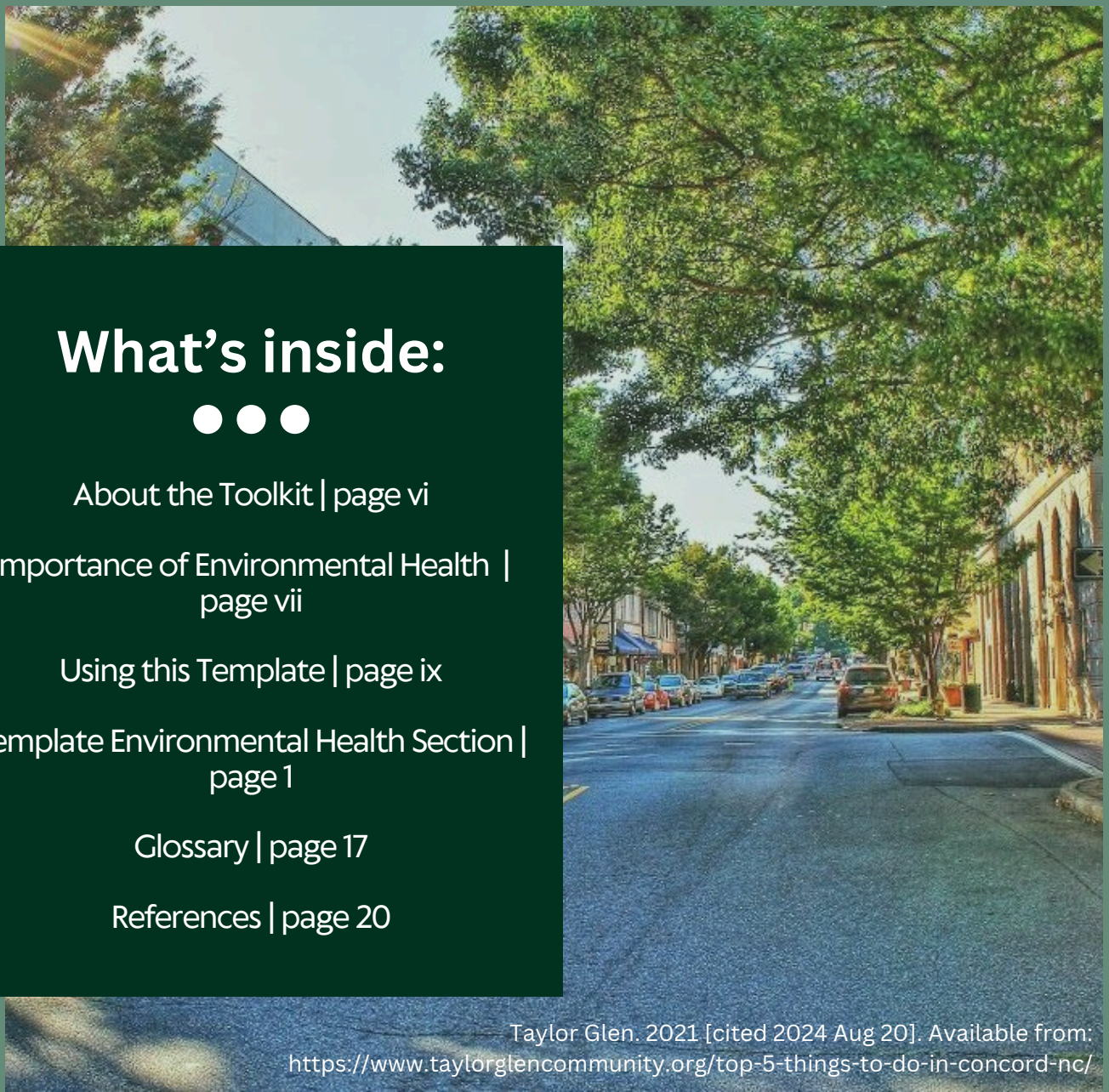
Environmental Health & Quality Toolkit

Guidance to help local health departments include environmental health and environmental justice on their community health needs assessment

Fall 2024 | Version 1.0



What's inside:

Taylor Glen. 2021 [cited 2024 Aug 20]. Available from: https://www.taylorglencommunity.org/top-5-things-to-do-in-concord-nc/

Page intentionally left blank

Development of this document was supported by…

TABLE OF CONTENTS

ABOUT THE TOOLKIT

The Environmental Health and Quality Toolkit offers valuable resources for local health departments, government staff, hospital systems, and community partners to recognize the importance of environmental health and environmental justice. It also provides a practical template for incorporating these topics into community health needs assessments (CHNA) and other documents, such as the State of the County Health report (SOTCH) or surveillance efforts related to environmental health in their jurisdiction. Please note that while this toolkit will highlight information and data sources specific to North Carolina, the broad concepts and topics may be applied across any state.

This toolkit includes...

- Background information on environmental health
- Background on the importance of including a chapter on environmental health and environmental health quality on the community health needs assessment
- A guide on how to work with partners to write a section on environmental health and environmental health quality
- An environmental health & quality chapter template with...
    - Suggestions on topics to highlight
    - Suggestions on data to collect & present
    - Guides on how to update the data for each new iteration of the needs assessment
    - One-pagers that can be independently shared or used for other reporting purposes
- Supplemental materials (linked separately)...
    - Two examples of environmental health department program report sections
    - One example of an environmental health quality report section
    - Sample survey questions
    - Sample listening session moderator questions
    - Sample community input promotion materials
    - Written and video guides on North Carolina's Environmental Health Data Dashboard
    - Written and video guides on North Carolina's ENVIROSCAN Dashboard

This toolkit has a focus on environmental health and environmental health quality. This toolkit does not provide information on environmental science or other environmental impacts on animals, crops, infrastructure, etc.

IMPORTANCE OF ENVIRONMENTAL HEALTH

Many people have different thoughts upon hearing the term “environmental health”. While it does not focus on the health of the environment, it does focus on the effects of the environment on human health. Environmental public health addresses local, regional, national, and global environmental factors that may influence health. This may include the physical, chemical, and biological factors external to a person and their behaviors. These conditions are called the **Environmental Determinants of Health** (**EDH**) [1].

