



An Overview of Healthy Homes Impacts on Vulnerable Populations

NC Public Health Leaders Conference
January 23, 2020

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Center for Environmental Health and Susceptibility



UNC
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THE ENVIRONMENT

Funding to develop and conduct this session is provided by NIEHS (grant #P30ES010126) and NC Department of Health and Human Services (contract #39681).

An Overview of Healthy Homes



Lead poisoning



Moisture and mold



Indoor air quality



Pests and pesticides



Maintenance & monitoring

Sources of Lead Poisoning



Common Asthma Triggers



Tobacco smoke



Dust mites



Mold



Pet dander



Cockroach



Personal care products



Air pollution



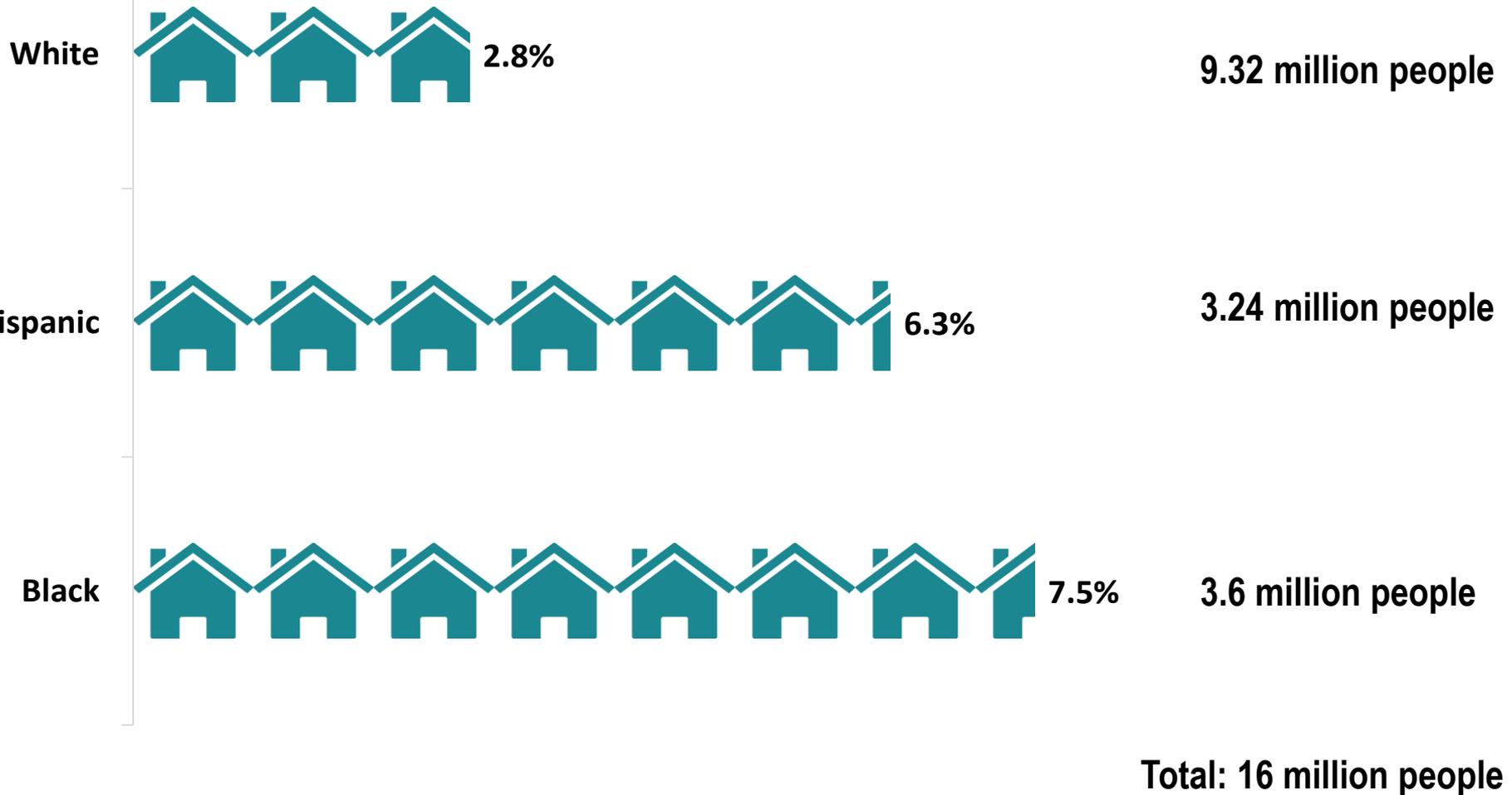
Pollen

Someone can live in either of these homes and have health risks related to that structure.

