Impact of Climate Change on Women’s Health/Pregnancy

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Questions:

(1) course/session they are running or preparing to teach

- Life Cycle lecture on pregnancy complications
- WHE elective
- OB/GYN residents
- MFM fellowship
Questions:

(2) Objectives on climate change included

• Anything I can find relating to pregnancy
• Using pregnancy complications to highlight impact of climate change on human health

(3) how you decided/are deciding to teach this material

• Life Cycle (core curriculum): one slide
• Elective/Residents/Fellows: several slides
Climate Change and Pregnancy

Medline Trend, accessed 9.11.2015
http://dan.corlan.net/medline-trend.html
Climate Change and Pregnancy

- Extreme heat associated with shorter gestation
  Barcelona 2001-2005

- Higher temperatures associated with PTB
  - Bay Area: 5-20% increase in PTB for 10F increase in temp
  - California 2010

- ? Increase in some birth defects
  - New York

Climate Change & Pregnancy

• Increased water source salinity & preeclampsia in Bangladesh

Table 6. Association of (pre)eclampsia and/or gestational hypertension with water source.

<table>
<thead>
<tr>
<th>Water Source</th>
<th>Cases (n = 202)</th>
<th>Controls (n = 1,006)</th>
<th>Crude Odds ratio (OR) (95% CI)</th>
<th>OR Adjusted by age, parity, SES, mid-upper arm circumference (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rain+another1</td>
<td>10 (5.26)</td>
<td>234 (25.7)</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Filter2</td>
<td>25 (13.2)</td>
<td>117 (12.8)</td>
<td>4.99 (2.32–10.8)</td>
<td>5.32 (2.41–11.7)</td>
</tr>
<tr>
<td>Pond</td>
<td>47 (24.7)</td>
<td>251 (27.5)</td>
<td>4.38 (2.16–8.87)</td>
<td>5.31 (2.60–10.9)</td>
</tr>
<tr>
<td>Tube-well</td>
<td>108 (56.8)</td>
<td>310 (34.0)</td>
<td>8.15 (4.17–15.9)</td>
<td>8.30 (4.20–16.4)</td>
</tr>
</tbody>
</table>

1. ‘Rain’ has been combined with any other water source because of small numbers in the rainwater only group.
2. For brevity we refer to filtered pond water as ‘filter’.
doi:10.1371/journal.pone.0108715.t006

Khan 2015

P<0.001
Prenatal Air Pollution: Predicted effects of PM$_{2.5}$ on birth weight

Black vertical lines represent the frequency distribution of PM$_{2.5}$. Population-based retrospective cohort: singleton births in British Columbia, 2001-6. Exposure to PM2.5 was estimated using a national land-use regression model developed to estimate PM2.5 at the census street block level. 

Erikson *BioMedCentral* 2016
Costs of PTB Attributable to Air Pollution (PM2.5)

Attributable Fraction = 3.32%
Attributable Preterm Births = 15,808
Lost Economic Productivity, PM2.5-Attributable PTB = $4.33 billion
Additional Medical Care, PM2.5-Attributable PTB = $760 million
Total Costs, PM2.5-Attributable PTB = $5.09 billion

Trasande *EHP* 2016
Prenatal Air Pollution: Effects of exposure on self-regulatory capacities & social competence

Margolis 2016, Journal of Child Psychology and Psychiatry,
Proximity to Fracking & Preterm Birth

Unconventional Natural Gas Development & Birth Outcomes in PA

Association between unconventional natural gas development activity & preterm birth (4th quartile OR 1.4)

Casey *Epid.* 2015
Proximity to Fracking & SGA
Perinatal Outcomes & Unconventional Natural Gas Operations in SW Penn.

Quartiles: Inverse Distance Weighted Well Count

Stacy PLOS One 2015, see also Hill 2014
Societal Change is Possible: Tobacco Smoke

Scotland’s public smoking ban

Small for Gestational Age

Mackay *PLOS Med* 2012
Questions:

(4) what you have learned

• Audiences vary in receptivity/interest
• New research coming out often

?s