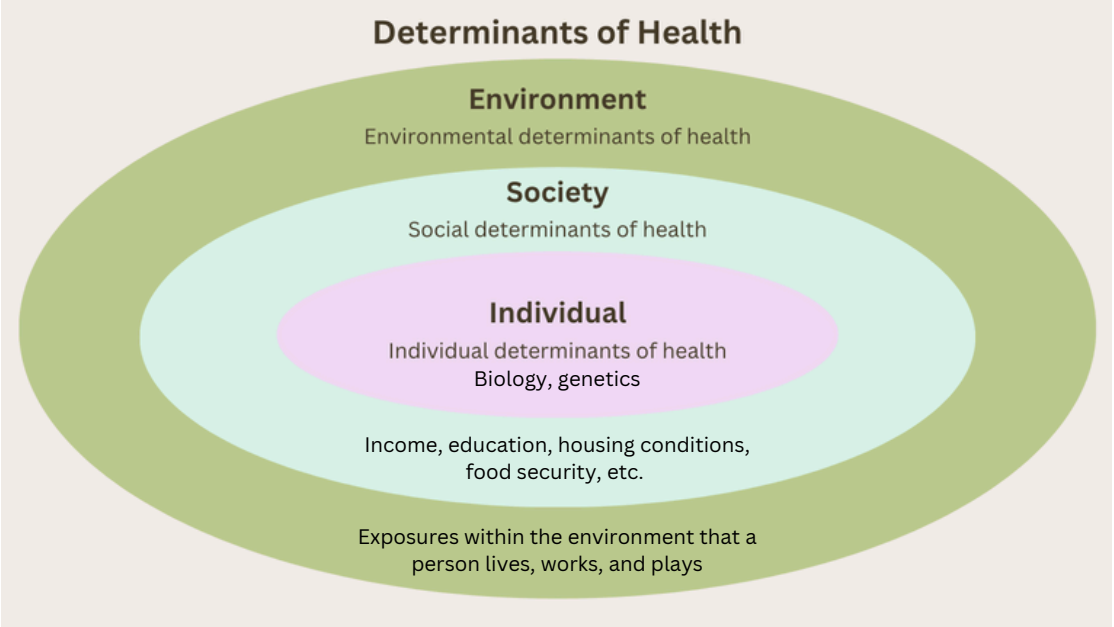


Fig. 1: The environmental determinants of health work in tandem with the social determinants of health and the individual determinants of health to all affect each person [1].

All people are exposed to the environment in some way. However, related health outcomes are dependent on the nature, amount, and frequency of the exposure. Though two different individuals may be exposed to the same environmental factor for the same amount of time, the resulting outcome on their health may differ depending on their pre-existing conditions, genetics, and social determinants of health.

One reason many people don’t know much about environmental health is because there are little environmental health data or education available on a county level. This toolkit guides a template for a section on the community health needs assessment to provide more data and education on environmental health. *Including environmental health and environmental justice on the needs assessment may lead to greater prioritization of environmental health issues on a local level.*

ENVIRONMENTAL HEALTH & ENVIRONMENTAL HEALTH DEPARTMENT PROGRAMS ON THE NEEDS ASSESSMENT

Environmental health advances policies and programs centered around the relationship between people and their environment. The environment does not only include the outdoors, but also the locations where people live, work, play, and worship [2].

Exposures in the environment may include air, food, soil, and water. These exposures can impact human health, especially the most vulnerable, at-risk populations. These can be referred to as environmental health factors.

Environmental health department programs strive to monitor, regulate, and reduce harmful exposures, ensuring safer environments for all individuals [3]. **Registered Environmental Health Specialists** (**REHS**) educate the community on best practices and compliance with their state's environmental health rules and laws [4].

Including environmental health programs helps in addressing issues that are already being directly monitored by the health department.

North Carolina Environmental Health Departments are required to have the following programs...

- Childcare and School Sanitation
- Childhood Lead Poisoning Prevention
- Food, Lodging, and Institutions
- Private Drinking Water Well Permitting and Testing
- Public Swimming Pool Program
- Tattoo Artist Permitting
- Onsite Wastewater Protection [3]

Depending on the risks and concerns in your jurisdiction, it can be advantageous to include data that is already being collected by the local environmental health department in your needs assessment.

Some local environmental health departments may also run additional programs such as Mosquito and Vector Programs or work in conjunction with other departments such as the local animal control. These programs may also be beneficial to include into your environmental health report section.

ENVIRONMENTAL JUSTICE ON THE NEEDS ASSESSMENT

Environmental justice is the *just* treatment and meaningful involvement of all people, regardless of income, race, color, national origin, Tribal affiliation, or disability in agency decision making and other activities that affect all human health and the environment [5].

Including environmental justice on the community health needs assessment is crucial as it addresses the disproportional impact of environmental hazards on marginalized community. Highlighting these issues can help the community better understand potential root causes of health inequities and therefore plan to address them. This approach promotes a more comprehensive view of community needs by considering environmental factors alongside other health issues, leading to more effective and equitable health interventions.

Writing about environmental justice also fulfills requirements for North Carolina Local Health Department Accreditation. On the Community Health Assessment Checklist for NC Local Health Department Accreditation, addressing environmental justice on the needs assessment can fulfill Benchmarks...

- 1.1A Providing evidence of community collaboration in planning and conducting the assessment;
- 1.1B Reflect the demographic profile of population;
- 1.1H Identify population groups at risk for health problems; and
- 1.1K Identify leading community health problems [6].

Other North Carolina **Health Department Self-Assessment Instrument** (**HDSAI**) **Interpretation Document 2024** Benchmarks this environmental health and environmental health quality section may fulfill include...

- 4.2 Environmental Health Risks;
- 9.1A Accessible dissemination of data and information on current local issues to the general public/community partners;
- 9.1B Dissemination of data and information on local issues to policy leaders;
- 10.1A Evidence of planning/development, implementation and evaluation of health promotion/disease prevention programs targeted to the general public;
- 10.1B Evidence of planning/development, implementation, and evaluation of educational materials targeted to the general public;
- 10.3A Evidence of agency exploration and employment of evidence-based strategy;
- 10.3B External evidence that indicates this strategy is effective;

- 10.4A Evidence of agency promotion and support of evidence-based strategy by community partners;
- 10.4B External evidence that indicates that this strategy is effective;
- 11.2A Evidence of community member input on assessing, prioritizing, and establishing desired outcomes for community health issues and needs;
- 12.1A List of participants (by organization or group represented) in a collaborative process to identify strategies for addressing community health problems;
- 12.1B Evidence of the department's active participation in this collaborative process; and
- 13.1A Documentation of targeted outreach and training activities with one new community partners or contacts [7].

This toolkit was written for the viewing perspective of a local health department in North Carolina. However, this toolkit includes topics and concepts that can be used for any local health department in any state.

Environmental issues and community vulnerabilities often result from the actions of various agencies over time, which means local health departments might not always have full authority to address them. However, the goal of this assessment is to outline actionable steps the local health department can take to improve public health. Engaging with community residents, who offer valuable insights and experience, is crucial to have fully comprehensive data. Combining this input with qualitative data analysis helps the local health department identify and implement effective actions to enhance health outcomes and reduce negative impacts on vulnerable populations.

Including environmental justice in community health needs assessments is important for fostering discussions aimed at achieving environmental equality for all individuals, regardless of race, ethnicity, gender, or income [6]. However, if the term "environmental justice" may cause hesitation in your community, consider using alternative terms instead...