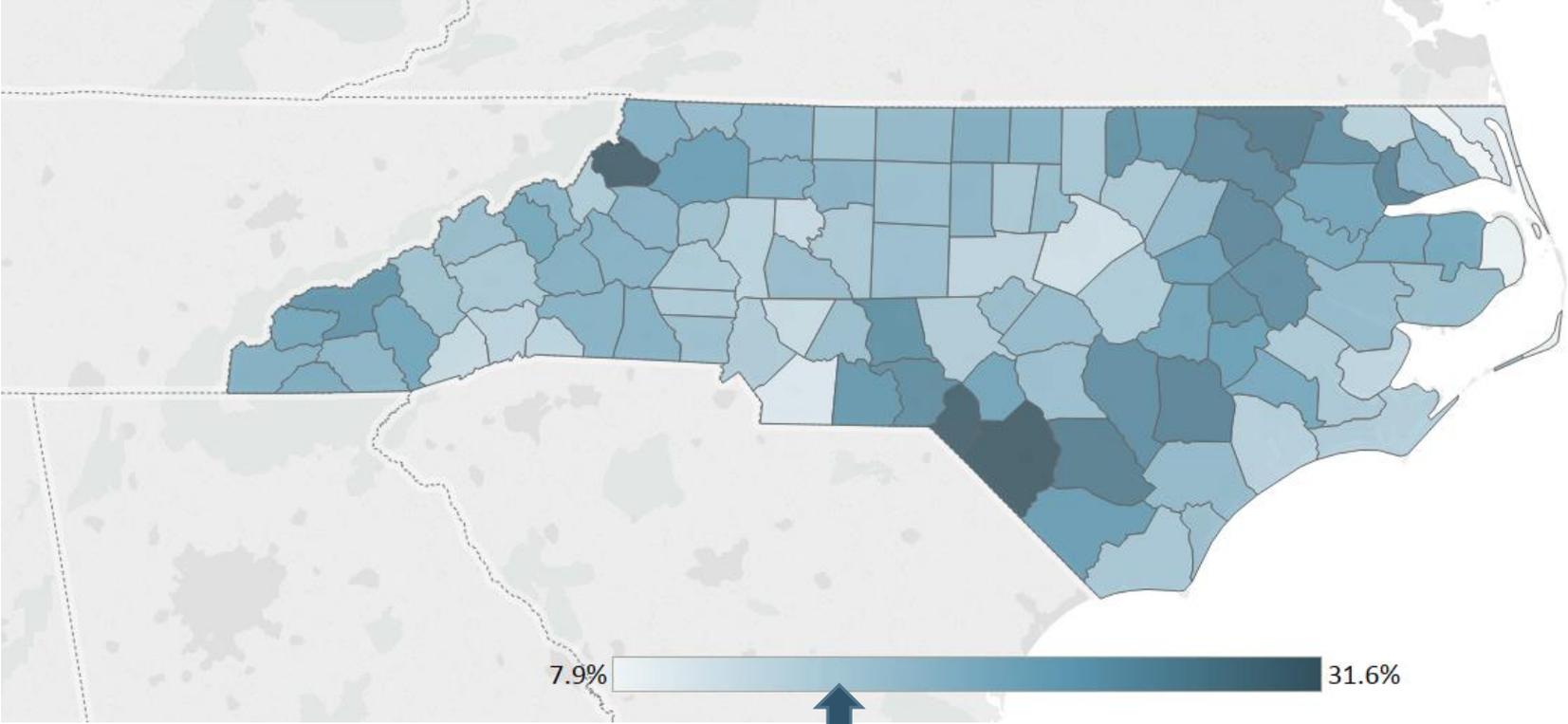


But the reality is...

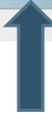
Substandard Housing in the United States



