

# Explanation of Blood Results Letters for the Michigan Dioxin Exposure Study

Community Advisory Panel Meeting  
Freeland Elementary School  
March 10, 2005

# Dioxin Results

- Over 250 people from Midland and Saginaw counties provided blood samples in the fall of 2004
- Samples were analyzed for 29 dioxin-like compounds and total blood lipids
  - 7 dioxins
  - 10 furans
  - 12 polychlorinated biphenyls
- **Confidential** letters describing blood results were mailed to study participants during the week of February 18

# Dioxin Results

- Additional data will be collected from Midland and Saginaw counties through the spring and summer of 2005
- Data will also be collected from people in Jackson and Calhoun counties in 2005
- The study is designed to collect blood results from over 900 subjects, so it is too soon to interpret results

We are measuring picograms of dioxins per gram of blood lipids

Gram	1 gram (about 1/30 <sup>th</sup> of an ounce)
Milligram	1/1,000 gram (one thousandth of a gram)
Microgram	1/1,000,000 gram (one millionth of a gram)
Nanogram	1/1,000,000,000 gram (one billionth of a gram)
Picogram	1/1,000,000,000,000 gram (one trillionth of a gram)

A blood dioxin level of 9 means you have 9 picograms of dioxin in one gram of your blood lipids

Congener	TEF	Serum Concentration*	Contribution to TEQ (based on 29 congeners)	Contribution to TEQ (based on 21 congeners)
<b>Dioxins:</b>				
2,3,7,8-TCDD	1			
1,2,3,7,8-PentaCDD	1			
1,2,3,4,7,8-HexaCDD	0.1			
1,2,3,6,7,8-HexaCDD	0.1			
1,2,3,7,8,9-HexaCDD	0.1			
1,2,3,4,6,7,8-HeptaCDD	0.01			
OctaCDD	0.0001			
<b>Furans:</b>				
2,3,7,8-TetraCDF	0.1			
1,2,3,7,8-PentaCDF	0.05			
2,3,4,7,8-PentaCDF	0.5			
1,2,3,4,7,8-HexaCDF	0.1			
1,2,3,6,7,8-HexaCDF	0.1			
1,2,3,7,8,9-HexaCDF	0.1			
2,3,4,6,7,8-HexaCDF	0.1			
1,2,3,4,6,7,8-HeptaCDF	0.01			
1,2,3,4,7,8,9-HeptaCDF	0.01			
OctaCDF	0.0001			
<b>Polychlorinated biphenyls (PCBs):</b>				
3,4,4',5-TetraCB (81)	0.0001			
3,3',4,4'-TetraCB (77)	0.0001			
3,3',4,4',5-PentaCB (126)	0.1			
3,3',4,4',5,5'-HexaCB (169)	0.01			
2,3,3',4,4'-PentaCB (105)	0.0001			
2,3,4,4',5-PentaCB (114)	0.0005			
2,3',4,4',5-PentaCB (118)	0.0001			
2',3,4,4',5-PentaCB (123)	0.0001			
2,3,3',4,4',5-HexaCB (156)	0.0005			
2,3,3',4,4',5'-HexaCB (157)	0.0005			
2,3',4,4',5,5'-HexaCB (167)	0.00001			
2,3,3',4,4',5,5'-HeptaCB (189)	0.0001			
		<b>Your Overall TEQ:</b>		

Congener	TEF	Serum Concentration*	Contribution to TEQ (based on 29 congeners)	Contribution to TEQ (based on 21 congeners)
Dioxins:				
2,3,7,8-TCDD	1			
1,2,3,7,8-PentaCDD	1			
1,2,3,4,7,8-HexaCDD	0.1			
1,2,3,6,7,8-HexaCDD	0.1			
1,2,3,7,8,9-HexaCDD	0.1			
1,2,3,4,6,7,8-HeptaCDD	0.01			
OctaCDD	0.0001			

