Environmental justice, catfish consumption and elevated levels of PCBs and dioxins in an African-American subpopulation

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USEPA Region 9
Focus

- Higher PCB and dioxin levels found in African-American than in White population
- African-Americans are more likely to be exposed to an array of PCB and dioxin sources
- Catfish consumption may be a significant source of PCB and dioxin exposure among a small percentage of African-Americans
- The multigenerational consequences may hinder African-American health
- Government efforts to minimize PCB and dioxin exposure may not be as successful protecting African-Americans as Whites
- Environmental justice recognizes the problem and suggests solutions
## Historical racial disparities in PCB and dioxin body burdens

<table>
<thead>
<tr>
<th>Study</th>
<th>Location</th>
<th>Year</th>
<th>Total PCB/ Dioxin</th>
<th>Race/ Ethnicity</th>
<th>Concentration (ppb, ng/g)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>White (urban)</td>
<td>22.0 – High, 2.3 - Mean</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>White</td>
<td>6.0 – High, 3.9 - Mean</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>White</td>
<td>&gt;3000 – increase from 3% to 7% of population</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>White</td>
<td>&gt;3000 – 5% of population</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>White</td>
<td>&gt;1000 – 6% of population</td>
</tr>
<tr>
<td>USEPA (1991)</td>
<td>U.S.</td>
<td>1982 - 87</td>
<td>Dioxin (adipose)</td>
<td>Non-White</td>
<td>Increase from .005 to .009</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>White</td>
<td>Decrease from .006 to .004</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>White</td>
<td>147 – Mean</td>
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<td></td>
<td></td>
<td></td>
<td>White</td>
<td>.154 – Mean (26.5 – TEQ)</td>
</tr>
</tbody>
</table>
Current racial disparities in PCB and dioxin body burdens

- 2003 NHANES report examined 31 types of dioxins and PCBs.
- Detected 16 types at the 95th percentile in African-Americans and 14 types at the 95th percentile in Whites.
- Of the 16 types, each one was at a higher level at the 95th percentile in African-Americans.
- Though most of the PCBs and dioxins found at the 95th percentile had low or no assigned TEFs, HxCDD, PCB 126, and PCB 169 were detected and have TEFs ≥ 0.01.
- PCB 126, with a TEF of 0.1 and a 95th level in African-Americans (0.120 ppb) almost double that of Whites (0.0678), is notable.
Elevated risk among African-Americans of multi-media exposure to PCBs and dioxins compared to Whites

<table>
<thead>
<tr>
<th>Source</th>
<th>Elevated risk</th>
<th>Dietary pathway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land contamination (e.g., spills)</td>
<td>Higher proportion of residential population close to Superfund sites</td>
<td>Residential food production</td>
</tr>
<tr>
<td>Air contamination (e.g., emissions)</td>
<td>Higher proportion of residential population close to incinerators</td>
<td>Residential food production</td>
</tr>
<tr>
<td>Water contamination (e.g., sediments)</td>
<td>Greater proximity to heavily contaminated waterways</td>
<td>Subsistence angling</td>
</tr>
</tbody>
</table>
Catfish consumption

- African-American anglers are almost twice as likely to fish for catfish as White anglers (39% vs 20%)

- African-American anglers fish for more days, fish more often from shore, are more likely to eat what they catch, and are less likely to trim fat off the fish, than White anglers

- African-Americans are more likely to eat farmed catfish than Whites (60% vs 45%)

- At the 95th percentile, African-Americans eat significantly more fish and shellfish than Whites (104 grams/day/capita vs 80 grams/day/capita)

- Catfish have been consistently recognized since the 1970s as having the highest PCB levels among widely eaten fish in U.S. (Note – No studies since the late 90’s)
Catfish aquaculture

- $500 million a year industry

- Half of the annual 600 million pound crop is grown in Mississippi

- Historical dioxin contamination of ball-clay anti-caking agent in soybean meal for catfish feed halted in 1997

- Current concern over high levels of dioxins in menhaden used as fishmeal in catfish feed (and farmed salmon feed).
Wild Catfish

- Strongest correlation between PCB body burden and fishing in Midwest and Northeast

- Highest concentration of PCB fish advisories in Midwest and Northeast urban areas

- Though majority of African-American anglers are in the South, African-American anglers are most concentrated in Midwest and Northeast urban areas
African-Americans are more likely to be exposed to dioxins from eating farmed catfish than Whites.

African-Americans are exposed to higher levels of PCBs from catching catfish than Whites.
Multi-Generational Impact

- African-American dietary practices that are high in animal fat are transferred from generation to generation

- Greater PCB and dioxin body burden among African-American mothers results in greater transfer to fetus and infant and increased risk of associated health threats
So why eat catfish...

Fish advisories say “Don’t do it”,
but fail to recognize
African-American catfish consumption
is a legacy of

Slavery
Economic disenfranchisement
Inappropriate educational efforts
Environmental justice offers solutions

- Community-based participatory research
- Community-based educational outreach
- Community activism to promote remediation
- Community activism to promote subsistence angling policies
Thanks!

- To RTP colleague Linda Birnbaum
- To Region 9 librarians Barbara Hagler, Rosemary Hardy, and Deborra Samuels

DISCLAIMER

This talk does not in any way represent EPA policy or guidance.