implemented

• The Test
  – Simple, safe, precise, validated & acceptable
  – Suitable cut-off level defined and agreed
  – Agreed policy for individuals with positive test
UK National Screening Committee
Criteria for Screening

• The Treatment
  – Effective
  – Agreed evidence-based policies who to treat

• The Screening Programme
  – Randomised controlled trial evidence of efficacy
  – Clinically, socially and ethically acceptable
  – Benefit outweigh physical & psychological harm
  – Cost-effective
Mild Hypothyroidism in Pregnancy: How Big is the Problem?
## Hypothyroidism in Pregnancy

<table>
<thead>
<tr>
<th>Country (period of study)</th>
<th>Observed cases with hypothyroidism</th>
<th>Severity of hypothyroidism</th>
<th>TSH (mIU/liter)</th>
<th>Time of screening and/or diagnosis</th>
<th>First author (Ref.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA (1975–1979)</td>
<td>11 cases/51,245 deliveries (IR, NA)</td>
<td>Extremely severe OH</td>
<td>40–293</td>
<td>OH known before pregnancy; most women with LT₄ (Re)</td>
<td>Montoro (243)</td>
</tr>
<tr>
<td>USA (1981–1990)</td>
<td>68 cases (IR, NA)</td>
<td>1/3 of cases, OH; 2/3, SCH</td>
<td>TSH &gt;5</td>
<td>First prenatal visit (Pro)</td>
<td>Leung (244)</td>
</tr>
<tr>
<td>Japan (1986–1990)</td>
<td>28 cases/9,453 deliveries</td>
<td>1/3 of cases, OH; 2/3, transient SCH</td>
<td>Not reported</td>
<td>First prenatal visit (Re)</td>
<td>Kamijo (253)</td>
</tr>
<tr>
<td>USA (after 1978)</td>
<td>49 cases/2,000 ♀ (IR, 2.5%)</td>
<td>SCH, 2.2% (43/49); OH, 0.3% (6/49)</td>
<td>TSH &gt;6</td>
<td>15–18 wk (Re)</td>
<td>Klein (245)</td>
</tr>
<tr>
<td>Belgium (1990–1992)</td>
<td>41 cases/1,900 ♀ (IR, 2.2%)</td>
<td>Mostly SCH + a few ♀ with OH</td>
<td>TSH &gt;4</td>
<td>First prenatal visit (Pro)</td>
<td>Glineer (246)</td>
</tr>
<tr>
<td>USA (1990–1992)</td>
<td>209 cases/9,403 ♀ (IR, 2.2%)</td>
<td>Mostly SCH + ♀ with moderate-severe OH</td>
<td>TSH &gt;6</td>
<td>15–18 wk (Re)</td>
<td>Allan (247)</td>
</tr>
<tr>
<td>USA (2000–2003)</td>
<td>436 cases/16,125 ♀ (IR, 2.7%)</td>
<td>SCH, 2.5% (404/436); OH, 0.2% (32/436)</td>
<td>TSH &gt;97.5th percentile</td>
<td>Before 20 wk (Pro)</td>
<td>Casey (250)</td>
</tr>
<tr>
<td>UK (2002–2003)</td>
<td>40 cases/1,560 ♀ (IR, 2.6%)</td>
<td>SCH, 1.6% (24/40); OH, 1.0% (16/40)</td>
<td>TSH &gt;4.2</td>
<td>First prenatal visit (Pro) (median, 9 wk)</td>
<td>Vaidya (251)</td>
</tr>
<tr>
<td>USA (1999–2002)</td>
<td>273 cases/10,990 ♀ (IR, 2.5%)</td>
<td>SCH, 2.2% (240/273); OH, 0.3% (33/273)</td>
<td>TSH &gt;4.29; TSH &gt;3.94</td>
<td>First and second trimesters (Pro)</td>
<td>Cleary-Goldman (252)</td>
</tr>
<tr>
<td>Finland (1985–1986)</td>
<td>278 cases/5,805 ♀ (IR, 4.8%)</td>
<td>SCH, 3.9% (224/278); OH, 0.9% (54/278)</td>
<td>TSH &gt;3.6</td>
<td>First trimester (Pro)</td>
<td>Mannisto (207)</td>
</tr>
<tr>
<td>India (not reported)</td>
<td>70 cases/633 deliveries (IR, 11.1%)</td>
<td>1/3 of cases, OH; 2/3, SCH</td>
<td>Not reported</td>
<td>Second trimester (Pro)</td>
<td>Sahu (255)</td>
</tr>
<tr>
<td>Netherlands (2003–2004)</td>
<td>11 cases/2,497 ♀ (IR, 0.44%)</td>
<td>Mostly SCH</td>
<td>TSH &gt;5.6</td>
<td>First trimester (Pro)</td>
<td>Benhadi (208)</td>
</tr>
</tbody>
</table>