- Environmental equality
- Community Environmental Health
- Effects of environmental factors
- Environmental inclusivity
- Environmental well-being

This toolkit uses the term "**Environmental Health Quality**" in place of environmental justice. Feel free to also use this term or change for a different term.

USING THE ENVIRONMENTAL HEALTH & QUALITY TOOLKIT

The rest of this document is a template guide that includes fill-in-the blank language that can be used as a starting point for your own Environmental Health & Environmental Quality Chapter on the Community Health Needs Assessment.

This template provides sample descriptions of various environmental health department programs and topics that can be included in your needs assessment. This template also includes examples of data that can be inserted into the document for future surveillance purposes.

This document includes a guide for addressing both programs in the environmental health department and environmental health quality, as there may not be cross over at times. This guide along with the supplemental materials, allows you to adapt and modify the information as needed by your local community.

WRITING ABOUT THE ENVIRONMENTAL HEALTH DEPARTMENT:

Work with your local environmental health department to determine which programs would be best to highlight in your community health needs assessment. The toolkit contains brief descriptions of all the required environmental health programs in North Carolina.

Each program collects data relating to their inspections, investigations, and programs. This template outlines some ideas of what data is collected how it may be presented for this report chapter.

This template also includes one-pagers that can be removed and printed separately for surveillance outside of the community health needs assessment.

There are also additional examples of a Private Drinking Water Well one-page report and a Childhood Lead Poisoning Prevention one-page.

WRITING ABOUT ENVIRONMENTAL HEALTH QUALITY (I.E., ENVIRONMENTAL JUSTICE):

Step 1: Conduct background research to gain a solid understanding of various environmental health factors that may be raised by community members.
Start by reviewing key environmental health topics, such as air quality, water contamination, waste management, climate change impacts, and exposure to toxins. It is important to understand how these issues disproportionately affect marginalized communities. Familiarize yourself with environmental justice frameworks, which can help contextualize how systemic inequities, such as housing segregation or industrial zoning practices, contribute to public health challenges. This foundational knowledge will prepare you to effectively engage with community stakeholders and understand their concerns.

Also, consider shadowing programs in the local environmental health department to gain a practical understanding of ongoing initiatives. Additionally, explore environmental health and justice dashboards to identify specific areas in your community that may face environmental risks. This will allow you to be able to provide a more specific approach to working with the community. See *Step 5* for examples of environmental health and justice related dashboards.

Step 2: Connect with local agencies and community-based organizations (CBOs) in the county or municipality that you serve [6].
This may include organizations that focus on environmental health or environmental justice. However, there are many other industries that are unknowingly connected to environmental health and environmental justice. Some examples of these industries include…

- Building and Zoning;
- City or County Planning & Management;
- Agriculture;
- Transportation;
- Organizations that focus on marginalized or underserved communities (such as the unsheltered population or the local chapter of the NAACP);
- County Emergency Management staff or responders;
- Local colleges and universities.

Also collaborate with other departments or programs within the local health department. Many times, other health department staff may have connections with the local community that you may be able to reach out to. Community health workers are also valuable connection as they have direct contacts and trust built with the communities that you may want to reach.

If you are unable to readily identify any community-based organizations (CBOs), various statewide networks such as the North Carolina Environmental Justice Network (NCEJN), North Carolina Conservation Network (NCCN), REACT4EJ, or the North Carolina Chapter of the National Association for the Advancement of Colored People (NAACP) to see if they are aware of any CBOS that may be active in your community.

Step 3: Work with the CBO to determine where roles are filled and where needs may lie [6].
Possible contributions by CBOs can include aiding in gathering community data through surveys and focus groups or facilitating listening sessions.

Community-based organizations have direct ties to the communities who are most affected by environmental injustices. Utilizing the connections held by CBOs ensures that the community is being reached in a culturally competent way.

Step 4: Gather qualitative information on how the community feels the environment is affecting their health [6].
This may be done by including questions about environmental health on the community health survey, distributing a survey to gather information only on environmental health, or holding community listening sessions about environmental health.

Materials to promote the focus groups and sample questions for focus groups or surveys can be found in Supplemental Materials section. Feel free to pick some or all the questions to best fit your community's needs.

Step 5: Compare the community's input with available state and national tools [6].
Many of the topics mentioned during the surveys or listening sessions may have some associated quantitative data to provide additional context. There are several data sources that are available and maintained from state and federal governments. These sources can be used to give insight to the topics mentioned by the community.

Many of these data sources use **Geographic Information Systems** (**GIS**) to display physical locations of areas and populations affected by the specified health topic.

Some of the already available data sources and dashboards include...

- County Health Ranking and Road Maps
- **Centers for Disease Control and Prevention Environmental Justice Index** (**EJI**)
- **Environmental Protection Agency Environmental Justice Screen** (**EJ Screen**)
- **North Carolina Department of Health and Human Services Environmental Health Data Dashboard** (**EHDD**) [6]
- North Carolina Department of Environmental Quality Community Mapping System
- North Carolina Department of Transportation Disadvantage Index
- **University of North Carolina at Chapel Hill ENVIROSCAN**

Instructions on using the **EHDD** and **ENVIROSCAN**, along with report examples, are in the Supplemental Resources section (linked separately).

Step 6: Provide a narrative on the environmental challenges faced by community members [6].
Incorporate personal stories and testimonials to illustrate the real-life impact of the environmental issues and support these accounts with correlating statistical data. This comprehensive narrative will help readers understand the urgency of addressing these environmental health challenges.

TOOLKIT FORMAT

- **HEADINGS** and black text are suggestions. You can use, adapt, or remove them based on your community's needs.
- Replace red text with your jurisdiction's data (e.g., "[County Name]" to "Rowan County").
- Grey text gives instructions or examples and should be deleted before publishing.
- **Bolded** words throughout the toolkit are defined in the Glossary.
- The References Page lists all data and sources in Vancouver style, which can be modified to your preference.
- All additional materials are included in Supplemental Resources.

The template displays data over a four-year period, but you can adjust the range of data to accommodate the needs of your county. Additionally, some state and federal data sources may fall outside this range. Clearly explain any data that does not align with your timeline.

This toolkit aims to inspire ideas and guide the prioritization of environmental health. We do not expect users of this toolkit and template to include all the topics listed, but rather identify and select topics most applicable to their jurisdiction.

Page intentionally left blank

CHAPTER
ENVIRONMENTAL HEALTH & ENVIRONMENTAL HEALTH QUALITY

Introduction and Assessment

Exposures in the environment have downstream impacts on individual and community health. These exposures may come from the air we breathe, the water we drink, the food we eat, or the ground we walk on. **Environmental health** centers around the relationship that people have with their environment [2].

The physical, chemical, and biological factors external to a person and their related behaviors are referred to as the **environmental determinants of health** [1].