# Dioxin Results

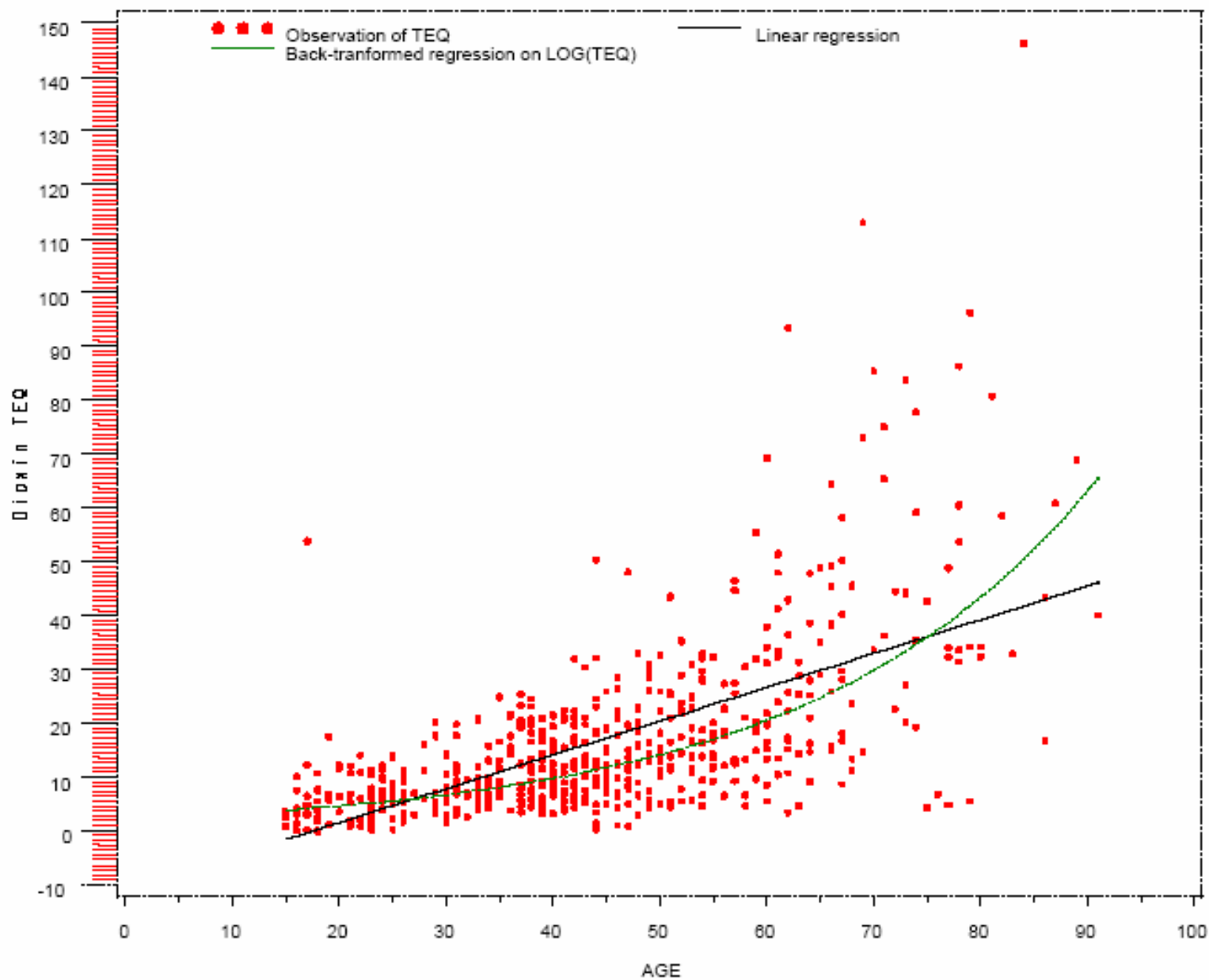
Almost everyone has measurable dioxins in their blood. Scientists at the Centers for Disease Control and Prevention (CDC) are working on finding current estimates for the level of dioxin-like compounds in the blood of a person with no known exposure to dioxins other than background exposure. Background exposure means that a person was never exposed to dioxin in a job setting or by an industrial chemical release. While the new estimates are not yet finalized, the CDC has preliminary data from 4 different U.S. studies that can be used as a comparison for the levels of dioxin-like compounds found in blood samples.

**Table 2: Dioxin TEQ reference range by age group based on studies from LA, MO, NC, & NY (in picograms/gram of blood lipids)**

<b>Age Group</b>	<b>N</b>	<b>Mean</b>	<b>75<sup>th</sup> % ile</b>	<b>90<sup>th</sup> % ile</b>	<b>95<sup>th</sup> % ile</b>	<b>Min</b>	<b>Max</b>
<b>15-29</b>	116	6.4	7.8	11.7	14.0	0.0	53.9
<b>30-44</b>	199	11.8	16.6	21.1	23.2	0.2	50.4
<b>45-59</b>	160	16.9	22.3	29.5	32.8	0.8	55.4
<b>60+</b>	113	36.1	45.6	69.2	85.4	3.4	146.4
<b>All</b>	588	16.8	20.8	33.7	48.0	0.0	146.4

Data from Donald Patterson, et al. Age specific dioxin TEQ reference range. Organohalogen Compounds, volume 66 (2004)

**Figure 1. Dioxin TEQ versus Age for Studies from LA, MO, NC, and NY**



# Dioxin Results

- In order to have scientifically valid results about the relationship between levels of dioxins in soil, household dust and blood, the entire study must be completed and analyzed. Individual or partial results do not permit scientists to make valid conclusions. This means that it is not possible at this time to make any judgments about the association between levels of dioxins in soil and household dust and levels of dioxins in the currently available blood samples.