



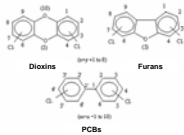
# The University of Michigan Dioxin Exposure Study project overview

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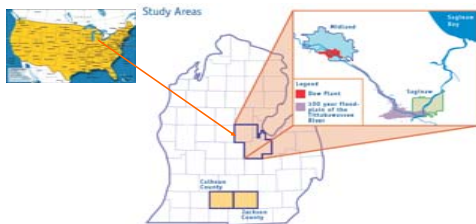
## Introduction and Study Goals

- The University of Michigan Dioxin Exposure Study (UMDES) was designed to assess exposures to dioxins, furans and coplanar polychlorinated biphenyls (PCBs), describe the pattern of serum dioxin, furan and PCB (collectively 'dioxins') levels among adults and to understand factors that explain variation in serum dioxin levels.
- The study was undertaken in response to concerns among the population of Midland and Saginaw Counties in Michigan that dioxin-like compounds from the Dow Chemical Company facilities in Midland have contaminated areas of the City of Midland and sediments in the Tittabawassee River flood plain. There is concern that residents' body burdens of dioxins may be elevated because of environmental contamination.
- To address these concerns the study was designed to measure the serum levels in a multistage random sample of the population in the region and to estimate each individual's past exposure to various factors that are believed to contribute to the body burden of dioxin-like compounds. By measuring factors that reflect potential exposure to dioxins, furans and co-planar PCBs through air, water, soil, food intake, occupations, and various recreational activities, the study identified factors that correlate with (and explain variation in) serum congener levels.
- An additional central goal of the study is to communicate the results and the implications of the results in an effective manner to the populations impacted by the study.



## Study Populations

- Study subjects were selected from five different geographic areas:
  - Floodplain of the Tittabawassee River
  - Near floodplain of the Tittabawassee River
  - Midland plume downwind of the Dow plant
  - Elsewhere in Midland and Saginaw counties, not near the Tittabawassee River
  - Jackson and Calhoun counties - control group with no known industrial point-sources for dioxins



## Study Design

- **Overall**
- 946 people were sampled from the five regions by using a two-stage area probability household sample design
- Eligible subjects participated in an interview, gave blood samples, soil samples and household dust samples for analysis of the WHO 29 dioxin-like compounds

Number of Participants	Region					Total Across All Areas
	Floodplain	Near Floodplain	Midland Plume	Other Midland/Ingham	Delaware/Calhoun	
Interviews	314	276	66	309	359	1324
Blood Samples	243	205	43	204	251	946
Household Dust Samples	205	161	32	168	198	764
Soil Samples	203	164	32	173	194	766
Interviews, Blood, Dust and Soil	195	156	30	167	183	731

### Interview

- **Eligibility:** Subjects ages 18 or older who lived in their current residence for at least 5 years were interviewed
- One hour standardized interview administered by trained interviewers
- Each subject was asked to recall possible dioxin exposure pathways over their entire lifetime in one year intervals. An Event History Calendar was used to collect time-varying information by using cues from the subject's lifetime to assist in recall
- Questions were grouped into sections:
  - Residential history, work history, property use, recreational activities, food consumption (meat, fish, game, eggs, dairy, vegetables), basic demographics, and health history

### Blood Sampling

- **Eligibility:** Based on the Red Cross criteria for blood donors (e.g. weight of at least 110 lbs, no recent chemotherapy)
- 80 milliliters of whole blood collected from each participant
- Blood was drawn by a mobile phlebotomy service in each community



### Household Dust Sampling

- **Eligibility:** Subjects who completed the interview and blood sample, owned their residence, and lived in their residence for at least 5 years were eligible
- Household dust samples were collected using a High Volume Small Surface Sampler, HVSS3
- Samples were collected from both hard and soft surfaces in living areas with high potential for human contact (living rooms, dining rooms, etc.)
- One composite sample was collected per home - samplers attempted to collect 10 grams of house dust
- The sampling protocol was based on the American Society for Testing and Materials (ASTM) Method D 5438-00, "Standard Practice for Collection of Floor Dust for Chemical Analysis"



## Study Design, cont.

### Soil Sampling

- **Eligibility:** Subjects who completed the interview and blood sample, owned their property, and lived in their residence for at least 5 years were eligible
- Up to seven sampling stations were located on each property (Fig. 2). Sampling stations were defined by placing a 3-foot diameter ring on the ground (Fig. 1).
- Three equal spaced cores were collected within the ring using single-use 2" ID polycarbonate tubes pushed into the ground with a slide hammer



Fig. 1 Soil Sampling

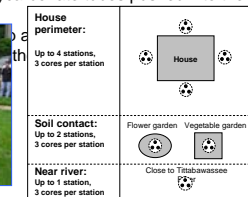


Fig. 2 Sampling Locations

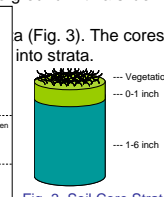


Fig. 3 Soil Core Strata

## Communications

- Communication and interaction with the community was a critical element of the UMDES throughout all stages of the study
  - Public relations consultants were hired to identify community leaders whose opinions matter, identify press contacts, and develop a plan for reaching the public (e.g. media interviews, direct mail, public meetings, advertisements)
  - A Community Advisory Panel was established to provide an opportunity for community members to ask questions, for the study team to give progress reports, and for the media to cover the study progress
  - A Scientific Advisory Board of respected scientists with expertise relevant to the study was created to oversee all aspects of the study to address concerns from the community about the independence from Dow
  - Communications with stakeholders during study development, field work and data analysis stages
  - Communications with study participants included: informed consent documents, letters providing personal results of GC/MS analyses, E-mail, 1-800 number
  - Meeting with with State officials (MDCH, MDEQ, Senators, Representatives, and Governor's Advisors) were held to keep them informed of study progress

## Results and Additional Information

- The results of the study have been released and are available on the study website at [www.umdioxin.org](http://www.umdioxin.org). Further analyses are ongoing and will also be posted on the website when available.
- For more information on dioxins, the University of Michigan Dioxin Exposure Study and the linear regression findings, see **Session T3-G: Dioxins are Forever: Dioxin Exposure and Public Health** and **Session T4-G: Michigan Dioxin Study – University of Michigan Perspective**.

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