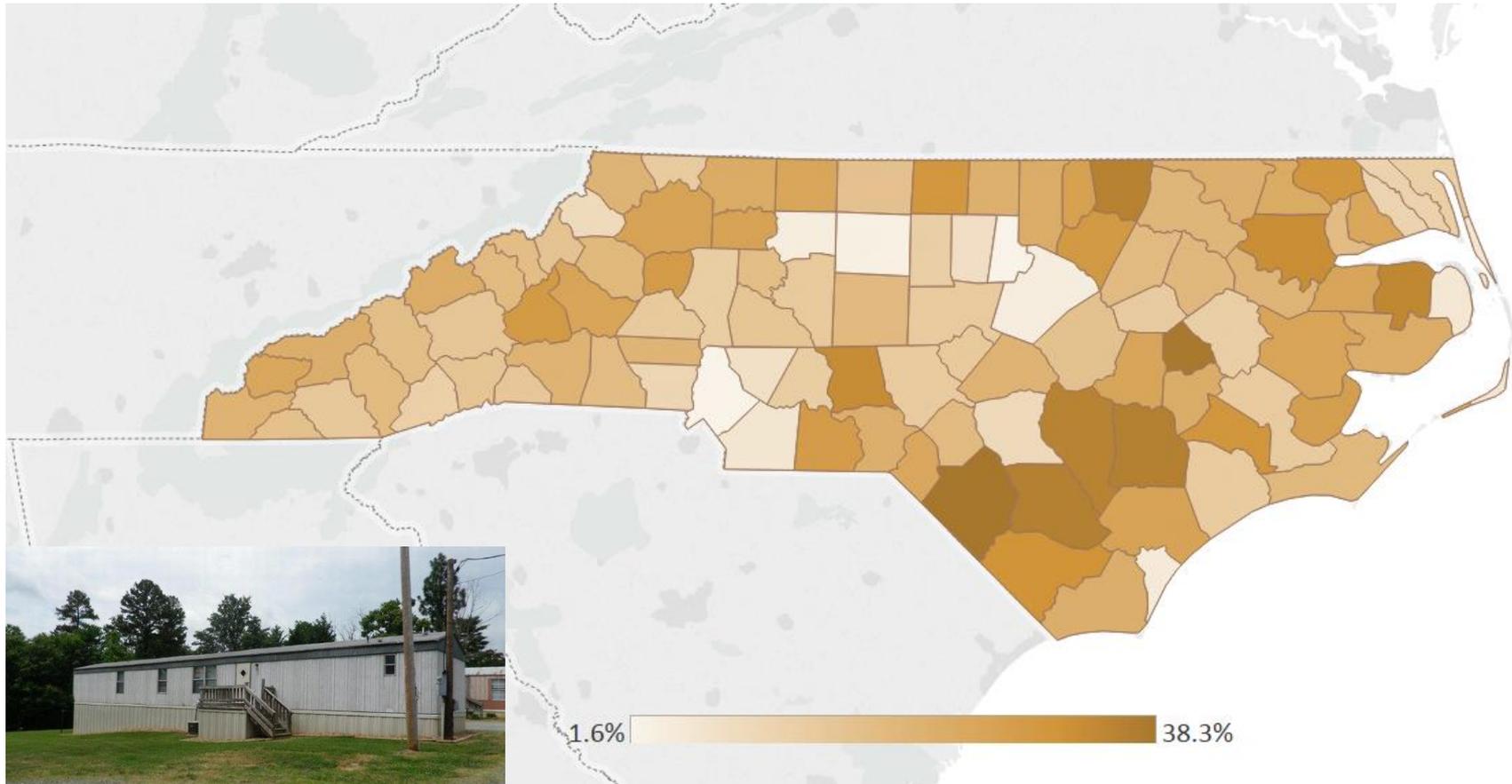
People Living in Poverty, 2012



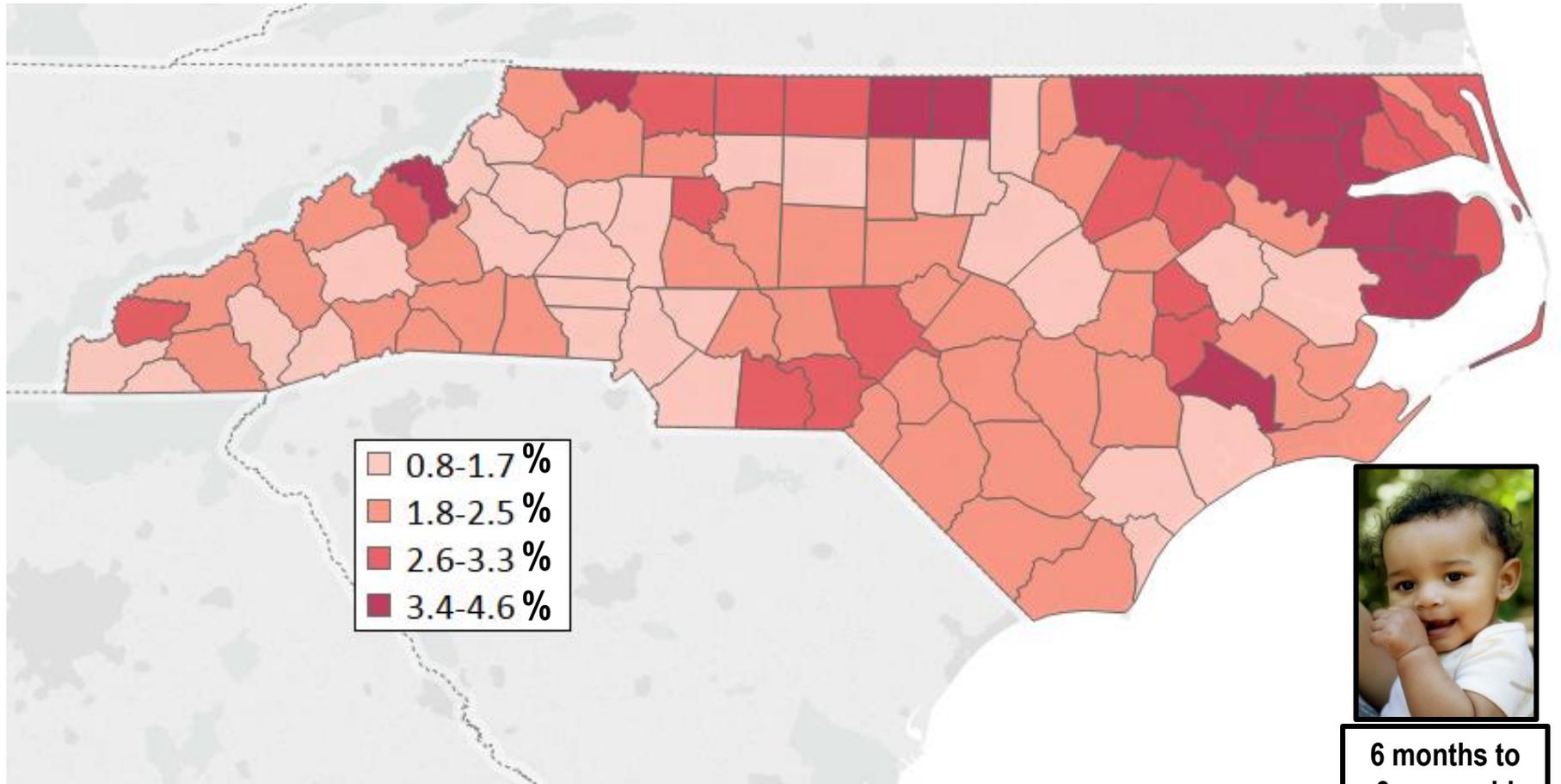
7.9% 31.6%



Housing Units that are Mobile Homes, 2015



Percent of North Carolina Children with Blood Lead Levels (BLLs) $\geq 5\mu\text{g}/\text{dL}$, 2010-2014



The Cost of Addressing Healthy Homes



Costs of Medical Care Related to Childhood Lead Poisoning

Medical Treatment	\$11-53 billion
Lost Earnings	\$165-233 billion
Lost Tax Revenue	\$25-35 billion
Special Education	\$30-146 million
Lead-Linked ADHD Cases	\$267 million
Lead-Linked Criminal Activity	\$1.7 billion
	\$192-270 billion

Source: Environmental Health Perspectives, July 2009, Elise Gould, "Childhood Lead Poisoning: Conservative Estimates of the Social and Economic Benefits of Lead Hazard Control"

Cost of Asthma in the US

Direct costs: \$49.9B

ED visits
Hospitalizations
Medications (all)
Outpatient visits
Additional labs/tests
Other costs



Indirect costs: \$32B

Work-related costs
Disability
Asthma-related death



\$81.9 billion

**Average annual cost of care for person with asthma:
\$3,266**

What is the cost of asthma care?