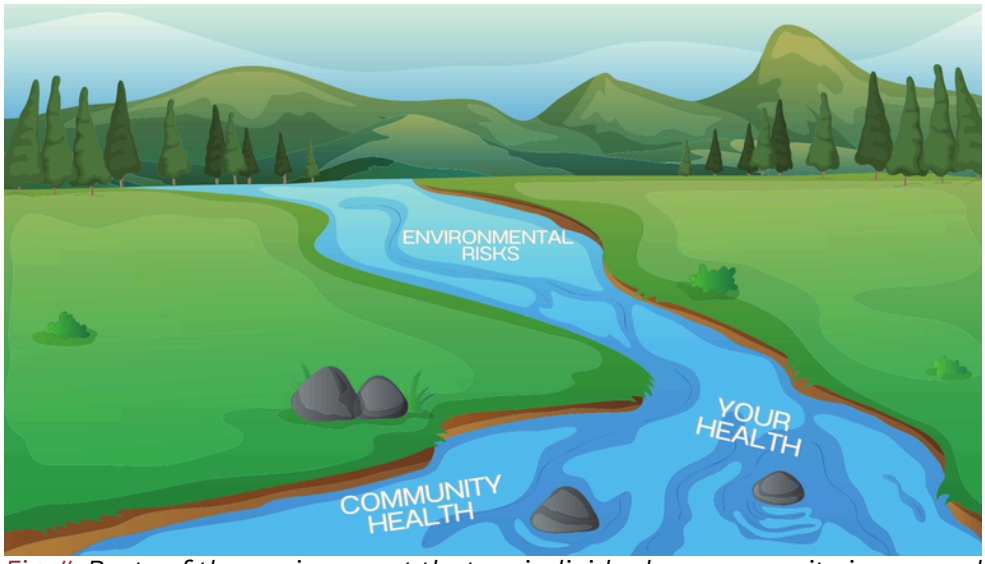


Fig. #: Parts of the environment that an individual or community is exposed to can have downstream impacts on health.

What a person is exposed to in the environment, combined with their socioeconomic status, the social context they live within, and their genetics all intersect together to impact their health.

All people in [COUNTY NAME] are exposed to various factors of the environment. However, related health outcomes are dependent on the nature, amount and frequency of the exposure. Though two different individuals may be exposed to the same environmental factor, the resulting outcome on their health may differ depending on the time of their exposure, how long each of them had been exposed, their pre-existing conditions, and genetics. Additionally, socioeconomic status, access to healthcare, and lifestyle choices can further influence the health impacts of environmental exposures. This chapter aims to find potential correlations between environmental exposures and health outcomes in [COUNTY NAME].

THE ENVIRONMENTAL HEALTH DEPARTMENT

Each local public health authority has a designated **Environmental Health Department** responsible for monitoring the health and safety of the county within its programs. The local Environmental Health Department ensures the compliance of the Environmental Health rules, laws, and codes that are set in place by the State of North Carolina [3].

Registered Environmental Health Specialists (**REHS**) are the qualified professionals within the health department who are authorized to ensure compliance from the community for various environmental programs [4]. These programs can include food and lodging facilities, permitted tattoo artists, permitting of public swimming pools, and sanitation of schools and other childcare centers.

Work with your local Environmental Health Department to determine what topics would be best to present in your report.

Add, delete, or modify any of the following programs as appropriate for the data collected for your local jurisdiction. They are all listed on separate pages, but you may adjust to fit the formatting of your document.

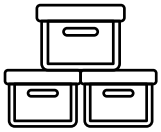
CHILDCARE AND SCHOOL SANITATION

Though childcare centers are licensed by the Division of Child Development & Early Education, they are required to undergo sanitation inspections by Registered Environmental Health Specialists authorized to enforce state rules and regulations. These inspections occur twice every year and assure the childcare center is following proper procedures to prevent the spread of illness, including general sanitation, food and snack service, and changing diapers [8].

Public, private, charter, and religious schools are inspected once per year. This inspection evaluates the maintenance of the school, proper chemical control, and protection from lead hazards [8].

A REHS GOES TO A CHILDCARE CENTER OR SCHOOL TO INSPECT...

Water supply & drinking water facilities



Storage spaces

Waste disposal

Lead Poisoning hazards

[8]

These are some things that the REHS evaluates during their inspections of childcare centers and schools.

#

of childcare centers inspected yearly in [COUNTY]

#

of schools inspected yearly in [COUNTY]

Other things that could be included in this section is the number of yearly inspections that take place for childcare centers and for schools.

Work with the local environmental health department to determine this number and if it should be something that can/should be shared on this report.

CHILDHOOD LEAD POISONING AND PREVENTION

In North Carolina, it is recommended that all children have their blood tested for lead during their 12-month and 24-month well-child visits.

If there is a child with two consecutive blood lead levels between 5.00 and 9.99 µg/dL, they are considered an **Elevated Blood Lead Level** (**EBL**) case and are offered an optional home investigation by the health department to look for potential sources of lead poisoning [9].

If there is a child with two consecutive blood lead levels tested over 10 µg/dL, they are considered a **Confirmed Lead Poisoning** (**CLP**) case and are required by the state to have a home investigation [9].

HEALTH IMPLICATIONS OF LEAD POISONING FOR CHILDREN INCLUDE...

Behavior & learning problems

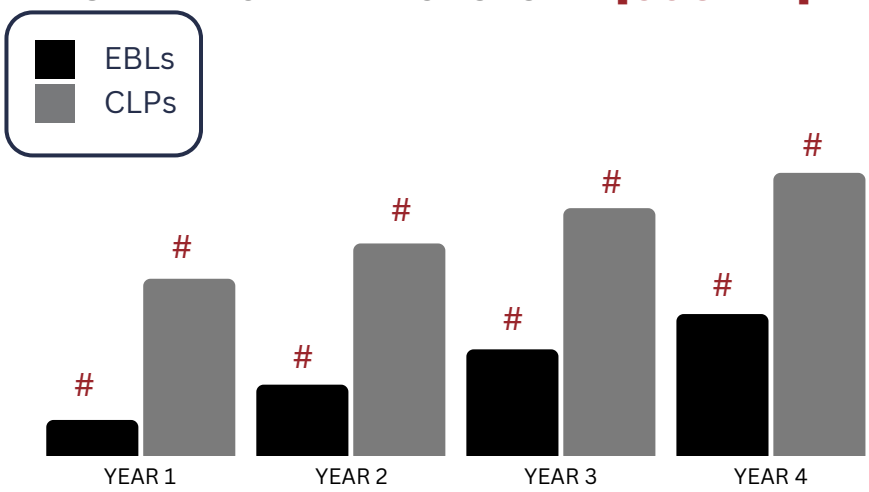
Lowered IQ & hyperactivity

Hearing problems

Anemia

[10]

NUMBER OF LEAD CASES IN [COUNTY]



#%

INCREASE/DECREASE in EBL cases from YEAR 1 to YEAR 4.

