

Topic 1: Impact of Congener Profile on the Toxicity of PCB Mixtures

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Diabetes at Akwesasne

- We monitored serum PCBs and three pesticides in 601 Akwesasne Mohawks and obtained fasting glucose and physician diagnosed diabetes.
- We used three models: Model 1. adjusting only for sex, age, BMI and total serum lipids. Model 2. In addition adjusting for total PCBs or total pesticides. Model 3. Adjusting for all contaminants except the one other consideration.

Association Between Diabetes and Various POPs after Adjustment for all other POPs and Number of Chlorines.

<u>Exposure</u>	<u>RR</u>	<u><i>p-trend</i></u>
• Tri-Tetra	5.02	0.034
• Penta-Hexa	0.40	0.404
• Hepta Plus	1.27	0.300
• HCB	1.74	0.003
• DDE	2.18	0.206
• Mirex	1.75	0.518

RRs of PCB Congeners Having No or One Ortho-substituted Chlorine After Adjustment for all Other POPs.

	RR	<i>p-trend</i>
• All non-mono	5.25	0.0002
• Dioxin-like	0.91	0.2174
• Non-dioxin-like	7.54	0.0185

Conclusions

- Diabetes at Akwesasne is associated only with elevations in serum levels of low-chlorinated, non-dioxin like PCB congeners.
- Inhalation of PCBs from local contaminated sites is almost certainly the route of exposure.
- Our results suggest that inhalation of low chlorinated, non-dioxin-like PCBs cause diabetes.

Topic 3: Potential for Hazard Identification and Dose-Response Assessment for PCB Exposure via Inhalation

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The Tragic Story of JM and GM

- JM (age 43) was employed as a chemist at a company that dealt with old oils from transformers. He was told to smell the oils to see if they contained PCBs. This he did from 1994 until 2003. In 2003 he was found to have thyroid cancer. In 2011 he was diagnosed with malignant melanoma. In 2012 he was diagnosed with lung cancer. He died in 2013.
- GM (age 44), wife of JM, was employed as a dish washer and person responsible for dumping used oils. She was told to smell the oils to determine whether they contained PCBs.
- GM was diagnosed with thyroid cancer in 2003. In 2011 she was diagnosed with a severely dysplastic nevus, a precursor to malignant melanoma.

PCB concentrations ($\mu\text{g}/\text{kg}$ or ppb wet weight) in serum samples from JM and GM (nd = not detected) in relation to those from the National Health and Nutrition Examination Survey random sample of US residents.

PCB Congener	JM	GM	NHANES 50%	NHANES 95%
28	1.82	3.47	0.031	0.067
52	1.22	1.60	0.016	0.043
101	nd	0.33		
138	nd	0.22		
153	0.17	0.23	0.148	0.671
180	0.16	0.44		
Sum	3.37	6.28		

Inhaled PCBs Caused These Cancers

- For two individuals who are not blood relatives to develop the same cancers cannot be due to chance.
- The PCB content in their blood indicates large exposure to volatile PCBs.
- This is very strong evidence that inhaled PCBs caused JM and GM's cancers.