Average annual cost of care for person with asthma: **\$3,266**

Preventive environmental measures can reduce annual costs by **\$1,960**

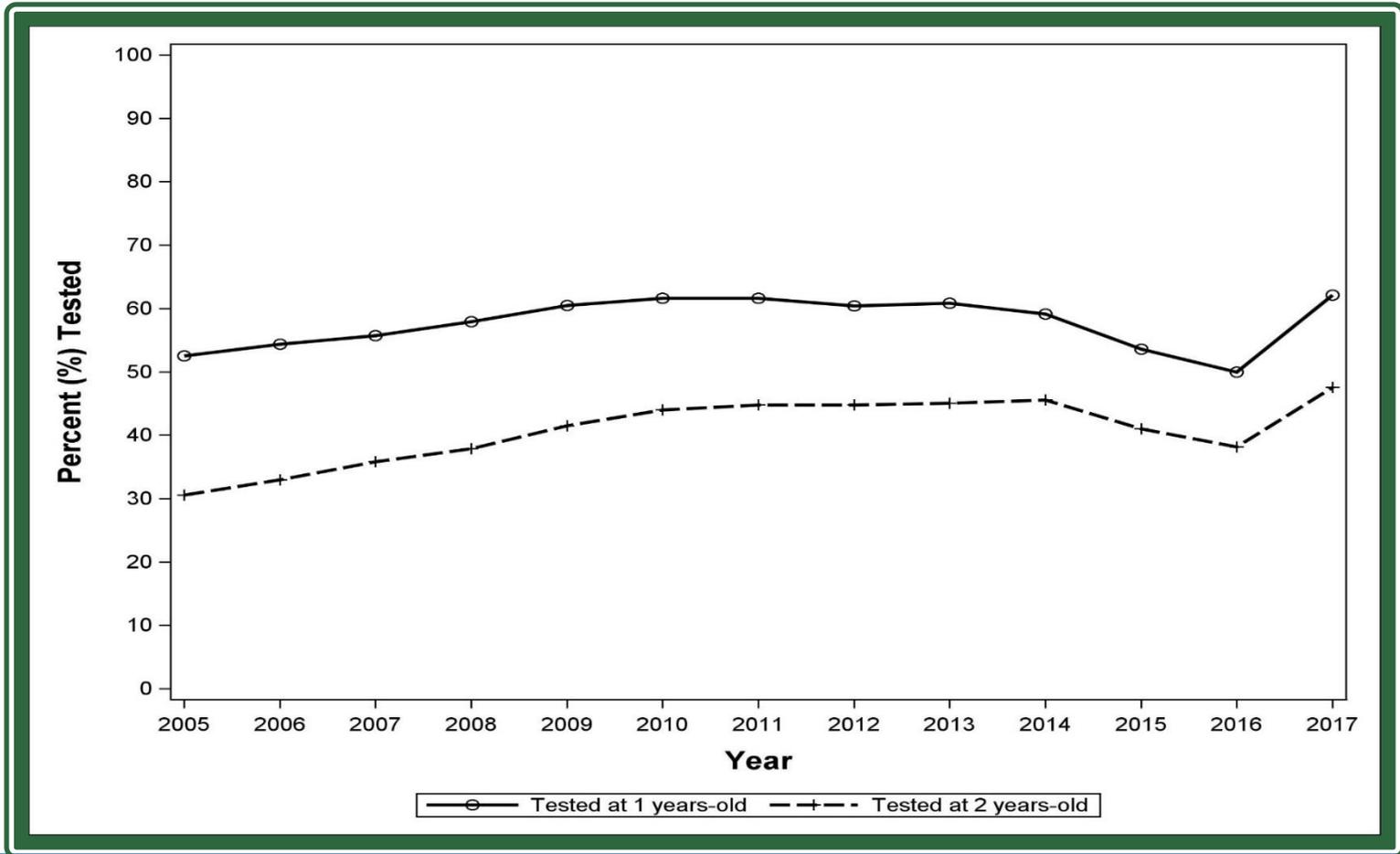


Other Influences Impacting Lead and Asthma Care

When should children be tested for lead poisoning?



Less Testing among Those at Greater Risk



Policy: *NC Lead Investigation Expansion Plan*

Since January 1, 2018...

- Blood lead action level dropped from 10 μ g/dL to 5 μ g/dL for children <6 years old
- Investigation **offered** for a child whose BLL is 5-9 μ g/dL
- Investigation **required** for a child whose BLL is \geq 10 μ g/dL
- Same for pregnant women with similar EBLs
- 2 consecutive blood lead tests w/in 12 months required at new action levels

Policies aimed at vulnerable children

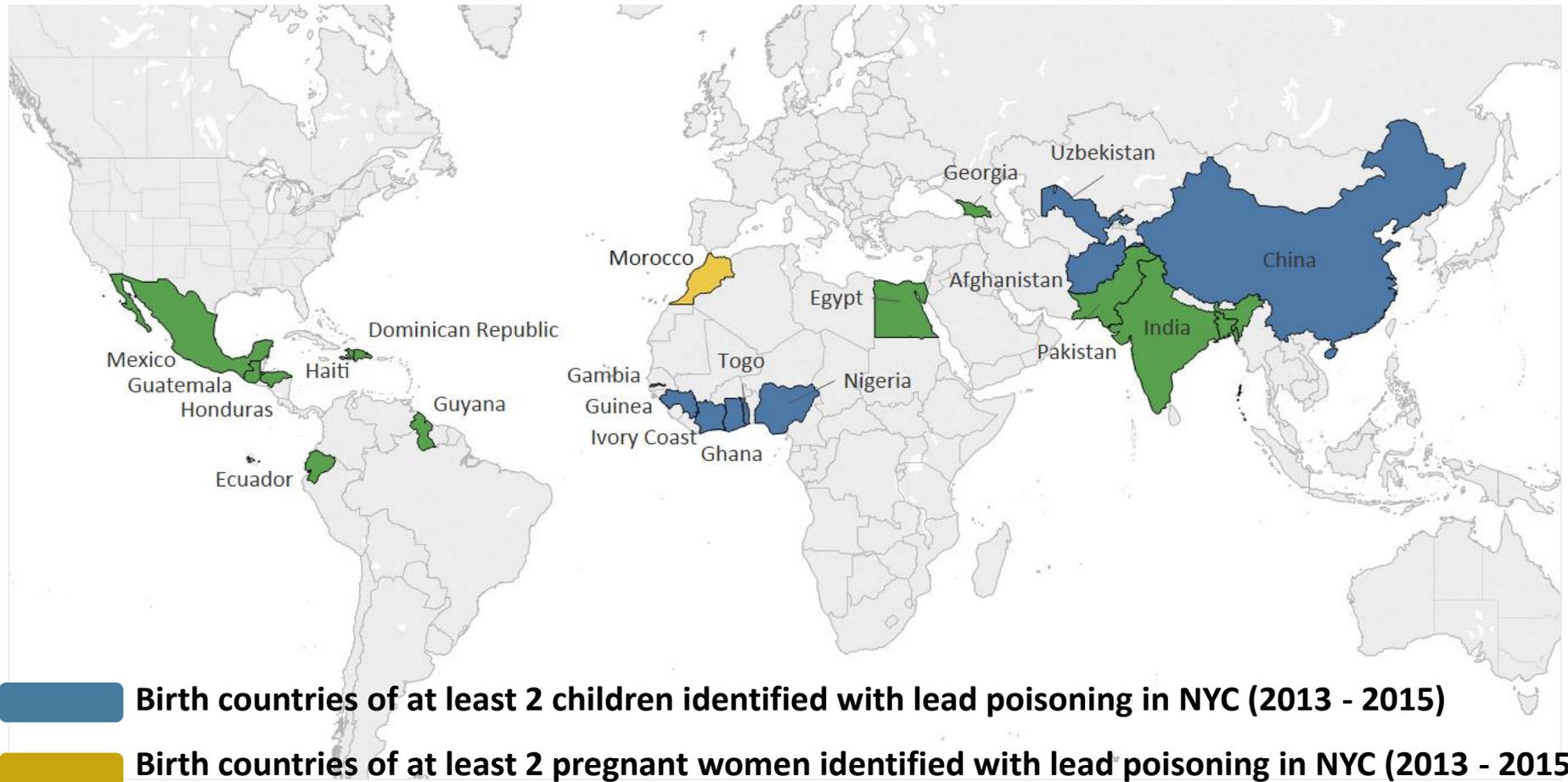
Medicaid recipients



Refugee children



Birth countries of lead poisoned children and pregnant women



Birth countries of at least 2 children identified with lead poisoning in NYC (2013 - 2015)

Birth countries of at least 2 pregnant women identified with lead poisoning in NYC (2013 - 2015)

Both

A woman may have lead in her body due to **ingestion or inhalation** over her lifetime.



Risk factors

- Recent immigrant to the US
- Pica
- Cultural items
- Occupational exposure
- Contaminants in the home
- Nutritional status
- Cumulative lifetime exposures

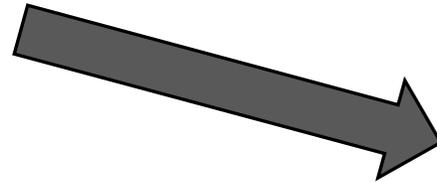
What are some factors that influence poor asthma outcomes?

