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2023

NC BREATHE

Climate Justice: Our Path to Healthier Communities

CONFERENCE

REPORT & RECOMMENDATIONS

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Executive Summary

The eighth annual NC BREATHE conference was held on April 6, 2023, at the 658 Center in Charlotte, North Carolina. Organized by CleanAIRE NC, the conference brought together health professionals, policymakers, community leaders, advocates, and students to share strategies and solutions for climate justice and healthier communities in North Carolina.

This year's conference emphasized the communities and voices from the frontlines of the climate crisis, highlighting the various efforts and initiatives community leaders are pursuing to build solutions. Five clear underlying themes and recommendations arose from the conference proceedings and participant discussions:

Prioritize language accessibility: Communities are often frustrated by communication barriers that prevent them from fully participating in policy conversations and solutions. State agencies, health workers, and advocacy groups must work to overcome language barriers with both English and non-English speaking communities.

Start by actively engaging communities to identify existing language barriers. Conduct community asset mapping to find partners who can assist with outreach and offer insights into the community. Organizations should hire for multilingual positions to increase their language diversity and improve engagement with non-English speaking communities.

Organizations and agencies should also utilize available interpretation services to create translations for all outreach, educational resources, and websites related to environmental health. Continue seeking community feedback to guide the creation of culturally competent communications.

Improve environmental training for health professionals: Despite the clear connections between health and the environment, many health professionals receive little-to-no formal training on climate change and air pollution. Medical education programs must explicitly train health professionals to recognize and treat threats from climate change and air pollution and to discuss these issues with their patients.

This will require significant institutional support from program administrators. CleanAIRE NC can support health educators by surveying existing climate health programs to identify core concepts and develop best practice toolkits for and resources to train for core competencies. We also encourage health educators to join our call for medical education accrediting bodies to establish formal curriculum guidelines related to climate change and air pollution for all U.S. medical schools.

Reduce the environmental footprint of health systems: Health systems and facilities are major contributors to climate change and air pollution, accounting for roughly 8.5% of greenhouse gas emissions in the U.S. The healthcare system should reduce its environmental impact by transitioning away from carbon-intensive fuels and toward renewable energy sources, while finding ways to reduce medical waste.

It is important to engage hospital leadership on these issues from the start of the process to cultivate institutional buy-in and support. Conducting an initial assessment of facility emissions helps establish current baselines to inform meaningful reduction goals. An inventory of on-site emission sources can also help hospitals identify high-yield, low-cost areas to target. Several leading health institutions have developed resources to help hospitals achieve emission reductions.

Hospitals should also transition to medical supply companies that can help minimize packaging and medical waste. We encourage healthcare workers to contact the N.C. Department of Environmental Quality and N.C. Department of Health and Human Services for assistance with medical waste disposal to better protect community health.

Target infrastructure and cumulative impacts: Infrastructure and the cumulative impacts of multiple pollution sources can strongly influence community health outcomes. We must take a holistic approach to how these issues affect a community. That requires permitting agencies, such as the N.C. Department of Environmental Quality, to conduct cumulative impact assessments as part of all permitting decisions.

Before engaging in permitting decisions, agencies should require an inclusive stakeholder process that brings together affected communities,

researchers, environmental and public health advocates, and business interests to ensure diverse insights are represented. Agencies should then develop a complete and holistic inventory of all emission sources impacting a community, regardless of their individual size.

Local governments and communities could also promote infrastructure to mitigate climate and air pollution impacts. Inquire into CleanAIRE NC's [Community Green Districts](#) program to learn how we can help support and implement these changes.

Increase transparency in permitting: Communities navigating environmental challenges rely on having accurate information on the policies that impact them. Unfortunately, vital environmental health and policy information is often obscured. Major state permitting agencies, such as the N.C. Department of Environmental Quality, must improve transparency to ensure communities are fully engaged with the environmental policy decisions that impact their health.

That requires a committed effort to understand a community's preferred communication channels and identifying community leaders who can help spread the word. Conducting focus groups can yield insights into how permitting agencies can meet community members where they are. Agencies must also provide timely public notice at least 60 days prior to a public hearing. Guided by an explicit goal of maximizing community input, permitting agencies should conduct additional outreach through educational campaigns to ensure residents understand the process and all necessary background information of the permitting decision.

Policymakers, health professionals, researchers, and communities should develop strategies that holistically implement these recommendations to pursue environmental equity and community health.

Introduction

On April 6, 2023, CleanAIRE NC hosted the eighth annual NC BREATHE conference to foster awareness, education, and advocacy on critical health and climate justice issues. Over 110 health professionals, policymakers, community leaders, advocates, and students gathered at the 658 Center in Charlotte (with another 72 joining virtually) to share strategies and solutions for healthier communities in North Carolina.

This year's conference emphasized the communities and voices from the frontlines of the climate crisis. From pediatricians treating childhood asthma to organizers securing basic health amenities for their communities and students creating new youth engagement opportunities, NC BREATHE 2023 highlighted the various efforts and initiatives community leaders are pursuing to build solutions.

Dr. Aaron Levy, Atrium Health – Levine Children's Hospital

Keynote Presentations

Climate Health on the Frontlines: From Classroom to Clinic
Dr. Aaron Levy, Atrium Health – Levine Children's Hospital

From Surviving to Thriving: Charting a Path to Restoration
Dr. Mustafa Santiago Ali, The National Wildlife Federation

The World Health Organization considers climate change "the single biggest health threat facing humanity."[1] Meanwhile, air pollution from fossil fuel combustion is responsible for an estimated one in five deaths worldwide, accounting for approximately 350,000 premature deaths in the U.S.[2] Nine of the ten leading causes of death in North Carolina are caused or exacerbated by air pollution,[3] including heart disease, cancer, COVID-19, and stroke.

