The Collaborative Data Analysis (CoDA) Study of Residential Exposure to Industrial Pollution and Health in Louisiana

An April 2026 report by the CoDA team

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Executive Summary

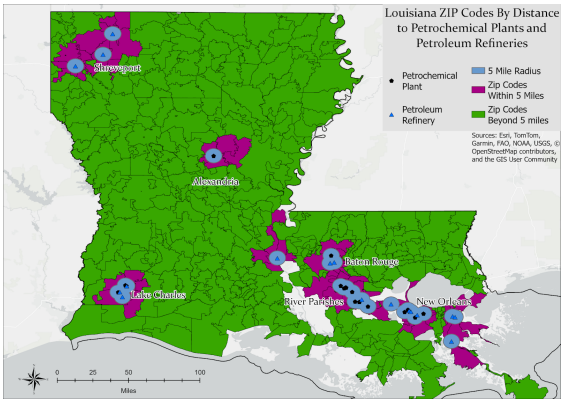
Introduction

Across heavily industrialized regions of Louisiana, residents have long described concerns related to industrial pollution exposures and patterns of illness, including extensive community-driven documentation of these issues.[1–9] Previous academic research has identified recurring patterns of increased respiratory illness, cancer, and other health issues in Louisiana's industry-adjacent communities.[8,10–20] However, regulatory decisions have often ignored community-based reports of health issues and instead relied on analyses done by government agencies,[21] which have inadequately addressed residents' questions about how industrial activity relates to health in their communities and/or minimized their concerns.[22] Our team's systematic review of the existing evidence on industrial pollution and health in Louisiana suggests a relationship between industrial proximity and health outcomes in the state.[23] However, one current gap in the research is using government-generated data to answer the questions residents are most interested in answering.

The Collaborative Data Analysis (CoDA) project sought to address this longstanding gap by combining rigorous quantitative analysis of state health and environmental data with collaborative, qualitative data interpretation processes involving residents across multiple regions of Louisiana. Through this multi-method approach, we sought to build meaningful epidemiologic insights that residents could easily understand, discuss, and communicate in policy-relevant settings.

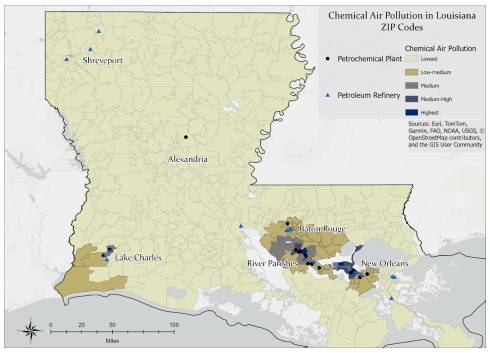
Methodological Approach

Our community-engaged research project used complementary quantitative and qualitative methods. First, we analyzed patterns of health outcomes and environmental exposures using government data. Health outcome data came from Louisiana Medicaid claims records from 2017–2019, covering approximately 40% of the state's population, including children, lower-income adults, pregnant women, and individuals receiving Supplemental Security Income. Because people ages 65 and older are eligible for Medicare, their health information is not included in this Medicaid dataset, so we are only able to study health issues among children and adults up to age 64.

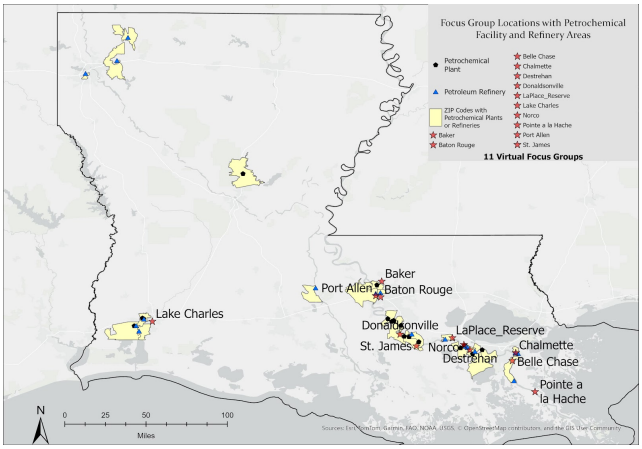


Environmental exposure data were drawn from publicly available federal and state sources, including the U.S. Environmental Protection Agency (EPA) and the Louisiana Department of Environmental Quality (LDEQ), and operationalized using two complementary measures: (1) ZIP code-level proximity to 40 petrochemical plants and petroleum refineries identified in 2017 LDEQ records, and (2) ZIP code-level weighted estimates of toxic chemical air pollution based on 2016 EPA Risk Screening Environmental Indicators (RSEI) geographic

microdata, which account for the quantity, toxicity, and atmospheric behavior of reported industrial emissions. We linked and analyzed these different datasets to assess whether certain health outcomes occurred more frequently in areas located nearer to industrial activity or with more industrial air pollution. We conducted analyses for a wide variety of health outcomes, including health outcomes related to respiratory health, cardiovascular health, neurological health, cancer, reproductive health, child health and infant health, among others. We calculated risk ratios to compare the chances of health problems in more industrialized areas versus less industrialized areas, and we estimated the number of additional cases among exposed residents that may be attributable to living in those industrialized regions.



To complement and enrich the quantitative analyses, we conducted 22 virtual and in-person focus groups across multiple regions of Louisiana, prioritizing communities situated near petrochemical and industrial activity. In these sessions, residents reviewed preliminary quantitative results, shared interpretations grounded in their lived experiences, raised additional questions or concerns that informed subsequent analyses, and offered ideas on next steps. We recorded these workshops to create anonymized transcripts, and analyzed these transcripts to identify overarching ideas and illustrative quotes. This dual approach—rigorous epidemiologic analysis combined with resident-guided interpretation—supported the project's goal of producing findings that were scientifically sound and directly responsive to community concerns.