- Race and ethnicity
- Income
- Education
- Poor medication use

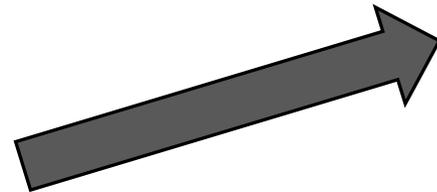


Influences on Asthma Care and Outcomes

**ASTHMA
EDUCATION**



ENVIRONMENT



**Improved Asthma
Outcomes**

Tools and Resources for Informing Vulnerable Populations

Engaging with patients can improve asthma outcomes



Basic asthma facts

Patient skills

Roles of medications

Self-management should be taught and reinforced throughout the patient's continuum of care.

Strategies for Addressing Asthma in Homes

Core Elements of a Home Visit

Asthma Education

What Is Asthma?

INFLAMED BRONCHIAL TUBE
NORMAL ASTHMA

Medications and Devices

Asthma Action Plans

Home Exposure Assessment

Asthma Triggers

PETS

DUST

CHEMICALS

MOLD

PESTS

Partnering and Resources

Communication with Healthcare Providers, Schools, etc.

Links to Services

Additional Elements

Home Cleaning

Hand-Washing

Allergen Avoidance Supplies

Asthma Symptom Diary

Home Characteristics and Asthma Triggers

Checklist for Home Visitors

Using this Home Assessment Can Help Make Homes Healthier.

A trained home visitor can help find common asthma triggers in homes and discuss ways to reduce and remove triggers. Removing asthma triggers in the home, along with proper medical care can improve health.

The checklist is organized into a Core Assessment plus two appendices (Dust Mite Module and Mold and Moisture Module). The Core Assessment can be used for all types of housing and climates, but the additional modules can be used if dust mites or mold/moisture issues are suspected by the trained home visitor. The suggested action items in this checklist are generally simple and low cost.

Glossary of Asthma Triggers Commonly Found in Homes

Combustion by-products

Triggers: Particles and gases that are formed when fuel is burned.

Where Found: Gas cooking appliances, fireplaces, woodstoves, candles, incense, cigarettes, and unvented kerosene and gas space heaters.

Pests

Triggers: Cockroaches—Body parts and droppings. Rodents—Fur, skin flakes, and urine.

Where Found: Areas with food and water such as kitchens, bathrooms, and basements.

Dust Mites

Triggers: Body parts and droppings.

Where Found: Mattresses, bedding, carpeting, curtains, upholstered furniture, and stuffed toys. Dust mites are too small to be seen with the naked eye. They can survive in a range of climates, but they prefer high humidity.

Pets with fur

Triggers: Fur, skin flakes, and saliva.

Where Found: Throughout entire home.

Secondhand Smoke

Triggers: Mix of smoke from the burning end of a cigarette, pipe, or cigar and the smoke exhaled by a smoker.

Where Found: Anywhere that smoking is allowed.

Volatile organic compounds (VOCs)

Triggers: Chemical vapors that come from household items.

Where Found: Products such as cleaning agents, deodorizers, air fresheners, perfumes, paints, nail polish, and nail polish remover.

Asthma action plans can help people manage their asthma

Asthma Action Plan

Name: _____ DOB: _____
 Doctor: _____ Date: _____
 Phone for Doctor or Clinic: _____
 Predicted/Personal Best Peak Flow Reading: _____

Asthma Triggers
Try to stay away from or control these things:

<input type="checkbox"/> Exercise	<input type="checkbox"/> Smoke, strong odors or spray
<input type="checkbox"/> Mold	<input type="checkbox"/> Colds/Respiratory infections
<input type="checkbox"/> Chalk dust/dust	<input type="checkbox"/> Carpet
<input type="checkbox"/> Pollen	<input type="checkbox"/> Change in temperature
<input type="checkbox"/> Animals	<input type="checkbox"/> Dust mites
<input type="checkbox"/> Tobacco Smoke	<input type="checkbox"/> Cockroaches
<input type="checkbox"/> Food _____	<input type="checkbox"/> Other _____

Use these controller medicines every day to keep you in the green zone:

Medicine: _____	How much to take: _____	When to take it: _____	<input type="checkbox"/> Home
_____	_____	_____	<input type="checkbox"/> School

Or Peak Flow _____ to _____ (80-100%)
 5-15 minutes before very active exercise, use Albuterol _____ puffs.

1. Green – Go

- Breathing is good.
- No cough or wheeze.
- Can work and play.

Keep using controller green zone medications everyday.

2. Yellow – Caution

Add these medicines to keep an asthma attack from getting bad:

Medicine	How much to take	When to take it
Albuterol	<input type="checkbox"/> 2 puffs by inhaler	<input type="checkbox"/> May repeat every 20
or	<input type="checkbox"/> 4 puffs by inhaler	mins up to 3 doses in
_____	<input type="checkbox"/> With spacer, if available	first hour, if needed
_____	<input type="checkbox"/> By nebulizer	_____

If symptoms **DO NOT** improve after first hour of treatment, then go to red zone.

Medicine	How much to take	When to take it
Albuterol	<input type="checkbox"/> 2 puffs by inhaler	<input type="checkbox"/> Every 4 – 8 hours
or	<input type="checkbox"/> 4 puffs by inhaler	for _____ days
_____	<input type="checkbox"/> With spacer, if available	_____
_____	<input type="checkbox"/> By nebulizer	_____

_____ times a day for _____ days Home
 (oral corticosteroids) (how much) School

Call your doctor if still having some symptoms for more than 24 hours!

3. Red – Stop – Danger

Call your doctor and/or parent/guardian NOW!
 Take these medicines until you talk with a doctor or parent/guardian

Medicine	How much to take	When to take it
Albuterol	<input type="checkbox"/> 2 puffs by inhaler	<input type="checkbox"/> May repeat every 20
or	<input type="checkbox"/> 4 puffs by inhaler	mins until you get
_____	<input type="checkbox"/> With spacer, if available	help
_____	<input type="checkbox"/> By nebulizer	_____

_____ times a day for _____ days Home
 (oral corticosteroids) (how much) School

Call 911 for severe symptoms, if symptoms don't improve, or you can't reach your doctor and/or parent/guardian.