These health burdens are not shared equally. BIPOC (Black, Indigenous, and People of Color) and low-income communities are disproportionately exposed to pollution and climate impacts due to a legacy of discriminatory policies such as redlining[4] that drive major health disparities. As just one example, the Asthma and Allergy Foundation of America found that Black Americans are three times more likely to die from asthma and air pollution exposure.[5]

Dr. Mustafa Santiago Ali,
National Wildlife Federation

Dr. Mustafa Santiago Ali, Executive Vice President of The National Wildlife Federation, founder of Revitalization Strategies, and renowned environmental justice thought leader, laid out the nature of this challenge in his keynote address at NC BREATHE:

"Environmental injustices are created by actions and choices that we've made through policies. Policies that shape where we live and where we place resources that can either create healthy environments or unhealthy environments through investment or disinvestment in communities which influences social determinants of health and public health disparities."

Since actions and policies lay the foundations for environmental injustices, we have the opportunity to rectify this. Through policy change, we can foster health equity across North Carolina.

"We each have a role to play in this climate movement," said Dr. Levy in his keynote address, summarizing the mission of the NC BREATHE Conference. "Whether you're a student…to everybody in the community, to people with different professions in research and science."

Recommendations

Five clear underlying themes and recommendations arose from the conference proceedings and participant discussions.

Prioritize Language Accessibility

Communities facing environmental challenges are often frustrated by language barriers that prevent them from fully engaging in the conversation.[6] Many researchers and policymakers have an unfortunate tendency to employ overly technical or jargon-laden language that causes their intended audience to tune out.

"One of the biggest barriers to getting people to work together is [not] respecting the language of where they live and where they work," said Omega Wilson. Or, as Bailey Scarlett said during the *Future Climate Justice Leaders* panel discussion, "It's not knowledge if no one understands it."

This is especially pronounced for non-English speaking communities, such as migratory farmworkers. Public health messaging is often predominantly in English without readily available translations, creating significant information gaps.[7] During the *Voices From The Frontline* panel, Ana Flores-Dolbow of Toxic Free NC noted, "When it comes to environmental issues, I have seen a huge lack of access to critical information in the Latinx community."

The *Voices From The Frontlines* panel (left to right): Dr. Crystal Cavalier-Keck, 7 Directions of Service; Omega Wilson, WERA; and Ana Flores-Dolbow, Toxic Free NC

State agencies, health workers, and advocacy organizations (including CleanAIRE NC) must all do a better job at engaging communities through the language they use and understand. We should start by spending time in the communities we work in or impact, actively listening to residents and

identifying language barriers. Community asset mapping[8] can be a powerful tool for finding partners that can assist in reaching community members. CleanAIRE NC aims to bring greater language diversity to our team by hiring for multilingual positions. Other organizations should do the same to improve their engagement with non-English speaking communities.

Organizations and agencies should also create translations for all outreach, educational resources, and websites related to environmental health. This empowers non-English speaking communities and can profoundly improve community health outcomes. During the conference, Flores-Dolbow described an all-Spanish language environmental justice academy she conducts with farmworker families and its benefits to the community: "Now they're getting air monitors. People are signing up to do water testing. We're working [to get them] low-cost water purification systems. We're doing health education courses to talk about how contamination affects health."

There are numerous interpretation services organizations can utilize. Some even offer live translation services to foster more inclusive events. The U.S. Environmental Protection Agency (EPA) provides a partial model through their online resource portal for individuals with limited English proficiency.[9] The North Carolina Judicial Branch's Office of Language Access Services can also work with organizations to remove language justice barriers.[10]

Throughout the process, organizations should seek community feedback to ensure their communications are culturally competent and accessible.

Improve Environmental Training for Health Professionals

As our most trusted voices on health, clinical workers such as doctors and nurses are responsible for providing direct patient care and education on issues that impact health. Yet many health professionals receive little-to-no formal training on the impacts of climate change and air pollution.

This leaves health and medical students unprepared for clinical practice in a climate-changing world.[11] Researchers studying a database of American medical schools failed to find any explicit inclusion of climate change education in their curriculum.[12]

As keynote speaker Dr. Aaron Levy recalled: "The only experience I got for climate health training and [how environmental health] impacts our patients was a short presentation through [CleanAIRE NC] for about 30 minutes. That was it."

Doctors must be trained to both recognize and treat health problems associated with climate change and to discuss these issues with their patients.[13] There have been growing calls to include climate and pollution in medical school curriculums, and several medical student groups have begun spearheading these efforts.

Dr. Aaron Levy, Atrium Health – Levine Children's Hospital

In Chapel Hill, the student-led Climate Leadership & Action Network at the UNC School of Medicine (CLEAN UNC) is working with administrators and professors to incorporate climate change impacts into their training.[14] And the University of Colorado—Boulder has officially added a Climate & Health Program to their School of Medicine.[15]

Yet these successful examples remain small and sporadic. Improving patient care, both statewide and nationally, will require significant institutional support from health program administrators to make air pollution and climate a regular part of the medical conversation.