#%

INCREASE/DECREASE in CLP cases from YEAR 1 to YEAR 4.

The most common categories of potential sources contributed to EBLs and CLPS in **[YEAR 4]** were **[INSERT TOP SOURCES]**. This changes from **[YEAR 1]** where the most common categories of potential source were **[INSERT TOP SOURCES]**.

See Supplemental Materials for an example of Childhood Lead Poisoning Prevention Section report.

FOOD & LODGING

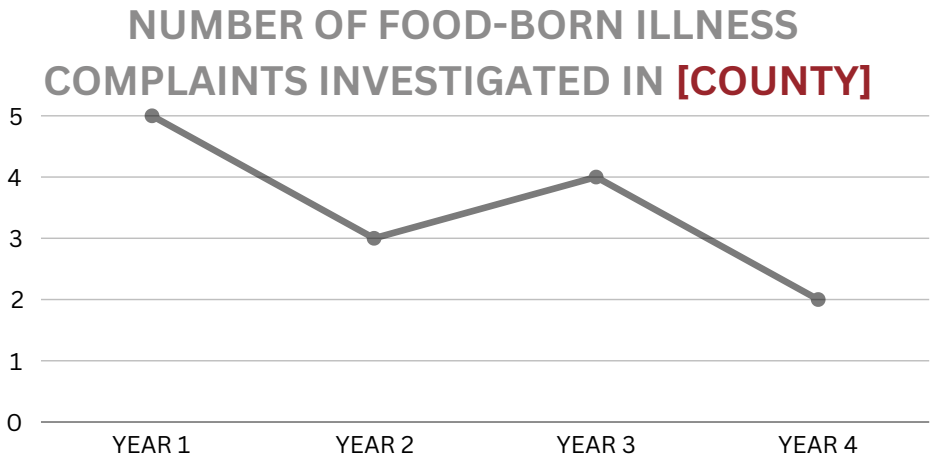
The local environmental health department regulates all establishments selling food for pay and enforces rules in the North Carolina Food Code Manual. In local environmental health departments, Registered Environmental Health Specialists inspect all facilities within their county, including restaurants, food stands, mobile food units, school cafeterias, meat markets, and lodging [11].

Each permitted facility is routinely inspected one to four times each year depending on their assigned risk category. These inspections assess facility sanitation, food handling procedures, and proper food protection while it is being prepared including hand washing, food and utensil storage, and transportation [11].

The Food & Lodging Division also investigates sanitation complaints and potential outbreaks of food-borne illness. The REHS also helps with education on food safety to ensure compliance with food code rules [11].

Things that can be tracked on this page include number of yearly inspections, number of establishments inspected, number of educational activities, or yearly number of food-borne illness investigation activities.

Work with the local environmental health department to determine this number and if it should be something that can/should be shared on this report.



Include a brief explanation of the chart.

PRIVATE DRINKING WATER WELLS

All local environmental health departments in North Carolina will permit drinking water wells for residential and commercial properties. After the wells are permitted and drilled, they must be tested for microbial, organic, and inorganic contaminants within 30 days and before the property owner can use them [12]. The environmental health department will sample the water and share the results with the property owner.

Following the first well water test, the North Carolina Department of Health and Human Services (NCDHHS) recommends that well owners test their wells for contaminants every three to five years, especially if the well has previously tested high in a contaminant [12].

In [COUNTY] from [YEAR 1] through [YEAR 4], many tested wells were found to be elevated in [CONTAMINANT]

Information about contaminant of interest, such as...

- What it is
- Who is at risk
- What are the potential health outcomes
- Number of wells that have been tested for contaminant

See Supplemental Resources for an example of a Private Drinking Water Wells Section report.

You can insert a well contaminant map from ENVIROSCAN if there is particular contaminant of interest in your county to highlight in this section.

See Supplemental Resources for instructions on using UNC Chapel Hill's ENVIROSCAN.

Alternatively, you can also include the number of wells that have been drilled, permitted, tested, or abandoned.

Work with the local environmental health department to determine what to focus on in this section.

PUBLIC SWIMMING POOL PROGRAM

The North Carolina Department of Health and Human Services requires public swimming pools to undergo inspection by local environmental health inspectors so pools are clean, healthy, and safe for community members. These rules are implemented to decrease the public's risk of illness and injury. In North Carolina, seasonal pools operate from April to October. Local Environmental Health Specialists inspect seasonal pools at the beginning of swimming pool season.

During the inspections, the Environmental Health Specialist assesses the water quality, pool maintenance, the premises of the area, the equipment room, and the dressing/sanitation facilities. After successfully passing inspection, the Environmental Health Specialist will issue the operations permit, and the pool will be available for public use [13].

You can also include number of pools inspected or number of seasonal pools permitted, number of year-round pools permitted, number of complaints investigated, or number of plans reviewed each year.

Work with the local environmental health department to determine this number and if it should be something that can/should be shared on this report.

[#]

of public swimming pools permitted [COUNTY] during [YEARS].

TATTOO ARTIST PERMITTING

In North Carolina, tattoo artists must obtain permits from the local environmental health department which operates under the sanitation and infection control strategies set by the North Carolina Department of Health and Human Services (NCDHHS). At the local health department, Registered Environmental Health Specialists inspect the tattoo studios and the practices of the artists to ensure compliance with health and safety standards [14].

The inspection process includes assessments of sanitation practices, sterilization protocols, and overall cleanliness to prevent infections and promote a safe environment for both artists and clients. Tattoo artists must ensure that all equipment is clean and sterilized before use. Proper sanitation techniques reduce the spread of blood-borne infections [14].

You can include number of permits renewed, number of new permits issued, or number of temporary tattoo permits issued each year.

Work with the local environmental health department to determine this number and if it should be something that can/should be shared on this report.

#

of tattoo artists permitted in [COUNTY] during [YEARS].

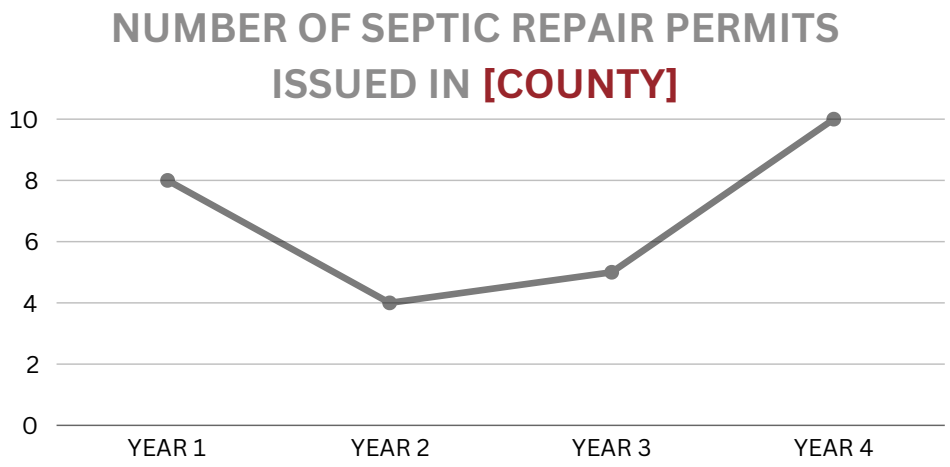
ONSITE WASTEWATER PROTECTION

The Onsite Water Protection Branch provides regulatory oversight of subsurface sewage disposal systems, also known as septic systems. Septic systems treat and dispose of sewage on residential and commercial properties unable to connect to the public sewer system [15].