Or Peak Flow _____ (Less than 50%)

Physician Signature _____ Date _____ Phone _____

Asthma Triggers

Try to stay away from or control these things:

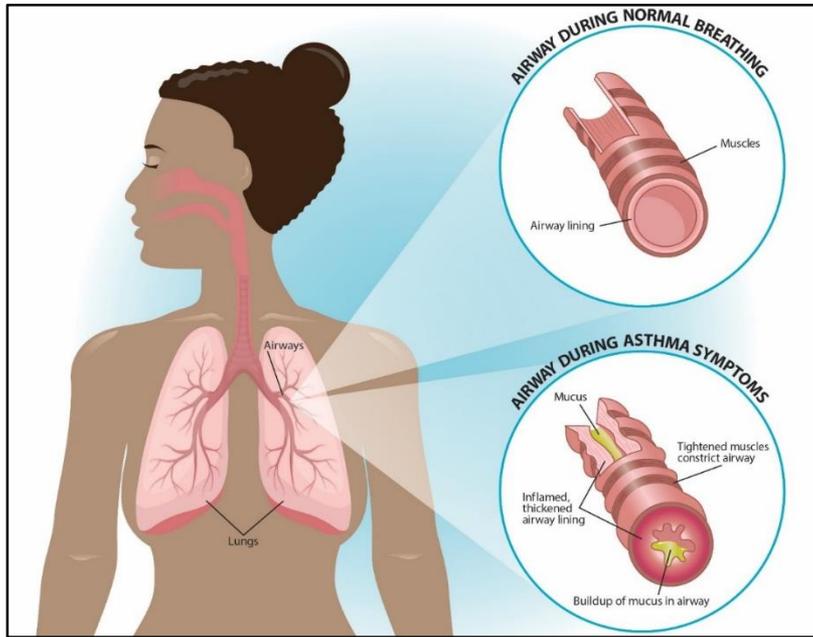
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<input type="checkbox"/> Pollen	<input type="checkbox"/> Change in temperature
<input type="checkbox"/> Animals	<input type="checkbox"/> Dust mites
<input type="checkbox"/> Tobacco Smoke	<input type="checkbox"/> Cockroaches
<input type="checkbox"/> Food _____	<input type="checkbox"/> Other _____

Nearly 44% of NC children with asthma have never been given an asthma action plan.

Hands on Learning



Teaching asthma as a chronic lung disease



Online Resources

Funded in part by
NIEHS grant #P30ES010126 and
NC DHHS contract #39681

NORTH CAROLINA HEALTHY HOMES

Asbestos Chemical Irritants Lead Mold & Moisture Pests & Pesticides Radon Secondhand Smoke

Additional Resources

- Join the Task Force
- News You Can Use
- Request a Free Training
- NC Disaster Response and Recovery

UPCOMING EVENTS

JAN 01 National Radon Action Month
January 1, 2020 - January 31, 2020

JAN 09 2020 Radon Webinar Series | Radon: A Primer for Everyone
January 9, 2020 @ 11:00 am - 11:30 am

[View More...](#)

NC Healthy Homes

Welcome to the North Carolina Healthy Homes website! This site provides general information to the public on healthy homes issues and is designed to provide health, housing, and community organization professionals access to resources for their work in educating North Carolina residents about maintaining a healthy home and in improving health outcomes.



PARTNER SPOTLIGHT

Warren Richardson



Warren Richardson is an environmental health specialist for the Durham County Department of Public Health, Environmental Health Division. He has an extensive background in environmental health, although he did not begin his career in the field. Warren earned an architectural engineering degree from NC

<http://nchealthyhomes.com>

CENTER FOR ENVIRONMENTAL HEALTH AND SUSCEPTIBILITY

Outreach and engagement



IN THIS SECTION



CONTACT INFO



The UNC-CEHS Community Engagement Core (CEC) enhances the environmental health literacy of public health professionals, community health workers and vulnerable populations, by increasing their understanding of the Center's environmental health sciences research and empowering them to make informed decisions to reduce harmful environmental exposures in homes and communities. The CEC also fosters dialogue between UNC-CEHS researchers and community partners about Center research to inform responsive research approaches and strategies for communicating CEHS science to community audiences.



ASTHMA



LEAD AND HEALTHY HOMES



ENVIRONMENTAL CANCERS

Local Healthy Homes Resources

The screenshot shows a website interface with a dark blue header containing navigation tabs: Asbestos, Chemical Irritants, Lead, Mold & Moisture, Pests & Pesticides, Radon, and Secondhand Smoke. A sidebar on the left features a red-bordered box around the 'Additional Resources' link, with a red arrow pointing to it. Below this are links for 'Join the Task Force', 'News You Can Use', 'Request a Free Training', and 'NC Disaster Response and Recovery'. The 'UPCOMING EVENTS' section lists 'National Radon Action Month' (Jan 01, 2020) and '2020 Radon Webinar Series | Radon: A Primer for Everyone' (Jan 09, 2020). The 'RECENT POSTS' section includes 'Partner Spotlight | Warren Richardson'. The main content area is titled 'Pitt County Resources' and includes a descriptive paragraph, followed by sections for 'Addressing Home Hazards' (Disaster Recovery, Pest Management, Smoking Prevention), 'Housing Assistance', and 'Maternal, Infant, and Child Health', each with contact information for various organizations.

Additional Resources

- Join the Task Force
- News You Can Use
- Request a Free Training
- NC Disaster Response and Recovery

UPCOMING EVENTS

- JAN 01** National Radon Action Month
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[View More...](#)

RECENT POSTS

- Partner Spotlight | Warren Richardson

Pitt County Resources

Listed below are agencies and organizations that may be able to assist with housing, environmental hazards and other needs.

Addressing Home Hazards

Disaster Recovery
Disaster Recovery Partner for Pitt County
Rev. Rodney Coles: 252-717-9600 or rodneycon2007@gmail.com

Pest Management
NC Cooperative Extension: 252-902-1700

Smoking Prevention
Allyson Smith at the Tobacco Prevention and Control Branch: 252-902-2438

Housing Assistance

Ayden Housing Authority: 252-746-2021
Catholic Charities: 252-355-5111
Community Crossroads Center: 252-752-0829
Farmville Housing Authority: 252-753-5347
Farmville Housing Department: 252-753-6720
Greeneville Housing Authority: 252-329-4000

Maternal, Infant, and Child Health

Martin-Pitt Partnership for Children Inc: 252-758-8885
Pregnancy Care Management: 252-902-2319
WIC Clinic: 252-902-2393

Lead Sources Library

Asbestos Chemical Irritants Lead Mold & Moisture Pests & Pesticides Radon Secondhand Smoke

Information: Visit the eoc.com.sg website for the Consumer Focus Policy Commission resources for warnings and recall notices.

