

Children's Environmental Health Initiative (CEHI)

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Education,
Outreach and
Research



<p>Role(s)</p>	<ul style="list-style-type: none"> The Children's Environmental Health Initiative (CEHI) leads multiple environmental and public health research projects focused on people, data, and maps. CEHI's projects incorporate innovative spatial analysis into environmental and public health research. CEHI maintains a deep institutional commitment to issues of social justice and thus focuses much of its work in low income and minority communities. CEHI develops, maintains and extends an extensive fully spatially referenced data architecture; this makes it possible to jointly consider diverse variables collected by different disciplines, creating the opportunity to explore the complex and dynamic relationships among the components of health. CEHI works collaboratively across disciplines to develop methods for identifying and understanding the pathways through which features in the physical and social environments influence individual health and development.
<p>Mission</p>	<ul style="list-style-type: none"> CEHI is a research, education, and outreach program committed to fostering environments where all people can prosper.
<p>History</p>	<ul style="list-style-type: none"> Late 1990's: Established by Marie Lynn Miranda as a soft-funded initiative at Duke University in North Carolina to foster research that leads to action. 2002-present: Developed new GIS models for directing childhood lead poisoning prevention programs (doi: 10.1289/ehp.02110947; doi:10.1289/ehp.9994; doi:10.1289/ehp.11540.) 2004-present: Created new GIS models of air pollution to study its impact on environmental justice (doi:10.1289/ehp.7066; doi: 10.3390/ijerph8061755) 2008: Received the 2008 U.S. Environmental Protection Agency's Environmental Justice Award. 2010 - 2015: Built and maintained the first University of Michigan HIPAA-compliant research computing environment (CEHI-VDI). 2011-present: Developed a new measure for racial residential segregation known as the racial isolation index; RI (doi:10.1016/j.sste.2011.06.002) 2015 - 2020: Built and maintained the first Rice University HIPAA-compliant computing environment (Virtual Research Desktop Environment – VRDE); supported the creation, development and establishment of the first Urban Data Platform in the city of Houston, Texas in collaboration with the Rice University Kinder Institute. 2018: Established the first registry to collect and maintain health and economic information about environmental exposures following a major U.S. flooding event such as Hurricane Harvey. 2020-present: Built and maintain, in collaboration with the Center for Research Computing (CRC), the first University of Notre Dame's HIPAA-compliant computing environment (On-Premises Environment for Research Analytics (OPERA)) which provides a variety of GIS and statistical software for state-of-art analyses.
<p>Org</p>	<p>Staff of 11 full time staff including project managers, research scientists, research analysts, statisticians, GIS analysts, data manager, plus part-time staff and undergraduate assistants.</p> <p>Leadership:</p> <ul style="list-style-type: none"> Marie Lynn Miranda: Director (cehi@nd.edu) Joshua Tootoo: CEHI Director of Training and Geo Spatial Sciences (tootoo@nd.edu) Carolina Avendano: CEHI Director of Research Operations (cavendan@nd.edu) Claire Osgood: CEHI Data Manager (cosgood@nd.edu)
<p>Board</p>	<p>Formal board is not required</p>

Finances	Supported by grants and contracts from the NIH, National Association of Chronic Disease Directors, CDC, and private foundations with an annual budget of \$2 million
Data Sources	<p>CEHI uses data from a large number and variety of national, state, and local sources, and is also involved in primary data collection. CEHI collects location attributes at the smallest geographic scale available in support of mapping and spatial analysis. The DUA's signed with the local and states sources allow CEHI to link the datasets resulting in a collection of curated datasets ready for analyses.</p> <p>Primary Data Collection</p> <ul style="list-style-type: none"> • Texas Flood Registry • COVID-19 Registry, Texas • COVID-19 Registry, Indiana <p>Local Sources</p> <ul style="list-style-type: none"> • University of Texas Health Science Center at Houston • North Carolina Education Research Data Center at Duke University <p>State Sources</p> <ul style="list-style-type: none"> • North Carolina Department of Health and Human Services, Vital Statistics; North Carolina Department of Health and Human Services, Department of Public Health; North Carolina Department of Public Instruction; Michigan Department of Health and Human Services <p>National Sources</p> <ul style="list-style-type: none"> • US Census Bureau, US Department of Housing and Urban Development (HUD), Agency for Health, Research and Quality (AHRQ), US Bureau of Labor Statistics, Centers for Disease Control and Prevention (CDC), Centers for Medicare and Medicaid Services (CMS), US Environmental Protection Agency (EPA), Atmospheric Composition Analysis Group, Federal Emergency Management Agency (FEMA), Health and Human Services Administration (HRSA), Pew Research Center, US Department of Homeland Security (DHS) and US Department of Agriculture (USDA)
Data Access	<ul style="list-style-type: none"> • A list of CEHI data can be accessed at the CEHI DataHub (www.cehidatahub.org/hub). CEHI's datahub contains the metadata and attributes of datasets created and curated by CEHI from the data sources described above. • Any of CEHI's datasets that are governed by a data use agreement (DUA) with a data provider are considered private and access to them requires a formal collaboration agreement with CEHI and the submission of a Research Project Plan.
Tech Capabilities	<p>CEHI curates community data, spatially-enables and integrates administrative and health outcome data, builds spatial information infrastructure, and develops information systems and decision support tools.</p> <p>Core capabilities include:</p> <ul style="list-style-type: none"> • Geo-spatial data warehousing, geo-referencing and geo-processing • Data linkage and integration • Ability to de-identify data and store in HIPAA-compliant environment • GIS support for research design and analysis
Projects	<ul style="list-style-type: none"> • Powering Research Through Innovative Methods for Mixtures in Epidemiology (PRIME): The central objective of this project is to develop new data architecture, statistical, and machine learning methods to assess how exposure to environmental mixtures (air pollution and childhood lead) shapes educational outcomes in the presence or absence of social stressors. • Building GIS Capacity: This project brings together CEHI and Health Departments (HDs) in a collaborative partnership under the advice and guidance of the Centers for Disease Control and Prevention and the National Association of Chronic Disease Directors to: (1) to build capacity in HDs to use GIS to improve heart disease and stroke prevention and treatment programs and policies and (2) to develop guidelines for developing GIS capacity in HDs across the country. • COVID Registries: the COVID-19 Registry in Indiana and Texas is a research study designed to capture, measure, and understand the economic and health impacts of the pandemic in local communities across each state.

Future Focus	<ul style="list-style-type: none"> • Expand our research portfolio to involve work based on Indiana data sets where we can attach geography and time stamp to the data. • Continue our emphasis on spatial analytic approaches and GIS capacity building efforts with a special interest in issues of environmental justice. • Invest simultaneously on innovative and flexible data architectures, statistical method development, characterization of exposomes and social correlates of health.
Talent Development	<ul style="list-style-type: none"> • GIS Capacity Building Project provides technical training to State, Local and Tribal health organizations. • Train individuals (staff, graduate students, post-docs, etc.) and organizations (government, non-profit and private) to access and use spatial information with clinical data to drive population health research and improve outcome. • Host multiple undergraduate research interns each year.
Data Sharing Agreements	<p>Many agreements in place which are use case specific: NC State Center for Vital Statistics (NC Birth and Death certificate data); NC DHHS, Department of Public Health (NC Blood lead level surveillance data and interventions/abatement data); NC Education Research Data Center (NC K-12 education data); MI DHHS (MI Birth and Death certificate data); MI DHHS (MI Blood lead level surveillance data); and UT Health Science Center (Stroke registry data).</p>
Programs/ Publications	<p>CEHI's publications can be found here: https://cehi.nd.edu/publications/</p>