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

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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

Study	Location	Year	Total PCB/ Dioxin	Race/ Ethnicity	Concentration (ppb, ng/g)
Finklea MD, et al (1972)	Charleston Co, SC	1968	PCB (serum)	African-American (urban) White (urban)	29.0 – High, 1.9 – Mean 22.0 – High, 2.3 - Mean
Krieger N, et al (1994)	San Francisco Bay area, CA	1964 - 71	PCB (serum)	African-American White	7.4 – High, 4.6 – Mean 6.0 – High, 3.9 - Mean
Lucas RM, et al (1980)	U.S.	1972-76	PCB (adipose)	Non-White White	>3000 – increase from 7% to 16% of population >3000 – increase from 3% to 7% of population
Robinson PE, et al (1990)	U.S.	1972 - 83	PCB (adipose)	Non-White White	>3000 – 8% of population >3000 – 5% of population
Kutz FW, et al (1991)	U.S.	1983	PCB (adipose)	Non-White White	>1000 – 2% of population >1000 – 6% of population
USEPA (1991)	U.S.	1982 - 87	Dioxin (adipose)	Non-White White	Increase from .005 to .009 Decrease from .006 to .004
Lordo RA, et al (1996)	U.S.	1986	PCB (adipose)	Non-White White	211 – Mean 147 – Mean
Orban JE, et al (1994)	U.S.	1987	Dioxin (adipose)	Non-White White	.167 – Mean (35.2 – TEQ) .154 – Mean (26.5 – TEQ)

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 $\geq$ 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

Source	Elevated risk	Dietary pathway
Land contamination (e.g., spills)	Higher proportion of residential population close to Superfund sites	Residential food production
Air contamination (e.g., emissions)	Higher proportion of residential population close to incinerators	Residential food production
Water contamination (e.g., sediments)	Greater proximity to heavily contaminated waterways	Subsistence angling

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, then 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

Result

- **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!

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