Existing climate health programs, including those mentioned above and others, can provide models for medical school faculty and administrators in identifying core concepts and training for core competencies. CleanAIRE NC will support health educators in achieving this goal, conducting a survey of successful programs to develop best practice toolkits and resources for climate health training. Medical schools, nursing programs, and other health programs should also consult with the American Academy of Pediatrics, who are developing their own guidelines on climate health education.

Beyond individual programs, we are also looking to the [Liaison Committee on Medical Education](#) (LCME), the accrediting body for North American medical education programs, to establish formal curriculum guidelines for all U.S. medical schools. CleanAIRE NC will develop position papers and coordinate health professional advocacy to engage LCME on this issue.

Reduce the Environmental Footprint of Health Systems

Health facilities are major contributors to climate change and air pollution. The U.S. healthcare system accounts for approximately 8.5% of national greenhouse gas emissions,[16] while U.S. hospitals generate about 30lbs of waste per patient per day.[17] "We are basically putting toxins [in our] patients' mouths that we are trying to treat," remarked Dr. Aaron Levy.

"We are part of the problem as a health care institution. And so we have to be part of the solution." – Dr. Aaron Levy

Hospitals must grapple with this paradox and take steps to reduce their environmental impact. It is important to engage hospital leadership from the start of the process to cultivate institutional buy-in and support.

Conducting an initial assessment of facility emissions helps establish current baselines to inform meaningful reduction goals. [The U.S. Department of Health and Human Services](#) (HHS) recently launched the Health Sector Climate Pledge,[18] a voluntary commitment from facilities to halve emissions by 2030 and achieve net zero emissions by 2050. A group of 116 organizations representing 872 hospitals has signed onto the HHS pledge as of April 2023, including NC BREATHE 2023 sponsor Atrium Health.[19]

An inventory of on-site emission sources can also help hospitals identify high-yield, low-cost areas to target. HHS provides [a resource hub](#) with programs and best practices to support health systems in reducing their environmental footprint.[20] [The American Academy of Pediatrics](#) has also developed recommendations to reduce the carbon and environmental footprint of health facilities;[21] in particular, they encourage hospitals and medical offices to find ways to pivot away from carbon-intensive fuels and toward renewable energy sources.

Hospitals should also transition to medical supply companies that can help minimize packaging and medical waste. Since medical waste is primarily regulated by state environmental and health departments,[22] we encourage healthcare workers to contact the N.C. Department of Environmental Quality (DEQ) and N.C. Department of Health and Human Services (DHHS) for assistance with medical waste disposal to better protect community health.

The *Health Equity* panel (left to right): Dr. Chris Heaney, Johns Hopkins Bloomberg School of Public Health; Dr. Arlinda Ellison, Alamance County Health Department; and Dr. Virginia Guidry, NCDHHS

Target Infrastructure and Cumulative Impacts

Infrastructure and our surrounding built environments (the physical structures where people live, work, and play) strongly impact community health outcomes.[23] Neighborhoods near power plants, highways, landfills, and other emission sources typically experience poorer air quality.[24,25,26]

Residents in these communities are not impacted by multiple pollution sources in isolation—they compound as "cumulative impacts." This presents a clear challenge to permitting agencies tasked with safeguarding public health. As environmental reporter Lisa Sorg illustrated in the conference's closing remarks, an individual facility might not be large enough to require an air permit itself. But a cluster of unpermitted emitters may create a cumulative pollution exposure equivalent to a major Title V emission source.

"What if you have ten [small emitters] in a neighborhood? Ten small could equal one big." – *Lisa Sorg, NC Newsline*

To truly protect public health, we must take a holistic approach to how these issues affect a community's well-being. That requires agencies to conduct cumulative risk and impact assessments as part of all permitting decisions.

There are several existing models for action. In 2020 New Jersey passed the nation's strongest law addressing environmental stressors on a community level, denying permits for facilities that cannot mitigate impacts on overburdened communities.[27] The U.S. EPA also issued a major policy update aimed at reducing excessive pollution burdens from cumulative impacts.[28]

We hope North Carolina agencies adopt similar rules to target cumulative impacts. Before engaging in permitting, agencies should require an inclusive stakeholder process that brings together affected communities, researchers, environmental and public health advocates, and business interests to ensure diverse insights are represented. These meetings should be facilitated at the local level to promote transparency and effective community communication before the proposed action reaches the state level.

Agencies should then inventory all emission sources impacting a community, regardless of individual size. Federal mapping tools such as EJSCREEN can help planners identify areas with environmental hazards to avoid adverse development in impacted communities.[29] Air quality sensors can also assess any existing pollution burden. CleanAIRE NC can deploy PurpleAir sensors if state-operated monitors are absent. CleanAIRE NC will also develop guidelines to help agencies navigate cumulative impact assessments.

Local governments and communities can also target built environments. Strategies might include changes to zoning laws, land use policies, and building codes to create more equitable access to healthy living conditions.[30] Transportation infrastructure incentivizing zero-emission vehicles and public transit can reduce local air pollution.[31] And policies promoting the growth of beneficial green infrastructure could mitigate climate impacts.[32] Cities should inquire into CleanAIRE NC's Community Green Districts program took learn how we can help support the development of green infrastructure.

Increase Transparency in Permitting and Funding

Communities navigating environmental challenges rely on having accurate and timely information on the policies that impact them. Unfortunately, several conference attendees lamented that North Carolina often fails to provide sufficient notice on upcoming public hearings related to permitting.