Krassas, Poppe & Glineer, Endo Reviews, 2010
Prevalence of Mild Thyroid Hormone Deficiency in Pregnancy

- Prevalence of subclinical hypothyroidism: 2-4%
- Prevalence of isolated hypothyroxinaemia: 1-2%
- Prevalence of thyroid antibodies: ~10%
Mild Maternal Hypothyroidism & Offspring Neuropsychological Outcome

• **Subclinical hypothyroidism:**
  – Low IQ (*Haddow ’99, Klein ‘01*)
  – Neurodevelopmental delay (*Li ’10, Su ‘11*)
  – Behavioural problem (*Ghassabian ‘11*)

• **Isolated Hypothyroxinaemia:**
  – Impaired psychomotor development (*Pop ’99, Barbel ’09, Li ’10*)
  – Poor language development (*Henrichs ‘10*)
  – No association (*Oken ’09, Chevrier ‘11*)
Mild Maternal Hypothyroidism & Obstetric Adverse Effects

- Fetal loss (Negro ‘06, Allan ‘07, Mannisto ‘09, Benhadi ’09)
- Premature birth (Abalovich ’02, Stagnaro-Green ‘05, Casey ’05)
- Placental abruption (Davis ‘88, Casey ’05)
- Pre-eclampsia (Leung ’93, Davis ‘88)
- Admission to intensive care (Casey ’05)
- Impaired fetal growth (Blazer ’03)
- No adverse effects (Cleary-Goldman ’08)
<table>
<thead>
<tr>
<th>Author (year) reference</th>
<th>Number of women with thyroid dysfunction in the study</th>
<th>Early fetal loss (spontaneous abortion)</th>
<th>Anemia</th>
<th>Gestation-induced hypertensive and pre-eclampsia</th>
<th>Placental abruption</th>
<th>Congenital anomalies</th>
<th>Preterm Delivery and/or Low Birth Weight</th>
<th>Fetal distress in labour</th>
<th>Stillbirths/Perinatal Death</th>
<th>Postpartum Hemorrhage</th>
<th>Increased frequency of Caesarian section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jones &amp; Man (1969) (242)</td>
<td>33 (OH)</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Niswander (1972) (288)</td>
<td>244 (OH)</td>
<td></td>
<td></td>
<td>•</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Montoro (1981) (243)</td>
<td>11 (OH)</td>
<td></td>
<td></td>
<td>•</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Davis (1988) (283)</td>
<td>28 (OH: 16; SCH: 12)</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Leung (1993) (244)</td>
<td>68 (OH: 23; SCH: 45)</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Wasserstrum (1995) (284)</td>
<td>42 (OH: 9; SCH: 33)</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Allan (2000) (247)</td>
<td>209 (OH: 37; SCH: 172)</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Abalovich (2002) (282)</td>
<td>51 (OH: 16; SCH: 35)</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Blazer (2003) (289)</td>
<td>259 (treated HO)</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Pop (2004) (287)</td>
<td>135 (hypo-T4)</td>
<td></td>
<td></td>
<td>•</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Casey (2005) (250)</td>
<td>404 (SCH)</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Idris (2005) (290)</td>
<td>40 (OH)</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Tan (2006) (285)</td>
<td>419 (treated HO)</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Matalon (2006) (291)</td>
<td>1,102 (treated HO)</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Casey (2007) (261)</td>
<td>831 (SCH: 598; Hypo-T4: 233)</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Cleary-Goldman (2008) (252)</td>
<td>490 (SCH: 247; Hypo-T4: 243)</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Mannisto (2009) (207)</td>
<td>278 (OH: 54; SCH: 224)</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Benhadi (2009) (208)</td>
<td>11 (SCH)</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

**Krassas, Poppe & Glinoer, Endo Reviews, 2010**
Summary: Consequences of Mild Maternal Hypothyroidism

- Impaired neuropsychological development of the offspring
- Association with several adverse obstetric outcomes
Is There An Appropriate Screening Tool?

