



Purpose of the study

Measure dioxin levels in the blood (serum) of East Palestine residents and compare with levels typically found in the US.

What did the study involve?

Twenty East Palestine Health Tracking Study participants were invited to participate. Eighteen enrolled and provided enough blood for analyses. Samples were analyzed by the Centers for Disease Control and Prevention, National Center for Environmental Health, Division of Laboratory Sciences, Organic Analytical Toxicology Branch.

What are dioxins?

Dioxins are a group of chemicals including polychlorinated dibenzo-p-dioxins and furans (PCDD/F) and coplanar polychlorinated biphenyls (cPCBs). Dioxins and furans were chemicals of concern following the train derailment and subsequent rail car burn. They form when burning occurs (forest fires or household trash) or during chemical reactions. PCBs are man-made products which were banned in 1979 and are not thought to be associated with the derailment, but because these PCBs are similar to dioxins and furans, the blood test also includes them. All of these chemicals can enter the food chain and accumulate in the human body. Thus, older adults typically have higher levels in their bodies than younger adults and children.

How are people exposed to dioxins?

People can be exposed to dioxins by eating high-fat foods such as milk products, eggs, meat, and some fish. All Americans have some dioxin in their body from these sources.

How was the TEQ calculated?

There are 20 dioxin and dioxin-like chemicals that can be analyzed. The concentration of all dioxins measured in serum is commonly given as a Toxic Equivalent (TEQ) value. The TEQ is measured by picograms per gram of serum lipid (pg/g lipid). A picogram is one-trillionth of a gram which is very, very, very small. This amount can be compared to one teaspoon of a chemical in the combined water of 1,000 Olympic sized swimming pools. The TEQ represents the biological activity of the dioxins. The TEQs are calculated by multiplying the value of each chemical measured in serum by a factor related to how toxic that chemical is and then summing the resulting value for each chemical.

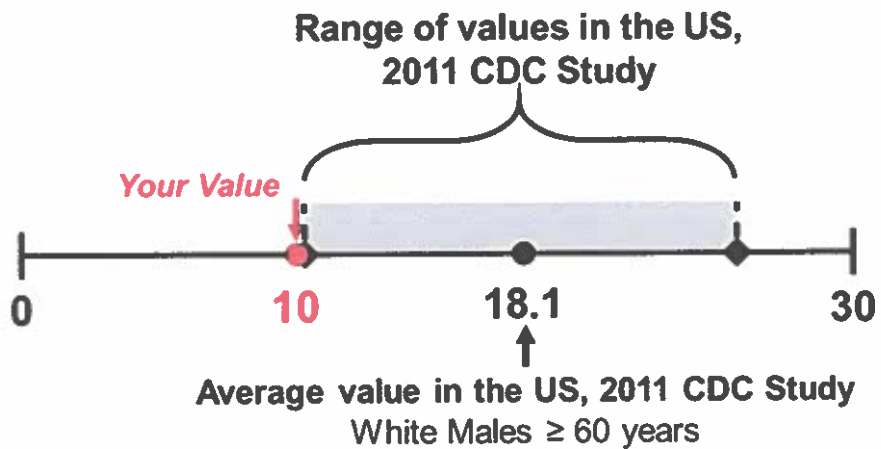
How did the East Palestine participants in the pilot study compare to average values in the US?

Each participant's value was **below or within the range** of levels found in the 2011 CDC study for their specific age range, race, ethnicity, and sex.

The 2011 CDC study used serum from multiple individuals across the US to create 'pooled' samples. The same laboratory was used to measure the serum dioxin levels. If each person's serum in the CDC study had been analyzed for dioxins individually rather than pooled, the range would have been much wider.

Thus, although dioxins may have formed during the burning of chemicals in the railcars, the level of dioxin that experienced was not high enough to increase the serum dioxin level beyond what is typically found in the US.

Representative EXAMPLE of a participant's TEQ value compared to the values in the US



University of Kentucky East Palestine Train Derailment Health Tracking Study

Preliminary findings – February 8, 2024



In April 2023, the University of Kentucky launched the East Palestine Train Derailment Health Tracking Study. The goals of the research are to 1) establish a cohort of residents to evaluate potential long-term health impacts related to the derailment and 2) answer residents' questions about their exposures and health. *To our knowledge, this is the only study that has collected information on residents to assess long-term health effects.* This study was designed with and for the residents of East Palestine and the surrounding area. The study also includes pilot studies to assess biological (blood and urine) and indoor air samples for chemicals associated with the derailment. Only the health survey data are presented here. A few representative preliminary findings are provided below.

Health Tracking Survey

Approximately 380 residents of East Palestine and the surrounding area have shared their experiences, concerns, and health symptoms. Over half of our participants live within 2 miles of the derailment site.

What we have found so far

- Nearly 3 out of every 4 participants reported experiencing at least one NEW health symptom since the derailment.
- Over half of the participants indicated NEW upper airway symptoms.
- Over 80% of participants who live within one mile reported NEW upper respiratory symptoms.
- Over half of the participants reported their NEW symptoms remained in the Fall of 2023.
- We screened for stress and PTSD and found that even in Fall 2023 half continued to experience elevated levels of stress, and nearly 1/3 had symptoms of PTSD.
- Nearly half of the participants currently rely on bottled water for drinking.
- Over a third of participants continue to report odors in their community related to the derailment.

Next Steps and Recommendations

Thus far, we have conducted two surveys and are planning a third in February 2024. We will continue to follow the cohort so we can evaluate any long-term health effects associated with the derailment and chemical release. The biological and air data analyses are still underway. Based on our findings and given the potential health impacts of the chemicals released, we strongly recommend ongoing medical monitoring for the community and follow-up research to investigate potential long-term lung damage and health effects that can result from high levels of stress.

Funding for this research

This research is supported internally by funds held by the Principal Investigator at UK, a pilot grant from the National Institute of Environmental Health Science's (NIEHS) Environmental Health Science Core Center at the University of Kentucky Center for Appalachian Research in Environmental Sciences (UK-CARES, NIEHS P30 ES026529) and the National Center for Advancing Translational Sciences, NIH (UL1TR001998).

To learn more about the study contact the Principal Investigator

Erin N. Haynes, MS, DrPH, Professor and Chair

Phone: 859-562-2119

Email: erin.haynes@uky.edu