Environmental Exposures in Pregnancy
What are the real risks?

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Objective

- To learn evidence based reasonable approaches to prenatal counseling related to:
  - Diet
  - Caffeine, Alcohol, Nicotine
  - Endocrine Disruptors
  - Lifestyle

Superstition and Post-Tonsillectomy Hemorrhage

- Full Moon
- Friday 13th
- Cluster of 3’s
- Red Hair

Kumar, et al. Laryngoscope 114: November 2004

Fish

+ High quality protein
+ Low saturated fat
+ Omega-3 fatty acids
- Methylmercury
Fishy History

RETROSPECTIVE
- Japan – 1956, 1965
- Iraq – 1960, 1970

- High dose exposures
- Neurotoxic

Fishy Future

PROSPECTIVE
Conflicting Results
- Faeroe Islands
- Seychelles

Reference Dose (RfD)

- 1ug/kg bw/day
- EPA estimates 1-3% women exposed
- NHANES 1999-2002, 6% women above RfD
- Case reports from Wisconsin, Massachusetts
Joint FDA/EPA Consumer Advisory 2004

- Do not eat Shark, Swordfish, King Mackerel or Tilefish
- Eat up to 12 ounces (2 avg. meals) a week of a variety of fish and shellfish that are low in mercury
- Check local advisories about safety of fish caught locally

Recent data
Fish good, Mercury bad

- Beneficial effects on child development with maternal seafood intakes of more than 340 gm/week
  

- Higher fish consumption in pregnancy associated with better cognition, but higher mercury levels associated with lower cognition
  
  *Environ Health Perspective* 2005 Oct;113(10):1376

Radiation

- Chernobyl vs. Fukushima
- Deaths, thyroid cancer, leukemia, cataracts
- Psychological effects
- No known reproductive effects

Kitty Litter
Toxoplasmosis

- Intracellular parasite – undercooked meat, cat feces, soil
- Symptoms in 10-20% adult cases
- Later in gestation, higher transmission
- 55-85% of infected infants develop sequelae

*ACOG Practice Bulletin No. 20, 2000*
Toxoplasmosis
- Routine serologic screening of all pregnant women not recommended (Level C)
- Pregnant women should be counseled about methods to prevent acquisition (Level C)
- Diagnosis should be confirmed by a reliable reference laboratory (Level C)
- Pregnant women should be treated with spiramycin (Level B)

ACOG Practice Bulletin No. 20, 2000

Cheese + Listeriosis
- 1/3 cases in pregnant women
- Associated with sabb, stillbirth
- Flu-like syndrome
- Most cases sporadic
- Prognosis worse in early pregnancy

FDA and USDA advise pregnant women!
- No hotdogs or luncheon meats unless reheated to steaming
- No soft cheeses
- No refrigerated pates or meat spreads
- No refrigerated smoked seafood
- No raw (unpasteurized) milk
- ACOG adds raw or undercooked meats

Caffeine

<table>
<thead>
<tr>
<th>Item</th>
<th>Avg</th>
<th>Range</th>
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<tbody>
<tr>
<td>Coffee (8oz)</td>
<td>184mg</td>
<td>96-288</td>
</tr>
<tr>
<td>Tea (8oz)</td>
<td>64mg</td>
<td>33-144</td>
</tr>
<tr>
<td>Soft Drink</td>
<td>36mg</td>
<td>30-60</td>
</tr>
<tr>
<td>Dark Choc.</td>
<td>20mg</td>
<td>5-35</td>
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</table>
Caffeine and Reproductive Hazards

- Poor studies especially related to low birthweight, congenital anomalies, delay in conception, miscarriage
- Confounded by caffeine/cigarette association
  
  Leviton and Cowan, Food and Chemical Toxicology 40 (2002)

- Recent studies predominately negative
- RCT – no association between moderate caffeine intake and gestational age or birthweight
  
  BMJ 2007 Feb 24;334(7590):409

Alcohol Consumption Among Women Who Are Pregnant or Who Might Become Pregnant – U.S. 2002

- PREGNANT WOMEN
  - 10% use alcohol
  - 2% engage in binge drinking

- WOMEN NOT USING BIRTH CONTROL
  - >50% use alcohol
  - 12.4% engage in binge drinking

No Level Proven Safe

- Fetal Alcohol Syndrome (FAS)
  - Short stature
  - Neurocognitive defects
  - Facial dysmorphology

- Fetal Alcohol Spectrum Disorder
  - Positive history
  - Neurocognitive defects
  - +/- facial features

Nicotine

- Smoking underreported with nondisclosure 25-50%
- Associated with sab, abruption, PPROM, ectopic, PTL, PTD, previa, LBW
- Second hand smoke
- 90% relapse rate postpartum
Endocrine Disruptors

- Endocrine Disruptors
  - bisphenol A (BPA), phthalates,
- Critical Windows of Development
- Fetal Origins of Disease (Barker Hypothesis)

Hot Tubs

- Hyperthermia
  - First trimester loss
  - Neural tube defects

- Potentially teratogenic temp. = 38.9C/102F
  - 15 min. at 39C (102.2F)
  - 10 min. at 41.1C (106F)

Maternal Hyperthermia and the Risk for Neural Tube Defects in Offspring

- Systematic Review and Meta-Analysis
  - 42 total studies, 15 included
  - 14/15 fever, 1/15 fever +/- hot tub, sauna, or electric blanket
  - Adjusted OR 1.86 (95%CI 1.54-2.24)


Hot tubs and first trimester loss

- Scant/poor data

- Li et al, Am J Epidemiol 2003
  - Prospective cohort
  - 1,063 women (39%)
  - Significant for >100F, ≥1/week w/in 4 weeks of LMP
Exercise and Pregnancy
ACOG

“In the absence of either medical or obstetric complication, 30 minutes or more of moderate exercise a day on most, if not all, days of the week is recommended for pregnant women.”

Benefits of Exercise

- Prevention of gestational diabetes
- Potential effect on preeclampsia
- Potential effect on premature labor
- Decreased postpartum depression

Exercise and pregnancy
ACOG recommendations

- Avoid supine activities and motionless standing
- Avoid sports with high potential for contact or falling
- No scuba diving

Exercise and Pregnancy

- Exertion at high altitudes appears safe (6000ft)
- No reports that hyperthermia associated with exercise teratogenic
- Strenuous exercise
  - Lighter babies
  - Persists through 5yrs
  - Improved intelligence and language skills scores
Hair dye

- No data to support teratogenic effects

Environmental Exposures

- UCSF Program on Reproductive Health and the Environment
  www.prhe.ucsf.edu/prhe

- Links to American Academy of Pediatrics Committee on Environmental Health
- U.S. EPA
- Etc...

Conclusions

- Fish
  - Moderation
- Cheese
  - NO soft cheese, refrigerated pates, meat spreads, smoked seafood, unpasteurized milk
- Caffeine
  - Moderation
- Alcohol
  - NO proven safe level
- Smoking
  - NO

Hot Tubs

- NO first trimester
- Temp <100, moderation

Exercise

- DO IT!

Hair Dye

- YOU GO GIRL!
“Take every word of advice from every medical expert, from TV, radio, books, magazines, newspapers, telephones and e-mails. That should fix whatever you have.”

Thank You!