- TSH – simple, safe, accurate and relatively cheap
- Trimester-specific reference ranges increasingly available for different populations
Is There Effective Treatment?
Antenatal Thyroid Screening and Childhood Cognitive Function

The Controlled Antenatal Thyroid Screening (CATS) Study

- Prospective RCT of thyroxine in thyroid deficiency in pregnancy
- Randomised 22,000 women at <16 wk gestation into the screening and control groups
- Screening group: Thyroxine if FT4 <2.5\textsuperscript{th} centile & TSH >97.5\textsuperscript{th}
- Neuropsychological assessment of the offspring at age 3 years
The Controlled Antenatal Thyroid Screening (CATS) Study

<table>
<thead>
<tr>
<th>Test</th>
<th>Screening Group (N = 390)</th>
<th>Control Group (N = 404)</th>
<th>Difference (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQ</td>
<td>99.2±13.3</td>
<td>100.0±13.3</td>
<td>0.8 (−1.1 to 2.6)</td>
<td>0.40</td>
</tr>
<tr>
<td>&lt;85 (％ of children)</td>
<td>12.1</td>
<td>14.1</td>
<td>2.1 (−2.6 to 6.7)</td>
<td>0.39</td>
</tr>
<tr>
<td>CBCL T score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>44.4±12.4</td>
<td>45.1±13.6</td>
<td>0.7 (−1.2 to 2.5)</td>
<td>0.49</td>
</tr>
<tr>
<td>Brief-P T score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>40</td>
<td>40</td>
<td>0</td>
<td>0.59</td>
</tr>
<tr>
<td>Interquartile range</td>
<td>47–55</td>
<td>47–55</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Lazarus et al., NEJM 2012
Thyroxine May Reduce Obstetric Complications in Thyroid Autoimmunity

Negro et al., JCE&M 2007
Over 4500 pregnant women randomised to the universal screening & case-finding groups

Case-finding group: Only high-risk screened

Thyroxine if TSH >2.5 mU/l

No difference in obstetric outcomes in 2 groups
Reduced Obstetric Complications with Universal Screening in Low Risk Pregnancy

Negro et al., JCE&M 2010
Summary: Effects of Thyroxine Treatment for Mild Maternal Hypothyroidism

- No evidence to show improvement in offspring’s neuropsychological development
- Some evidence to suggest reduction in adverse obstetric outcomes
Is Screening Pregnant Women for Thyroid Dysfunction Cost-effective?

Screening pregnant women for autoimmune thyroid disease: a cost-effectiveness analysis.

_Dosiou, EJE, 2008_

The cost-effectiveness of universal screening in pregnancy for subclinical hypothyroidism.

_Thung, AJOG, 2009_

Cost-effectiveness of universal and risk-based screening in for autoimmune thyroid disease in pregnant women.

_Dosiou, JCE&M, 2012_
What are the Potential Harm Caused by Screening?

- Increased anxiety over abnormal results
- Misdiagnosis & overdiagnosis
- Cascade of further investigations
- Unnecessary treatment
- Adverse effects from the treatment
No Association between Subclinical Hyperthyroidism & Pregnancy Outcomes

Subclinical Hyperthyroidism and Pregnancy Outcomes

Brian M. Casey, MD, Jodi S. Dashe, MD, C. Edward Wells, MD, Donald D. McIntire, PhD, Kenneth J. Leveno, MD, and F. Gary Cunningham, MD

Obstet Gynecol, 2006
Adverse Effect of Excess Exposure to Thyroxine in Thyroid Hormone Resistance

Anselmo et al., JAMA 2004
Are Cost-effective Primary Preventions Implemented?
UK Survey: Iodine Status of Schoolgirls

Median UIE: 80µg/L

Iodine deficiency
Mild: 51%
Moderate: 16%
Severe: 1%

Vanderpump et al., Lancet 2011
Uncertainties yet to be Resolved

- Should FT4 and TPO-Ab be included in the tests?
- When is the appropriate timing for screening?
- How often TSH be measured?
- What are the further investigations and follow-ups for positive cases?
- At what TSH level should thyroxine be started?
- How should these patients be monitored?
- Should they continue thyroxine after pregnancy?
## Criteria for Thyroid Screening in Pregnancy

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the condition an important public health problem?</td>
<td>Yes</td>
</tr>
<tr>
<td>Epidemiology &amp; natural history understood?</td>
<td>Yes</td>
</tr>
<tr>
<td>All cost-effective primary preventions implemented?</td>
<td>No</td>
</tr>
<tr>
<td>Is there a simple, safe &amp; precise screening test?</td>
<td>Yes</td>
</tr>
<tr>
<td>Suitable cut-off level &amp; policy for positive results?</td>
<td>Partly</td>
</tr>
<tr>
<td>Is there an effective treatment?</td>
<td>Yes</td>
</tr>
<tr>
<td>Agreed policy who should &amp; should not be treated?</td>
<td>No</td>
</tr>
<tr>
<td>Clinical trial evidence to show improved outcome?</td>
<td>No</td>
</tr>
<tr>
<td>Benefits outweigh the harm from screening?</td>
<td>Partly</td>
</tr>
<tr>
<td>Is the screening cost effective?</td>
<td>Yes</td>
</tr>
</tbody>
</table>
### What Do The Guidelines Recommend?