This prevents communities and environmental groups from thoroughly preparing for and engaging with the process, resulting in discussions dominated by insider interests. Major permitting agencies, including DEQ, sometimes compound the issue by delivering notice through channels rarely seen by the community.

Reporter Lisa Sorg relayed an anecdote from the Columbus County community of Delco, where a log fumigation plant applied for a methyl bromide permit. Public notice for the hearing was placed in the local newspaper of Whiteville—a town on the opposite side of the county.

During her closing remarks, Sorg urged community organizations to stay vigilant in tracking the agendas of city councils, county commissioners, and other local boards making decisions about where to site hazardous emission sources. "If you're not there at the local level," she warned, "by the time it gets to the state, they're not going to deny the permit."

Lisa Sorg, NC Newsline

But the onus should not be placed on community members. DEQ and other permitting agencies have a responsibility to maximize the participation and input of impacted communities in the decision-making process.

That means actively engaging with residents, taking the time to understand preferred communication channels, and identifying community leaders who

can help spread the word. Focus groups with trained facilitators to help minimize bias can yield insights into how to meet residents where they are.

Agencies must also provide timely public notice at least 60 days prior to a public hearing. Guided by an explicit goal of maximizing community input, permitting agencies should conduct additional outreach through educational campaigns to ensure residents understand the process and all necessary background information of the permitting decision.

The *Future Climate Justice Leaders* panel (left to right): Shruti Agrawal, New Normal X; Bailey Scarlett, Davidson College; Harmony Mason, Catawba College

"To be more equitable and inclusive for people who want to understand what's happening in their own backyards and communities, it's important for everybody to know what's going on." – Harmony Mason, Catawba College

Future Directions

North Carolina's climate is changing, and air pollution is already causing severe health and economic damage to the state. A recent climate change risk assessment ranks North Carolina among the top five U.S. states most likely to experience the worst impacts of climate change.[33]

Recent hurricanes such as Ian and Ida and other severe weather events have caused flooding and extreme precipitation along the Coastal Plains, causing over a billion dollars in damage and nearly 400 deaths.[34] Extreme heat waves are worsening pollution and increasing our risk for wildfires and droughts, with major consequences for North Carolina's agricultural economy.

These threats will only amplify without significant policy interventions. Fortunately, North Carolina has great potential to become a worldwide leader in clean energy. Our state is already a leader in solar power generation, ranking fourth nationally with 7,460 MW of installed solar capacity.[35] We also have numerous undeveloped wind energy resources, with more offshore wind potential than any other state along the Atlantic coast.[36]

The Governor's Office has taken several actions to help reign in emissions and support North Carolina's most vulnerable populations. These actions include Executive Order 246 (accelerating North Carolina's transition to a clean energy economy and creating economic opportunities in underserved communities), Executive Order 271 (supporting the growth of a zero-emission vehicle market), and Executive Order 143 (establishing the Andrea Harris Social, Economic, Environmental and Health Equity Task Force).

These are encouraging first steps. Now we must continue this momentum. We hope to see future actions from both governmental and non-governmental actors that will grow North Carolina's renewable energy sector and promote climate justice for healthier communities.

"This is an American problem historically, and it is an American opportunity for us to move forward on the solutions to make real change happen." – Dr. Mustafa Santiago Ali

Dr. Mustafa Santiago Ali, National Wildlife Federation, addresses attendees

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The CleanAIRE NC staff with keynote speaker Dr. Mustafa Santiago Ali

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Appendices

Appendix I: Glossary of Terms

Social determinants of health (SDOH): SDOH are the conditions in the environments where people are born, live, learn, work, play, worship, and age that affects a wide range of health, functioning, and quality-of-life outcomes and risks. SDOH can be grouped into five domains: (1) Economic Stability, (2) Education Access & Quality, (3) Healthcare Access & Quality, (4) Neighborhood and Built Environment, and (5) Social and Community Context.[37]

Built environment: Generally refers to where one lives, their neighborhood, and the surrounding community that impacts the daily quality of life. Neighborhoods with high rates of violence, unsafe air or water, and other health and safety risks are considered unhealthy built environments.[38]

Restrictive covenants: This refers to a covenant acknowledged in a deed or lease that restricts the free use or occupancy of property (as by forbidding commercial use or types of structures).

Redlining: Redlining is defined as a discriminatory practice that systematically denies services such as mortgages, insurance loans, and other financial services to residents of specific areas based on their race or ethnicity. The origin of the term is traced back to the U.S. Government's homeownership programs established in the 1920s and 1930s, in which maps were color-coded, each color corresponding to the loan worthiness of the neighborhoods in the U.S., and the color red was attributed to the areas that were deemed not worthy of inclusion in the homeownership programs. Black residents predominantly inhabited most of the communities marked in red. The consequences of this were that Black residents were denied government-insured loans.[39]

Zoning: Zoning laws determine what types of land uses and densities can occur on each property lot in a municipality and, therefore, also govern the range of potential environmental and health impacts resulting from the land use.[40]

Urban renewal: The rehabilitation of city areas by renovating or replacing dilapidated buildings with new housing, public buildings, parks, roadways, industrial sites, etc., often in accordance with comprehensive plans.

Gentrification: The buying and renovation of houses and stores in deteriorated urban neighborhoods by upper- or middle-income families or individuals, raising property values but often displacing low-income families and small businesses.