Search

Search Text

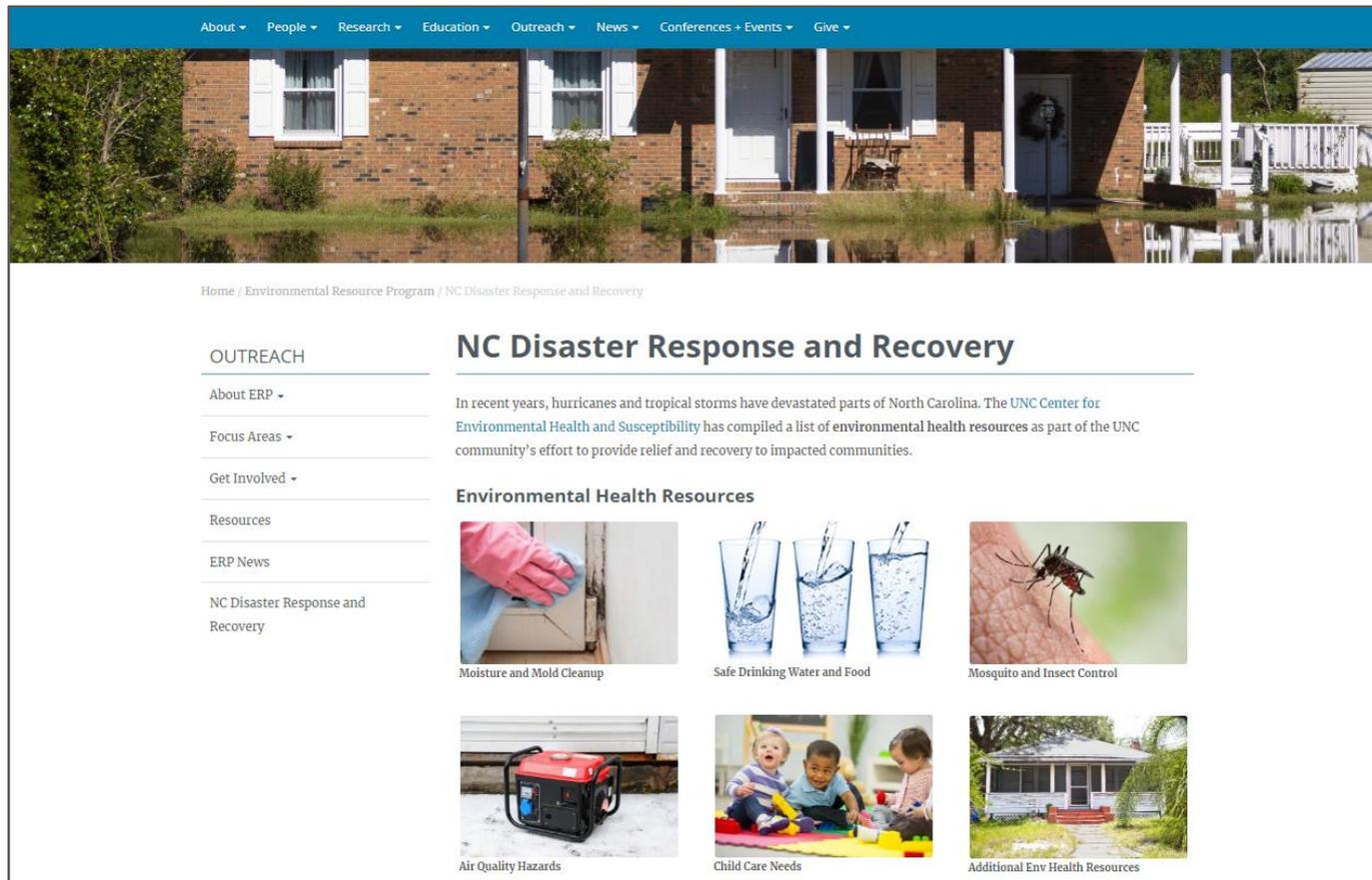
Choose Category

Search Clear Search

 <p>Anise (seed)</p>	 <p>Asafoetida (whole)</p>	 <p>Balguti Kesaria</p>	 <p>Chili Pepper (flakes)</p>	 <p>Chili Pepper (ground)</p>
 <p>Chili Pepper, green (whole, fresh)</p>	 <p>Chili Pepper, red (whole, dried)</p>	 <p>Chili Pepper, red (whole, fresh)</p>	 <p>Chili Pepper, yellow (whole, dried)</p>	 <p>Chili Pepper, yellow (whole, fresh)</p>
 <p>Cinnamon Powder (blend)</p>	 <p>Cinnamon (sticks)</p>	 <p>Cinnamon, Ceylon (powder)</p>	 <p>Cinnamon, Ceylon (whole)</p>	 <p>Cinnamon, Vietnamese (powder)</p>

- Educational tool for public health professionals and families
- Visual aid for public health professionals during and after a lead investigation

Addressing EH Issues after Natural Disasters



The screenshot shows a website page with a blue navigation bar at the top containing links for About, People, Research, Education, Outreach, News, Conferences + Events, and Give. Below the navigation bar is a large photograph of a brick house with a porch, partially submerged in water, reflecting in a pool in the foreground. The main content area has a breadcrumb trail: Home / Environmental Resource Program / NC Disaster Response and Recovery. On the left is a sidebar menu under the heading 'OUTREACH' with links for About ERP, Focus Areas, Get Involved, Resources, ERP News, and NC Disaster Response and Recovery. The main content area features a section titled 'NC Disaster Response and Recovery' with an introductory paragraph. Below this is a section titled 'Environmental Health Resources' with six image-based links: Moisture and Mold Cleanup, Safe Drinking Water and Food, Mosquito and Insect Control, Air Quality Hazards, Child Care Needs, and Additional Env Health Resources.

Home / Environmental Resource Program / NC Disaster Response and Recovery

OUTREACH

- About ERP
- Focus Areas
- Get Involved
- Resources
- ERP News
- NC Disaster Response and Recovery

NC Disaster Response and Recovery

In recent years, hurricanes and tropical storms have devastated parts of North Carolina. The UNC Center for Environmental Health and Susceptibility has compiled a list of environmental health resources as part of the UNC community's effort to provide relief and recovery to impacted communities.

Environmental Health Resources

- 
Moisture and Mold Cleanup
- 
Safe Drinking Water and Food
- 
Mosquito and Insect Control
- 
Air Quality Hazards
- 
Child Care Needs
- 
Additional Env Health Resources

ie.unc.edu/disaster-response-recovery/

Other Disaster Clean-Up Resources

Get Rid of Mold

After a flood, mold will grow in your house. It can make you sick. You will need to clean your house.



Take things that were wet for 2 or more days outside.

Things that stayed wet for 2 days have mold growing on them even if you can't see it.

Take out stuff made of cloth, unless you can wash them in hot water. Also take out stuff that can't be cleaned easily (like leather, paper, wood, and carpet).

