

Improving Public Databases for Advancing Environmental Health

Erin Speiser Ihde*

Project Manager of Environmental Research, The Deirdre Imus Environmental Health Center[®] at Hackensack University Medical Center, Hackensack, New Jersey, USA

***Corresponding author:** Erin Speiser Ihde, Project Manager of Environmental Research, The Deirdre Imus Environmental Health Center[®] at Hackensack University Medical Center, Hackensack, New Jersey, USA, Tel: +5519968071; E-mail: Erin.Ihde@hackensackmeridian.org

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Editorial

State-level environmental laws designed to monitor emissions from factories, businesses and other institutions are critical to protecting public health. The data collected as part of this process requires a highly-structured system from accurate emissions measurements and disclosure to collection by field staff who then submit data to regulatory agencies. The organization of this data into accessible systems that may be used by other state staff, researchers and public health professionals is a critical endpoint that relies upon coordination and collaboration among all stakeholders.

In the process of conducting research for a CDC-funded study, our research team utilized the New Jersey Department of Environmental Protection's (NJDEP) Known Contaminated Sites (KCSNJ) database [1]. Surprisingly, ours was the first study team to request this data. We mapped 269,790 points of detection in surface water, groundwater, air, soil, sediment and solid for eight environmental contaminants shown in the literature to be most associated with autism spectrum disorders (ASDs): arsenic, lead, manganese, mercury, organophosphorus pesticides (OPPs), polychlorinated biphenyls (PCBs), trichloroethylene (TCE), and vinyl chloride [1-3]. Our study examined these environmental factors in ten counties in northern New Jersey: Bergen, Morris, Essex, Hudson, Passaic, Sussex, Union, Middlesex, Somerset and Warren.

The steady rise in prevalence rates of Autism Spectrum Disorders (ASDs) is a public health concern impacting families in every racial, ethnic, and socioeconomic group. The CDC's Autism and Developmental Disabilities Monitoring (ADDM) Network indicates that approximately 1 in 68 children nationally have been diagnosed with ASDs, with prevalence rates for boys about 4.5 times that of girls [4]. New Jersey has the highest prevalence rate of ASDs among states surveyed, with approximately 1 in 41 children diagnosed in 2012, up from 1 in 45 children in 2010 [4,5]. With an increase of 12% in two years, concern regarding environmental factors associated with autism continues. Our study found that concentrations of toxins associated with autism spectrum disorders were most prevalent near urban industrial or mixed residential/industrial

areas, though conclusions cannot be made regarding association or causality.

This research hinged upon the reliability and accessibility of data mined by NJDEP for each contaminant. At the time of our study, the NJDEP collection and management process required significant enhancements to ensure the information was collected and delivered according to uniform methodology. Working in collaboration with NJDEP, our study influenced upgrades in the data collection processes, including creation of a new guidance and checker. These have been positively influencing the accuracy and breadth of information available since then, as NJDEP continues to upgrade methods for electronic data deliverables [6,7].

The process changes prompted by our study will assist other researchers in better understanding the relationship between environmental toxins and the rising prevalence rates of health conditions including ASDs. Going forward, we need to ensure that each state has adequate collection and dissemination processes in place to follow best practices. State-to-state collaboration could greatly enhance public health by making data uniformly accessible according to one set of standards instead of varying requirements in the current system. Accurately assessing how state and federal data overlap and work independently would help provide a more comprehensive picture of environmental health trends, especially critical areas of need.

For example, the U.S. Environmental Protection Agency (USEPA) is the lead investigator for some Known Contaminated Sites in NJ which are located on federal Superfund sites. Researchers would be greatly aided by keeping additional information collected by US EPA in the same format as NJDEP's system. Similarly, the National Institute of Health's TOXMap Environmental Health maps, which contain Toxic Release Inventory (TRI) data and EPA Superfund data, are extremely useful. However, they do not contain the same data as NJDEP or other states' information, although in NJ some overlap with Superfund sites does exist [8,9]. While all databases have limitations, maintaining information in one format across states would greatly help those investigating health trends and disparities from state to state. Electronic data collection should be utilized by all states to replace the current patchwork of

electronic and non-electronic methods which hinder any efforts to link states' records.

The infrastructure put into place for monitoring environmental contamination can most effectively be used if it benefits the public at large, whether in New Jersey or any state. Improving data collection systems and fostering collaborations at the state and federal level to more effectively coordinate collection systems, much like electronic medical records (EMRs), will enhance data sharing, for the ultimate benefit of those most affected by health disparities across the nation.

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