Cumulative impacts: Cumulative impacts are the totality of exposures to combinations of chemical (i.e., pollutants in air, water, and/or soil) and non-chemical stressors (i.e., lack of greenspace, socioeconomic disadvantages) and their effects on health, well-being, and quality of life outcomes. Cumulative impacts are a part of the larger conversation around environmental justice (EJ).[41]

HEALTH IMPACTS OF CLIMATE CHANGE: OVERVIEW

WHAT IS CLIMATE CHANGE?

Climate change is the rapid increase in global average temperatures and extreme weather events. It can lead to severe heat waves, shorter winters, rising sea-levels, changing precipitation patterns that cause flooding and droughts, intense hurricanes, and poorer air quality.

These changes have adverse effects on human health, including heat-related illnesses, respiratory problems, vector-borne diseases carried by ticks and mosquitoes, and mental stress and anxiety from job insecurity.
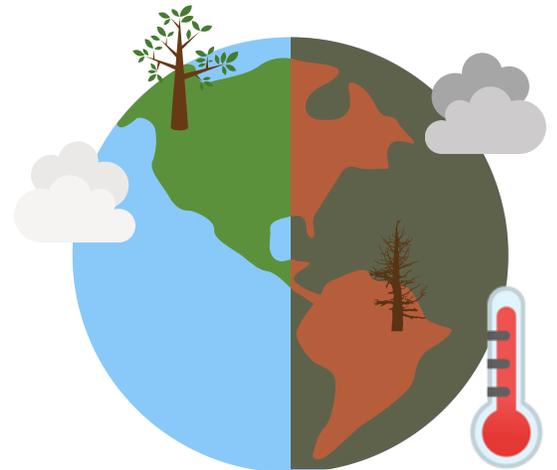
"CLIMATE CHANGE IS THE GREATEST HEALTH RISK OF THE 21ST CENTURY.

- WORLD HEALTH ORGANISATION

Research suggests that, with no change in regulatory controls or population characteristics, increased air pollution from climate change could result in

1,000 - 4,300

more premature deaths in the U.S. per year by 2050.

In the past 5 years, the U.S. spent

$99.1B

a year on climate-related natural disasters. This is $56.3 billion more than what we spent in 1980.

CLIMATE CHANGE THREATENS YOUR HEALTH...
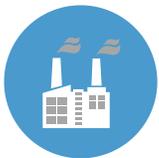
| IN INDUSTRIAL AREAS | NEAR BUSY ROADS | IN CITIES & URBAN AREAS | NEAR FARMS & RURAL AREAS | IN HOT & WARM WEATHER | IN COLD WEATHER |

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For more information, please contact our Health Manager, Kirsten Minor.
kirsten@cleanairenc.org

HEALTH IMPACTS OF CLIMATE CHANGE: SEVERE WEATHER

Extreme temperatures and heat waves are expected to rise each year. Over the last 40 years, temperatures have steadily increased in cities, suburbs, and even rural areas. Last century, we used to see an average of roughly 30 days with temperatures reaching 90 or higher. Later this century, we can expect half of the year to exceed 90 degrees. Warmer temperatures and shifting weather patterns can worsen air quality, leading to asthma attacks and other respiratory and cardiovascular health effects.

> **Increases in the frequency or severity of some extreme weather events, such as extreme precipitation, flooding, droughts, and storms, threaten the health of people during and after the event. - U.S. EPA**

Extreme rainfall, and the extreme lack of it, are getting worse and worse each year. We continue to see both record-breaking wet and dry months. When huge downpours immediately follow a drought, the dried-out earth cannot absorb the excess water, resulting in flooding. Severe flooding from intensifying hurricanes also imperils our coastal towns, cities, and ecosystems. Extreme weather events threaten access to safe drinking water, damage roads, bridges, and houses, and causes serious stress and mental health problems.

Wildfires in North Carolina are expected to increase due to extreme heat and severe drought. Wildfires can cause a spike in air pollution from smoke and other unhealthy air particles, and erase decades of clean air policy gains.

The number of months with record-high rainfall increased in the central and Eastern United States by more than

25%

between 1980 and 2013.

North Carolina expects to see the days of high risk for wildfire increase by

400%

in the coming years.

North Carolina expects to see an increase in drought severity of about

50%

by 2050.

HEALTH IMPACTS OF CLIMATE CHANGE: EXTREME HEAT

Heat is one of the leading weather-related killers. Warmer average temperatures and hotter days are leading to longer and more severe heat waves. As heat increases, body temperature and heart rate rise, resulting in severe health problems such as dehydration, heat stress, heat exhaustion, and heat stroke as the body is overwhelmed by heat. Extreme heat can also amplify the risk of cardiovascular, respiratory, and cerebrovascular diseases.

Heat is also a significant contributing factor in creating ground-level ozone, a serious health hazard. Ground-level ozone reduces lung function and inflames the linings of our lungs.

Approximately

300,000

people living in North Carolina are especially vulnerable to extreme heat.

Though urban areas are traditionally considered more susceptible to extreme heat issues, heat-related illnesses in North Carolina are most common in rural areas for the following reasons:

- Outdoor occupational labor is more common in rural areas, with higher concentrations of residents working in agriculture and construction than in urban locations

- Many rural residents cannot afford proper air conditioning

- Rural locations experience greater overall social vulnerability, putting them at higher risk for natural hazards such as extreme heat

Populations most likely to be impacted by extreme heat:

Young children
Pregnant women
Outdoor workers
Student athletes
Homeless people
The elderly
And people with certain medical conditions

The number of extreme heat days is expected to increase in the coming years.