The septic tank separates solid and liquid wastes and breaks down the solid parts. The remaining liquid flows through a series of pipes, called trenches, into the drainfield then seeps into the soil. The soil and beneficial organisms naturally treat the water before letting it re-enter into the environment [16]. Well-functioning and maintained septic systems protect human health by preventing groundwater contamination.

You can include trends repair permits issued, number of soil evaluations, number of final inspections (for new or repaired systems) for each year.

Work with the local environmental health department to determine this number and if it should be something that can/should be shared on this report or used for other surveillance.



Include a brief explanation of the chart.

ENVIRONMENTAL HEALTH QUALITY

Environmental Health Quality refers to how the environment affects the quality of an individual's and a community's health.

Describe the methods used for data collection, such as interviews, listening sessions/focus groups, or surveys, emphasizing the participatory approach that involves community members. Present the findings by integrating direct quotes or themes that emerged from the qualitative data, ensuring these voices are accurately represented and anonymized as necessary. Highlight key insights, recurring themes, and any differences in perspectives. Introduce the relevance to the community's overall health and well-being. If possible, connect to health concerns and activities of priority within the county and the local health department.

You may also use the various state and federal dashboards available (see Supplemental Resources for instructional guides on the NCDHHS's Environmental Health Data Dashboard and UNC Chapel Hill's ENVIROSCAN Dashboard) to support the community's contributions and concerns.

If there is limited information on community thoughts of how the environment affects their health, use the state and federal dashboards to identify potential environmental factors that may affect members of your community.
Topics of interest may include but are not limited to...

- Air pollution (indoor or outdoor)
- Flood plains
- Heat index and heat-related illness
- Chemical waste sites
- Water pollution or drinking water concerns
- Built environment
- Pesticide exposure

You write this section by yourself or with a writing team that also includes community members who may be interested in contributing time in writing their thoughts.

See supplemental resources for example of a Environmental Health Quality Section report.

ACKNOWLEDGEMENTS

This Environmental Health & Quality Toolkit was developed by...

- Alyssa Cabacungan, CHES, CDC Public Health Associate assigned to Cabarrus Health Alliance & Rowan County Public Health
- Courtney Meece, MPH, CHES, CHWC, Community Health Manager, Rowan County Public Health
- Jennifer Hatley, REHS, Environmental Health Director, Cabarrus Health Alliance
- Joe Bowman, RN, BSN, CPHN, Environmental Nurse Consultant, North Carolina Department of Health and Human Services
- Faye Koenigsmark Ph.D., GIS Analyst, North Carolina Department of Health and Human Services, Occupational and Environmental Epidemiology Branch
- Will Hendrick, Environmental Justice Director, North Carolina Conservation Network
- Lauren Eaves, Ph.D., Research Scientist and Training Division Lead, Institute for Environmental Health Solution, University of North Carolina at Chapel Hill
- Cailee Harrington, Ph.D. Student, Environmental Sciences and Engineering, University of North Carolina at Chapel Hill
- John Moore, Ph.D., REACT4EJ Team, North Carolina Central University
- Undi Hoffler, Ph.D., Research Compliance and Technology Transfer Director, North Carolina Central University
- Aubrey Daly, CDC Public Health Associate assigned to Cabarrus Health Alliance
- Billy Garrison, MPH, CHES, CDC Public Health Associate assigned to Rowan County Public Health

SUPPLEMENTAL RESOURCES AVAILABLE

The Supplemental Resources Section (linked separately) includes...

- Example of Childhood Lead Poisoning Prevention Section report (can be used in the chapter or as a one pager)

- Example of the Well Testing Contaminants Section report (can be used in the chapter or as a one pager)
  - Written and video instructions on how to use UNC at Chapel Hill's ENVIROSCAN to make a well contaminants map

- Example of Environmental Health Quality Page Section Report (can be used in the chapter or as a one pager)
  - Written and video instructions on how to use NCDHHS's Environmental Health Data Dashboard to make an environmental health map or request for technical support

- Modifiable community input promotional materials
  - Social Media Post and caption (English and Spanish versions)
  - Flyers (English and Spanish versions)
  - Promotional Article (English version only)

- Community Survey & Questions Examples (English and Spanish versions)

- Listening Session Moderator Questions (English version only)

CHILDHOOD LEAD POISONING AND PREVENTION

In North Carolina, all children are recommended to have their blood tested for lead at their 12-month and 24-month well child visits.

If there is a child with two consecutive blood lead levels between 5.00 and 9.99 µg/dL, they are considered an **Elevated Blood Lead Level** (**EBL**) case and are offered an optional home investigation by the health department to look for potential sources of lead poisoning [9].

If there is a child with two consecutive blood lead levels tested over 10 µg/dL, they are considered a **Confirmed Lead Poisoning** (**CLP**) case and are required by the state to have a home investigation [9].

HEALTH IMPLICATIONS OF LEAD POISONING FOR CHILDREN INCLUDE...

Behavior & learning problems

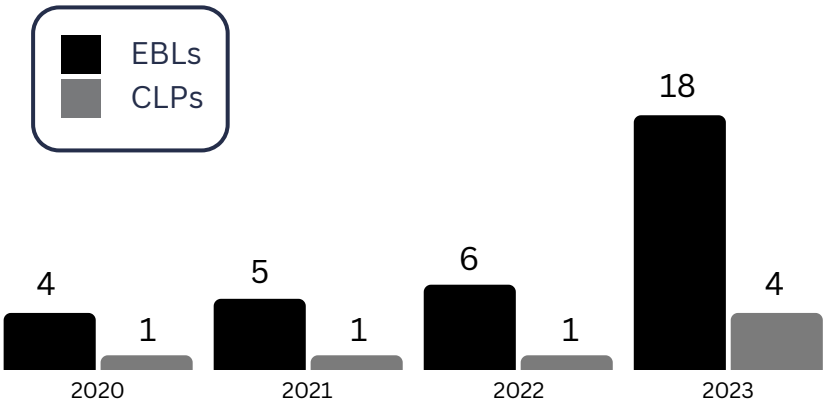
Lowered IQ & hyperactivity

Hearing problems

Anemia

[10]

NUMBER OF LEAD CASES IN ROWAN COUNTY



200%

INCREASE
in EBL cases from
2022 to 2023

300%

increase
in CLP cases from
2022 to 2023

Common categories of potential sources in 2023 were **LEAD BASED PAINT**, **LEAD PAINT DUST**, and **CONTAMINATED WATER FIXTURES**.

