

Title: Do environmental toxins predict violent crimes?

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Do chemical pollutants that persistent in the environment and bioaccumulate in the body affect human health and behavior? Could these Persistent, Bioaccumulative and Toxic (PBT) chemicals play a role in the cause of violent crimes due to deterioration of mental and cognitive functions? In the past, Mercury, a PBT chemical, has been shown in salmon to be associated with aggression. Could similar aggression occur in humans exposed to mercury through a toxic spill? Two sources of data are utilized in this analysis. The Environmental Protection Agency's (EPA) Annual Toxic Release Inventory publishes data on toxic releases into the environment and includes the following variables: location, chemical, chemical type, and amount of chemical released. The 2013 report contains information on 73,868 toxic releases during 2013. The second source of data uses the Uniform Crime Reporting (UCR) Program Data: Arrests by Age, Sex and Race. This dataset includes information on 1,048,578 arrests of which 201,308 were for violent crimes. These two data sets were merged based on location to facilitate this analysis. Two questions are analyzed to compare the three toxic release categories in the EPA data: PBT, TRI (General EPCRA Section 313 Chemical), and Dioxin. Is there a relationship between the number of spills at a location and the number of violent crimes at the location? Is there a relationship between the amount of toxic chemical released at the location and the number of crimes at the location? In addition, are toxic chemicals more likely to be dumped in certain regions of the United States, and is the average amount of toxic chemical released the same for PBTs and TRIs? To investigate these relationships, nonparametric and parametric hypothesis tests will be used with post hoc comparisons. Stratified scatterplots and stratified boxplots will be used to display the findings.

Word count: 297