By 2050, approximately 15% of the year, or about 60 days, are expected to have temperatures above

105°

In 2000, North Carolina experienced only 14 days at this temperature.

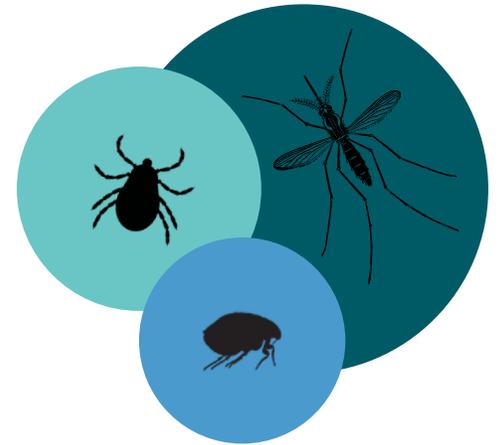# HEALTH IMPACTS OF CLIMATE CHANGE: VECTOR-BORNE INFECTIOUS DISEASES

Vector-borne diseases are transmitted by organisms such as mosquitoes, ticks, and fleas. These vectors can carry infectious viruses, bacteria, and protozoa from animals to humans. Changing weather patterns such as increased precipitation, warmer temperatures, and shorter winters can allow vector populations to increase in size and expand their geographic range, causing illnesses to occur more frequently and introducing diseases to new areas.

LYME DISEASE

Lyme disease is carried by ticks. As air temperatures rise ticks are likely to become active earlier in the season, increasing the risk of Lyme disease. Lyme disease symptoms include fever, headache, fatigue, and a characteristic skin rash.

WEST NILE VIRUS & ZIKA

West Nile virus and Zika are carried by mosquitoes. Extreme temperatures increase population sizes and the geographic range of mosquitoes transmitting these viruses. More than three million people were estimated to be infected with West Nile virus in the United States from 1999 to 2010. Large outbreaks of Zika virus occurred in the United States in 2015 and 2016.

DURHAM & RALEIGH

are both among the top 10 U.S. cities for growth in mosquito season since the 1980's.

In 2017, North Carolina confirmed

950

tick-borne illnesses. With

CHATHAM COUNTY

having one of the highest rates.

The annual average mosquito season has grown by

40
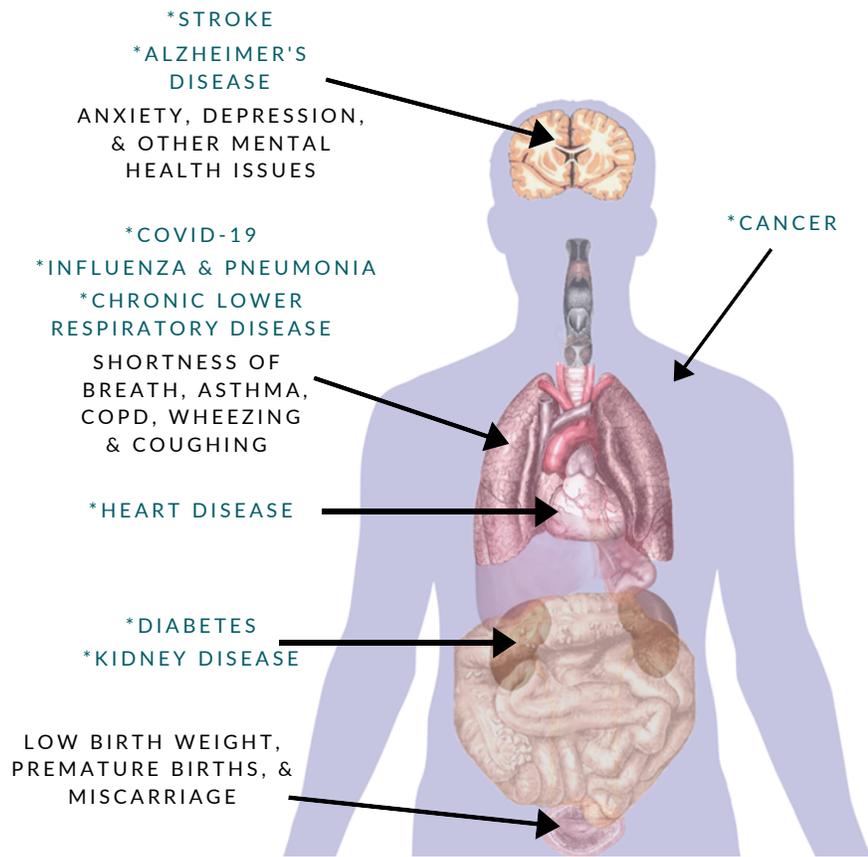
days.

HEALTH IMPACTS: SOOT & SMOG

SOOT

Soot is an air pollutant created by certain chemical reactions. Soot can come from a variety of sources such as cars, factories, construction vehicles, wood burning, and agriculture sites.

SMOG

Smog, or haze, is created when nitrogen oxides in the air react with air pollutants known as volatile organic compounds (VOCs). VOCs can come from cars, fuels, pesticides, cleaning products, factories, and other sources.