PRIVATE DRINKING WATER WELLS TESTING & PERMITING

All local environmental health departments in North Carolina will permit drinking water wells for residential and commercial properties. After the wells are permitted and drilled, they must be tested for microbial, organic, and inorganic contaminants within 30 days and before the property owner can use them [12]. The Environmental Health Department will sample the water and share the results with the property owner.

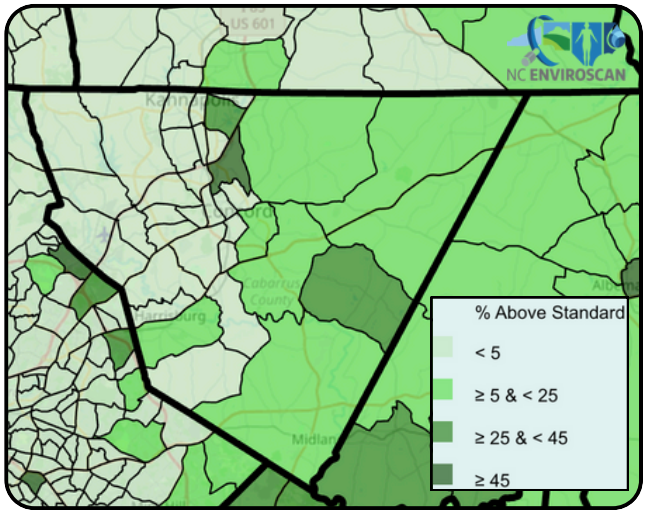
Following the first well water test, the North Carolina Department of Health and Human Services (NCDHHS) recommends that well owners test their wells for contaminants every three to five years, especially if the well has previously tested high in a contaminant [12].

Manganese (Mn) is a natural element that is found in soil and rocks underground. It may enter private drinking water from the erosion of underground rocks or from the soil [17].

The eastern parts of Cabarrus County fall in the **Carolina Slate Belt**; an underground rock formation in the soil [18]. Due to the types of minerals in the soil, private wells that fall within the Slate Belt are more likely to have higher levels of inorganic contaminants, such as Mn, in the drinking water.

The **US Environmental Protection Agency** (**EPA**) developed a secondary **health advisory standard** of 0.05 mg/L of Mn to help protect children from poor health effects that may be related to regularly drinking water with high levels of manganese [19].

HISTORICAL WELL TESTS FOR MN IN CABARRUS COUNTY



The map to the left displays the results of all historical inorganic contaminants tests taken of private drinking water wells [20].

The census tracts that are a darker shade of green have a higher percentage of wells that met or surpassed the EPA's Health Advisory secondary standard of 0.05 mg/L for Mn.

Click the link here to learn how to use ENVIROSCAN to make a well contaminants map of your own! [INSERT LINK HERE]

ENVIRONMENTAL HEALTH QUALITY

Environmental Health Quality refers to how the environment affects the quality of an individual's and a community's health.

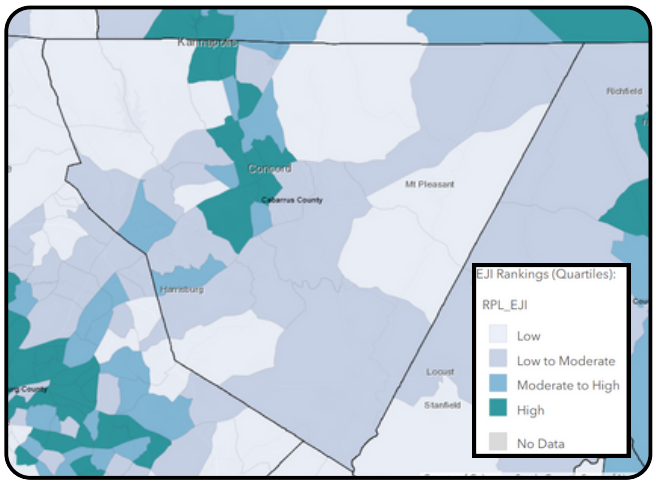
To gather to more information on how the community believes that the environment is directly affecting their health, Cabarrus Health Alliance (CHA) held a series of community listening sessions and distributed surveys in English and in Spanish.

Common topics mentioned during the listening sessions included...

- Indoor air quality from mold and asbestos
- Outdoor air quality from highway and traffic
- Lead in paint
- Accessibility

The CDC's **Environmental Justice Index** (**EJI**) ranks each census tract on 36 environmental, social, and health factors. This tool allows for placed-based approaches in recognition that the environment that people live in can have impacts on their health. The EJI can also be used to determine census tracts where communities may be disproportionately affected by environmental health concerns [21]. Census tracts with a higher ranking, meaning they have more areas of concern are shaded in a dark green.

CDC EJI: CABRRUS COUNTY



The environmental indicators of concern from the EJI in Cabarrus County included:

- Air toxics cancer risk
- National Priority List Sites
- Risk Management Plan Sites
- Proximity to High-Volume Roads
- Proximity to Railways
- Toxic Release Inventory Site
- Lack of Recreational Parks
- Housing Built Pre-1980 [21]

Overlapping concerns from the listening sessions, surveys, and EJI are **outdoor air quality** (represented by **proximity to high-volume roads** and **proximity to railways**) and **lead** in paint (represented by **housing built pre-1980**).

Page intentionally left blank

GLOSSARY

Anemia: “occurs when you do not have enough red blood cells or when your red blood cells do not function properly”; causes a lack of oxygen in blood and therefore a lack of oxygen being delivered to organs and muscles [22]

Carolina Slate Belt: underground soil formation extending from Virginia through the Carolinas, ending in Georgia; Carolina Slate Belt falls within the Piedmont Region of North Carolina [18]

Confirmed lead poisoning case (**CLP**): a child who has tested two consecutive blood tests that are over 10.00 µg/dL of lead [9]

County Health Ranking and Road Maps: University of Wisconsin Population Health Institute that draws attention to where and why there are differences across communities by providing a snapshot of the health of nearly every county in the United States [23]

Elevated blood lead level case (**EBL**): a child who has tested two consecutive blood tests that are between 5.00 - 9.99 µg/dL of lead [9]

EJScreen: GIS mapping tool created by the U.S. Environmental Protection Agency that provides a “nationally consistent dataset and approach for combining environmental and socioeconomic indicators,” [23]

Environmental determinants of heath: the global, regional, national, and local environmental factors that influence human health, including physical, chemical, and biological factors external to a person, and all related behaviors [1]

Environmental health: “the focus on how the environment affects human health; “this field advances policies and programs that reduce chemical and other environmental exposures in air, water, soil, and food” [2]