<table>
<thead>
<tr>
<th>Universal screening</th>
<th>Case-finding Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>AACE (‘02)</td>
<td>Expert Panel of ATA, AACE, TES (’04)</td>
</tr>
<tr>
<td>Second Panel of ATA, AACE, TES (’05)</td>
<td>BTA, ACB, BTF (’06)</td>
</tr>
<tr>
<td>ACOG (‘07)</td>
<td></td>
</tr>
<tr>
<td>TES (’07)</td>
<td></td>
</tr>
<tr>
<td>ATA (‘11)</td>
<td></td>
</tr>
</tbody>
</table>
TES Guidelines: The Case-finding Approach

- History of a thyroid disease
- Presence of a goitre
- Symptoms or signs of thyroid dysfunction
- Presence of thyroid antibodies
- T1DM or other autoimmune disease
- Family history of thyroid disease
- History of infertility, miscarriage or preterm delivery
- Previous head & neck irradiation

ATA Guidelines: Age ≥30, BMI ≥40, On drugs affecting the thyroid, Recent exposure to iodine contrast
### Does a Targeted Case-Finding Approach Work?

<table>
<thead>
<tr>
<th></th>
<th>Normal TSH</th>
<th>High TSH (&gt;4.2mU/l)</th>
<th>Low TSH</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Risk (n=413)</td>
<td>348</td>
<td>28 (6.8%)</td>
<td>37 (9.9%)</td>
</tr>
<tr>
<td>Low Risk (n=1147)</td>
<td>1051</td>
<td>12 (1.0%)</td>
<td>84 (7.3%)</td>
</tr>
<tr>
<td>All women (n=1560)</td>
<td>1560</td>
<td>40 (2.6%)</td>
<td>121 (7.8%)</td>
</tr>
</tbody>
</table>

- High vs. low risk, RR=6.5 (95%CI 3.3-12.6, p<0.0001)
- Targeted screening misses 1/3 women with hypothyroidism.

*Vaidya et al., JCE&M 2007*
### Difficulty in Implementing Case-finding Approach in the Clinical Practice

<table>
<thead>
<tr>
<th>Sub-groups of pregnant women</th>
<th>Number in whom thyroid screening indicated (% of total)</th>
<th>Number in whom thyroid screening performed (% of those indicated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>With known thyroid disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypothyroidism*</td>
<td>49 (1.2%)</td>
<td>49 (100%)</td>
</tr>
<tr>
<td>Thyrotoxicosis (past/current)</td>
<td>15 (0.4%)</td>
<td>10 (66.7%)</td>
</tr>
<tr>
<td>Non-toxic goitre</td>
<td>1 (0.02%)</td>
<td>1 (100%)</td>
</tr>
<tr>
<td>Total</td>
<td>65 (1.6%)</td>
<td>60 (92.3%)</td>
</tr>
<tr>
<td>With family history of thyroid disease</td>
<td>486 (11.9%)</td>
<td>38 (7.8%)</td>
</tr>
<tr>
<td>High risk group (those with known thyroid disease and/or family history)</td>
<td>551 (13.5%)</td>
<td>98 (17.8%)</td>
</tr>
</tbody>
</table>

*Vaidya et al., Clin Med 2002*
What is Happening in the Clinical Practice?
Over 0.5 million pregnant women from USA
Study period: June 2005- May 2008
23% tested for thyroid function
Of those tested, 15.5% hypothyroid
ETA Survey: Do you or your institution carry out screening of thyroid function in pregnancy?

- Universal screening: 41%
- Targeted screening: 41.6%
- No systematic screening: 17.4%

Vaidya et al., EJE 2012
Randomised Controlled Trial in Progress

- US study recruiting 120,000 pregnant women from 14 institutions
- Women with SH/isolated hypothyroxinaemia randomised to thyroxine or placebo
- Intellectual outcome at age 5 years
- Estimated completion: May 2014
Conclusions

• Mild maternal hypothyroidism is associated with poor fetal neuropsychological development & adverse obstetric outcomes

• Thyroxine may reduce obstetric complications, but no evidence that it improves fetal outcomes

• Case-finding approach misses one-third cases

• There is currently insufficient evidence to support universal thyroid screening in pregnancy
Acknowledgements

- Beverley Shields
- Beatrice Knight
- Rachel Freathy
- Tim Frayling
- Andrew Hattersley
- Rudy Bilous
- Kris Poppe & the ETA Thyroid & Pregnancy Survey Group
- The Endocrine Trust
- The R&D Directorate, Royal Devon & Exeter Hospital
- NIHR - PenClahrc