Both soot and smog are major sources of air pollution. Air pollution affects more than just the lungs; it can cause or worsen many health issues, including

*9 OF THE 10 LEADING CAUSES OF DEATH IN NC

*STROKE
*ALZHEIMER'S DISEASE
ANXIETY, DEPRESSION, & OTHER MENTAL HEALTH ISSUES

*CANCER

*COVID-19
*INFLUENZA & PNEUMONIA
*CHRONIC LOWER RESPIRATORY DISEASE
SHORTNESS OF BREATH, ASTHMA, COPD, WHEEZING & COUGHING

*HEART DISEASE

*DIABETES
*KIDNEY DISEASE

LOW BIRTH WEIGHT, PREMATURE BIRTHS, & MISCARRIAGE

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kirsten@cleanairenc.org

EFECTOS SOBRE LA SALUD: EL HOLLÍN Y LA NIEBLA TÓXICA

EL HOLLÍN

El hollín es un contaminante atmosférico que se crea a través de ciertas reacciones químicas. El hollín puede provenir de varias fuentes tal como los autos, las fábricas, los vehículos de construcción, quemar madera y las zonas agrarias.
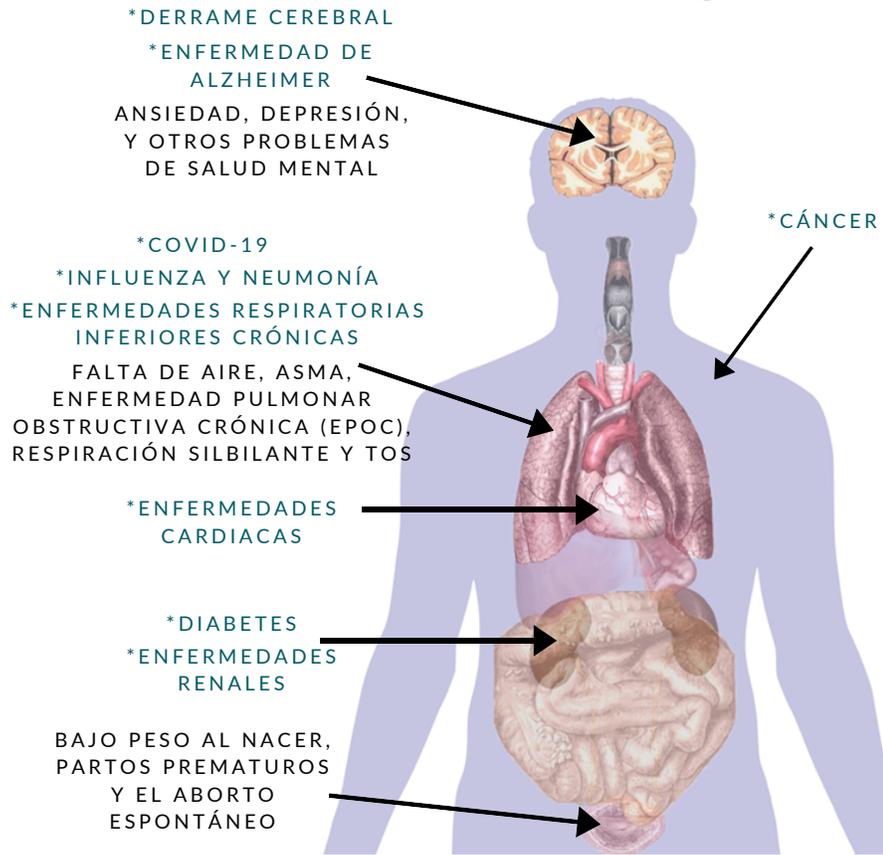
LA NIEBLA TÓXICA

La niebla tóxica, o el smog, se crea cuando óxidos de nitrógeno en el aire reaccionan con contaminantes atmosféricos conocidos como los compuestos orgánicos volátiles (VOCs, por sus siglas en inglés). Los VOCs pueden provenir de los autos, los combustibles, los pesticidas, los productos de limpieza, las fábricas y otras fuentes.

Tanto el hollín como la bruma son fuentes principales de la contaminación atmosférica. La contaminación atmosférica afecta a más que solo los pulmones; puede causar o empeorar muchos problemas de salud, incluidos

*9 DE LAS 10 CAUSAS PRINCIPALES DE LA MUERTE EN CAROLINA DEL NORTE

*DERRAME CEREBRAL

*ENFERMEDAD DE ALZHEIMER

ANSIEDAD, DEPRESIÓN, Y OTROS PROBLEMAS DE SALUD MENTAL

*CÁNCER

*COVID-19
*INFLUENZA Y NEUMONÍA
*ENFERMEDADES RESPIRATORIAS INFERIORES CRÓNICAS

FALTA DE AIRE, ASMA, ENFERMEDAD PULMONAR OBSTRUCTIVA CRÓNICA (EPOC), RESPIRACIÓN SILBILANTE Y TOS

*ENFERMEDADES CARDIACAS

*DIABETES
*ENFERMEDADES RENALES

BAJO PESO AL NACER, PARTOS PREMATUROS Y EL ABORTO ESPONTÁNEO

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Para obtener más información, por favor contacte a nuestra gerente en salud, Kirsten Minor.
kirsten@cleanairenc.org

APPENDIX III: PLANNING COMMITTEE

CANDACE CAHOON, BSAS, RRT, RCP

Program Coordinator/RT Case Manager

Vidant Health

STEPHANIE CLELAND, MSPH

Doctoral Candidate

The University of North Carolina at Chapel Hill

DAN COSTA, ScD

Former EPA National Program Director for Air, Climate and Energy, Adjunct Professor