Environmental health department: “protect people by promoting a safe and healthy environment in partnership with private businesses and public agencies through consistent application of education, best practices, and compliance monitoring” [3]

Environmental Justice Index (**EJI**): GIS mapping tool created by the U.S. Centers for Disease Control and Prevention that ranks cumulative import of environmental injustice on health in every US census tract [21]

Environmental health quality: how the environment affects the quality of people's health; interchangeable with environmental justice

ENVIROSCAN: helps users increase awareness of key environmental and societal indicators by creating visualizations of trends across the state of North Carolina [20]

Geographic Information System (**GIS**): a system that creates, manages, analyzes, and maps to help understand patterns and relationships with geographic context [25]

Health Advisory Standard: "health advisory values/levels identify the concentration of a contaminant in drinking water at which adverse health effects and/or aesthetic effects are not anticipated to occur over specific exposure durations" [19]

Health Department Self-Assessment Instrument (**HDSAI**) **Interpretation Document 2024**: provides a detailed description the required activities to meet accreditation. The 2024 version is effective starting January 1st, 2024 [7]

Housing Built Pre-1980: proportion of occupied housing units built prior to 1980 (EJI indicator); lead-based paint was banned in 1978 so houses built prior to 1980 may contain underlying layers of lead-based paint, a risk factor for childhood lead poisoning [21]

Lead: naturally occurring element that was commonly used to make products last longer, toxic to humans and animals, causing negative health affects; there is no safe amount of lead, especially for infants and young children [10]

Manganese (**Mn**): naturally occurring metal found in the Earth's crust; high concentrations can be found in the Carolina Slate Belt [17]

North Carolina Department of Health and Human Services (**NCDHHS**): "provides essential services to improve the health, safety, and well-being of all North Carolinians" [14]; aids local environmental health departments in North Carolina by setting in place the codes, laws, and policies for required environmental health department programs [24]

North Carolina Food Code Manual: the rules and laws that are adopted from the US Food and Drug Administration's Food Code for the State of North Carolina; this code outlines the requirements food venders must follow and what a REHS inspects in the State of North Carolina [26]

Proximity to high volume roads: “proportion of tract area within a 1-mile buffer of a high-volume street or road” (EJI indicator); high volume roads can cause exposure of air pollutants for nearby residents and “proximity to busy roads has been associated with a number of adverse respiratory symptoms, childhood cancers, adverse birth outcomes, and overall mortality”; “may also lead to deposition of heavy metals in nearby soil and water due to run off.” [21]

Outdoor air quality: outdoor air is the air outside of a building on ground level for several miles above the Earth’s surface; if there is high levels of pollutants in the air, this would mean poor air quality which exposures to poor air quality may increase risk of health effects including heart attacks, asthma attacks, respiratory illness, emergency department and hospital visits, and premature mortality [26]

Proximity to railways: “proportion of the census tract that falls within a 1-mile buffer of a railway” (EJI Indicator); people who live near railways may have increased exposure to pollutants that may enter the air, water or soil, leading to several adverse health outcomes [21]

Registered Environmental Health Specialist (**REHS**): public health professionals who are authorized to ensure compliance of the environmental health rules, codes, and laws that are set by their state [4]

Septic systems: an underground structure that treats and disposes of wastewater from bathrooms, showers, kitchen drains, and laundry in the home; usually used in rural homes and businesses where there is no central sewage treatment plant nearby [15]

U.S. Centers for Disease Control and Prevention (**CDC**): “the nation’s leading science-based, data-driven, service organization that protects the public’s health” [27]

U.S. Environmental Protection Agency (**EPA**): “protects human health and the environment”; “identifies the measurable environmental health and human health outcomes the public can expect from EPA and describes the intentions to achieve those results” [28]

REFERENCES

[1] Pan American Health Organization. World Health Organization. Environmental Determinants of Health.

[2] American Public Health Association. 2024. Environmental Health.

[3] North Carolina Department of Health and Human Services. 2024. Environmental Health Section.

[4] Durham County Public Health. Environmental Health.

[5] United States Environmental Protection Agency. 2024. Learn About Environmental Justice.

[6] Joe Bowman. NCDHHS toolkit on including environmental justice on the community health needs assessment.

[7] Accreditation Documents - NC Local Health Department Accreditation [Internet]. NC Local Health Department Accreditation. 2024. Available from: https://nclhdaccreditation.unc.edu/process/documents/

[8] North Carolina Department of Health and Human Services. 2024. Children's Environmental Health.

[9] Napier MD, Huneycutt A, Moore C, et al. Childhood Lead Exposure Linked to Apple Cinnamon Fruit Puree Pouches — North Carolina, June 2023–January 2024. MMWR Morb Mortal Wkly Rep 2024;73:622–627. DOI: https://www.cdc.gov/mmwr/volumes/73/wr/mm7328a2.htm?s_cid=mm7328a2_w.

[10] U.S. Environmental Protection Agency. 2023. Lead Awareness in Indian Country: Keeping Our Children Healthy!

[11] North Carolina Department of Health and Human Services. 2023. Food Protection Program.

[12] North Carolina Department of Health and Human Services. Division of Public Health. Epidemiology: Occupational and Environmental. 2021. Private Wells: Frequently Asked Questions about Testing.

[13] North Carolina Department of Health and Human Services. 2024. Pools, Tattoos, and State Institutions.

[14] North Carolina Department of Health and Human Services. Division of Public Health. Environmental Health Section. 2002. Rules Governing Tattooing 15A NCAC 18A .3200.

[15] United States Environmental Protection Agency. 2024. About Septic Systems.

[16] United States Environmental Protection Agency. How Septic Systems Work.

[17] North Carolina Department of Health and Human Services. 2022. Manganese and Private Wells.

[18] U.S. Geological Survey. 2009. NC's Geological History.

[19] U.S. Environmental Protection Agency. Drinking Water Health Advisories (HA).

[20] North Carolina ENVIROSCAN. Accessed [July 2024]. https://enviroscan.org/

[21] Centers for Disease Control and Prevention and Agency for Toxic Substances Disease Registry. 2022 Environmental Justice Index. Accessed [July 2024]. https://www.atsdr.cdc.gov/placeandhealth/eji/index.html

[22] American Society of Hematology. 2024. Anemia.

[23] County Health Rankings & Roadmaps. 2024. About Us.

[24] U.S. Environmental Protection Agency. 2024 EJ Screen (Version 2.3). Accessed [July 2024]. https://ejscreen.epa.gov/mapper/

[25] ESRI. What is GIS?

[26] N.C. Department of Health and Human Services. Division of Public Health. Environmental Health Section. 2021. North Carolina Food Code Manual.

[27] U.S. Environmental Protection Agency. 2023. Outdoor Air Quality.

[28] Centers for Disease Control and Prevention and Agency for Toxic Substances Disease Registry. 2024. About CDC.

[29] U.S. Environmental Protection Agency. 2024. Our Mission and What We Do.