Results

Quantitative analysis identified patterns of elevated health risks among residents living in areas with higher levels of petrochemical exposure. Across multiple analytic approaches, individuals residing in ZIP codes with higher pollution exposure experienced higher prevalence of certain adverse health outcomes compared to residents in lower-exposure areas, after adjustment for age and sex and exclusion of adult smokers. Here, we highlight findings that were statistically robust– that is, had similar findings– regardless of how we characterized industrial exposure.

Among children, living in an area with higher exposure to industrial pollution was associated with increased likelihood of being diagnosed with nutritional anemia and learning disabilities. For female children, living in an area with higher exposure to industrial pollution was associated with a higher risk of early puberty.

Table 1. Key findings of multivariate analysis of children's health outcomes (risk ratios and 95% confidence intervals), among all children aged 0-17 years (n=804,357).		
Health outcome	**Distance model RR (95% CI)**	**Air pollution model RR (95% CI)**
Nutritional anemia	1.34 (1.13-1.59)	1.16 (1.09-1.23)
Learning disabilities	1.20 (1.05-1.37)	1.12 (1.06-1.18)
Dermatitis and eczema	1.10 (1.01-1.20)	1.06 (1.03-1.08)
Early puberty (among girls only)	1.24 (1.10-1.41)	1.09 (1.04-1.16)

For non-smoking adult women who experienced pregnancy, higher residential exposure to industrial pollution was associated with higher risk of preeclampsia/eclampsia, miscarriage, and ectopic pregnancy. Among all non-smoking adult women, higher residential exposure to industrial pollution was associated with uterine fibroids and breast cancer.

Table 2. Key findings of multivariate analysis of women's health outcomes (risk ratios and 95% confidence intervals), among all non-smoking women aged 18+ (n= 494,920).		
Health outcome	**Distance model RR (95% CI)**	**Air pollution model RR (95% CI)**
Uterine fibroids	1.16 (1.05-1.28)	1.06 (1.03-1.10)
Breast cancer	1.10 (1.02-1.19)	1.06 (1.03-1.09)

Table 3. Key findings of multivariate analysis of pregnancy-related health outcomes (risk ratios and 95% confidence intervals), among non-smoking adult women who have been pregnant (n=96,482).		
Health outcome	**Distance model RR (95% CI)**	**Air pollution model RR (95% CI)**
Ectopic pregnancy	1.18 (1.02-1.37)	1.09 (1.02-1.16)
Miscarriage	1.11 (1.02-1.21)	1.05 (1.01-1.08)
Preeclampsia / eclampsia	1.24 (1.14-1.35)	1.08 (1.05-1.12)

Among all non-smoking adults, living in a ZIP code with a higher exposure to industrial pollution was associated with increased risk of nutritional and other acquired anemias.

Table 4. Results of multivariate analysis of non-smoking adult health outcomes (risk ratios and 95% confidence intervals), among non-smoking adults ages 18+ (n=810,732).		
Health outcome	**Distance model RR (95% CI)**	**Air pollution model RR (95% CI)**
Nutritional anemia	1.15 (1.08-1.23)	1.06 (1.04-1.09)
Other acquired anemia	1.18 (1.10-1.26)	1.07 (1.05-1.10)

Community focus group discussions frequently reinforced the epidemiological findings and provided specific examples that aligned with the health outcomes presented. Participants described recurring experiences with childhood learning challenges, anemia, respiratory concerns, and reproductive health complications, often linking these issues to proximity to petrochemical facilities and long-standing environmental exposures in their neighborhoods. Participants also discussed conditions that were not among our quantitative analysis of Medicaid data findings, including cancer, asthma and other respiratory issues, and adverse birth outcomes, such as low birthweight and preterm birth. Residents emphasized cumulative and intergenerational health concerns, noting patterns of similar diagnoses occurring across multiple family members and generations. Discussions also highlighted structural factors—including barriers to healthcare access, limited environmental monitoring transparency, and historical disinvestment—that participants believed interacted with pollution exposure to shape health outcomes. In addition, community members provided feedback on data analysis and interpretation.

Collectively, focus group input strengthened interpretation and presentation of the statistical analyses, identified priority areas for additional investigation, and informed refinement of how results were communicated in the final report. Participants also had specific recommendations for action, including strengthening state and federal policies governing industrial emissions and improving transparency and frequency of chemical reporting from petrochemical facilities. Community members expressed wanting state legislators, local representatives and elected officials, and regulatory agencies to advocate for stronger environmental protections and accountability from industry, including supporting community-based environmental monitoring and public health surveillance systems. Community members also recommended that public health agencies and school districts conduct campaigns to increase awareness about health conditions that were common in industrialized areas, and advertise and provide more health and school-based services.

Conclusions

After analyzing large-scale Medicaid data with multiple government-generated measures of industrial pollution exposure in response to resident-driven questions, we found that exposures to industrial pollution were associated with elevated risks of certain health outcomes among particularly vulnerable populations (e.g., children, pregnant women) as well as adults overall. The consistency of findings across exposure metrics and alignment with existing scientific literature add to the body of evidence that suggest a connection between industrial pollution and health in Louisiana. Focus group feedback not only enhanced understanding of the findings but also shaped next steps related to additional analyses, dissemination strategies, and implications for public health and environmental policy. The CoDA Environmental Health Study demonstrates the value of integrating rigorous epidemiologic analysis with sustained community engagement to examine environmental health issues in Louisiana.