UNC Gillings School of Public Health

CRYSTAL DIXON, MPH, MCHES, NBC-HWC

Assistant Professor of Health and Exercise Science

Wake Forest University

MADISON FRAGNITO

Partnerships Coordinator

CleanAIRE NC

CATHY GREEN

Director of Operations, Center for the Environment

Catawba College

BRAD IVES, JD

Executive Director, Center for the Environment

Catawba College

KIM LYERLY, MD

George Barth Geller Professor in Cancer Research, Professor of Surgery

Duke University

KIRSTEN MINOR, MPH, CHES

Health Manager

CleanAIRE NC

MERCEDES QUESADA-EMBID, PhD, MA

Associate Professor of Environmental Policy and Advocacy

Catawba College

JEFFREY ROBBINS, MBA

Executive Director

CleanAIRE NC

ANGIE SHATAS, MS

Environmental Scientist

US EPA, Office of Research and Development

DAISHA WALL, MS

Community Science Manager

CleanAIRE NC

SHERRI WHITE-WILLIAMSON, JD, MS

Environmental Justice Director

NC Conservation Network

MAYA WILSON

Public Health Graduate Student

Duke University

NC BREATHE
Climate Justice: Our Path to Healthier Communities
CONFERENCE

APPENDIX IV: AGENDA

8:00 AM • REGISTRATION & BREAKFAST

9:00 AM • WELCOME & OPENING REMARKS
Jeffrey Robbins, *CleanAIRE NC*

9:05 AM • LAND ACKNOWLEDGEMENT
Dr. Crystal Cavalier-Keck, *7 Directions of Service*

9:10 AM • CLIMATE HEALTH ON THE FRONTLINES: FROM CLASSROOM TO CLINIC
Dr. Aaron Levy, *Atrium Health*

9:50 AM • BREAK

10:00 AM • HEALTH EQUITY: PANEL DISCUSSION
Moderator: Crystal Dixon, *Wake Forest University*
Panelist: Dr. Arlinda Ellison, *Alamance County Health Department*
Panelist: Dr. Chris Heaney, *Johns Hopkins University*
Panelist: Dr. Virginia Guidry, *NC Department of Health and Human Services*

11:00 AM • BREAK

11:10 AM • FROM SURVIVING TO THRIVING: CHARTING A PATH TO RESTORATION
Dr. Mustafa Santiago Ali, *The National Wildlife Federation*

12:00 PM • LUNCH & STUDENT POSTER PRESENTATIONS

1:05 PM • BREAK

1:10 PM • VOICES FROM THE FRONTLINES: PANEL DISCUSSION
Moderator: Sherri White-Williamson, *NC Conservation Network*
Panelist: Dr. Crystal Cavalier-Keck, *7 Directions of Service*
Panelist: Omega Wilson, *West End Revitalization Association*
Panelist: Ana Flores-Dolbow, *Toxic Free NC*

2:10 PM • BREAK

2:20 PM • FUTURE CLIMATE JUSTICE LEADERS: PANEL DISCUSSION
Moderator: Yancey Fouché, *Davidson College*
Panelist: Bailey Scarlett, *Davidson College*
Panelist: Shruti Agrawal, *New Normal X*
Panelist: Harmony Mason, *Catawba College*

3:20 PM • BREAK

3:30 PM • CLOSING REMARKS
Lisa Sorg, *NC Policy Watch*

4:00 PM • NETWORKING HAPPY HOUR

APPENDIX V: SPEAKERS & PANELISTS

Keynote Speaker: **Dr. Aaron Levy, DO**
Pediatric Hospitalist, Atrium Health – Levine Children's Hospital

Keynote Speaker: **Dr. Mustafa Santiago Ali**
Executive Vice President, National Wildlife Federation; *Founder*, Revitalization Strategies

Panel Discussion: **Health Equity**
   Panelist: **Dr. Arlinda Ellison, DHSc, MS, HHC**
   Director of Community Health, Outreach, & Policy, Alamance County Health Department
   Panelist: **Dr. Virginia Guidry, PhD, MPH**
   Branch Head, Occupational Health & Environmental Epidemiology, NCDHHS
   Panelist: **Dr. Chris Heaney, PhD, MS**
   Associate Professor of Environmental Health & Engineering, John Hopkins University
   Moderator: **Crystal Dixon, MPH, MCHESS, NBC-HWC**
   Assistant Professor of the Practice, Wake Forest University

Panel Discussion: **Voices From The Frontline**
   Panelist: **Dr. Crystal Cavalier-Keck, PhD**
   Policy Director, Toxic Free NC; *Co-Founder*, 7 Directions of Service
   Panelist: **Ana Flores-Dolbow**
   Health & Justice Organizer, Toxic Free NC
   Panelist: **Omega Wilson**
   Co-Founder, West End Revitalization Association (WERA)
   Moderator: **Sherri White-Williamson, JD, MS**
   Director of Environmental Justice Strategy, NC Conservation Network

Panel Discussion: **Future Climate Justice Leaders**
   Panelist: **Shruti Agrawal**
   Founder, New Normal X
   Panelist: **Harmony Mason**
   Catawba College
   Panelist: **Bailey Scarlett**
   Davidson College
   Moderator: **Yancey Fouché, MS**
   Director of Sustainability, Davidson College

Closing Remarks: **Lisa Sorg**
Assistant Editor & Environmental Reporter, NC Newsline