Use bleach to clean mold off hard things (like floors, stoves, sinks, certain toys, countertops, flatware, plates, and tools).



Follow these steps:

- Never mix bleach with ammonia or other cleaners.
- Wear rubber boots, rubber gloves, goggles, and N-95 mask.
- Open windows and doors to get fresh air when you use bleach.
- Mix no more than 1 cup of bleach in 1 gallon of water.
- Wash the item with the bleach and water mixture.
- If the surface of the item is rough, scrub the surface with a stiff brush.
- Rinse the item with clean water.
- Dry the item or leave it out to dry.

Recommendations from the Centers for Disease Control and Prevention



National Institute of Environmental Health Sciences

Mold Clean-up and Treatment Orientation

National Institute of Environmental Health Sciences
NIEHS Disaster Recovery

Health and Safety Essentials for Workers, Volunteers, and Homeowners



June 2013

WORKER EDUCATION & TRAINING PROGRAM



National Institute of Environmental Health Sciences

Hurricane Response Initiative

Safety Awareness for Responders to Hurricanes:
Protecting Yourself While Helping Others



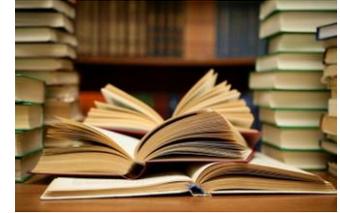
Developed by HMTRI through cooperative agreement # 2U45 ES006177-14 with NIEHS



WORKER EDUCATION & TRAINING PROGRAM

<http://bit.ly/2wNnYrc>

How Literacy Impacts Vulnerable Populations



>36 million

US adults can't read above 3rd grade level

43% of adults with lowest literacy levels live in poverty

\$232 billion

each year in health care costs related to low adult literacy levels

72% chance of a child to have low literacy if they're parents are illiterate

1 in 6 adults drop out of high school every year

50% (2 million) immigrants come to the US each year without HS diploma or proficient English skills

Low Literacy Educational Materials

ARE YOU PREGNANT?

TAKE ACTION TO PROTECT YOUR BABY FROM LEAD POISONING

- ✓ **Get a Blood Test**
- ✓ **Wash Hands**
- ✓ **Wet Clean**
- ✓ **Leave Shoes at Door**
- ✓ **Eat Healthy Food**
- ✓ **Use Safe Drinking Water**

Do not drink, cook, or make baby formula with your tap water if it contains lead.

Reduce levels of lead in your water by flushing pipes after six hours of nonuse and always use cold water for drinking, cooking, and making formulas and juices.

Additional resources are available at the NC Department of Health and Human Services, Division of Public Health, Environmental Health Section, Childhood Lead Poisoning Prevention Program, <http://ehs.ncpublichealth.com/hhccnl/ehnl/index.html#lcpwp> or 1-800-774-0071.

HEALTHY HOMES
www.nchsh.com

LEAD

IN SPICES AND OTHER CULTURAL ITEMS

Some spices, herbal remedies, ceremonial powders, and cosmetics may contain lead, especially those imported from India, Asia, Mexico, and the Middle East.

Lead poisoning can cause decreased IQ, attention-related deficits, hearing impairment, kidney disease, and delayed growth and development in children.

SPICES: Anise Seeds Asafoetida Chili powder/ whole chilies Cinnamon Cloves Coriander Cumin Curry powder Dagar Phool (stone flower) Garam Masala Ginger Hungarian Paprika Kabza Mix Seven Spices Mix Turmeric	HERBAL TEAS AND REMEDIES: Ash powder Azarcon Balguti Kesaria Bali Gali Ghasard Greta Kandu Mojhat ceremonial drink Pay-loo-ah	CEREMONIAL POWDERS: Ash powder (Vibhuti) Kum kum Incense Pooja powder Rangoli	COSMETICS: Kohl Kajal Sindoor Surma
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Additional resources available:

Prevent LEAD Poisoning

LEAD POISONING CAN BE PREVENTED

Some Do's & Don'ts

TAKE ACTION TO PREVENT LEAD POISONING

- ✓ **Test Kids for Lead**
- ✓ **Wash Hands and Toys**
- ✓ **Wet Clean**
- ✓ **Leave Shoes at Door**
- ✓ **Eat Healthy Food**
- ✓ **Use Safe Drinking Water**
- ✓ **Hire a Professional**

Do all that you can to protect your child from becoming lead poisoned.

Updated March 2017

HEALTHY HOMES
www.nchsh.com

NC
Public Health

Keeping Lead at Work and Preventing Take-Home Lead Exposure

Lead dust can be carried home on your clothes, shoes, skin and hair and could expose your family, vehicles, and home interiors to lead. Children and pregnant women are especially at risk to health effects of lead exposure.

Be careful what you bring to work

The following personal possessions may become contaminated at work: **watch, glasses, car keys, cell phone, hat, tobacco products, jewelry, and other pocket items**

These are items small children may want to play with or put in their mouths. Leave these items **at home or in your car**, or place in a **clean locker room** before work.

The following items may become contaminated at work:

Consider bringing **food, water or clothing** in disposable containers or bags. Store the disposable container or bag in a **clean place** at work and in a **clean plastic bag** in the car or at home. Also, consider using disposable tissues instead of handkerchiefs.

While at work

- Follow protocols for staying clean during work breaks.
- Protect your personal belongings from lead exposure.
- Do **NOT** eat in work area, keep lunch items in break room.
- Use disposable water sources or what is provided at work.
- Do **NOT** go to car during breaks at work.
- **ALWAYS** wash hands and face with soap and water before eating, drinking, or smoking.

	Tenant Responsibility	Landlord Responsibility
Keep it clean	<p>Clean up spills</p> <p>Store food in sealed containers</p> <p>Sweep/vacuum regularly</p> <p>Use trash cans with lids</p>	<p>Help tenants safely get rid of pests</p>
Keep it dry	<p>Monitor indoor humidity</p> <p>Open windows or use fans after showering and cooking</p> <p>Alert landlord to moisture, leaks, pests, holes</p>	<p>Make sure ventilation fans work</p> <p>Fix indoor leaks</p> <p>Fix moisture intrusion</p> <p>Clean gutters in spring and fall</p>
Fix it	<p>Alert landlord to moisture, leaks, pests, holes</p>	<p>Fix structural issues</p> <p>Protect tenants from lead and asbestos hazards</p>
Monitor it	<p>Replace batteries in alarms as needed during tenancy (unless alarm is 10 year lithium battery tamper resistant)</p> <p>Replace furnace filter every 3 months</p>	<p>Install one working CO alarm per unit, per level</p> <p>Install working smoke alarm</p> <ul style="list-style-type: none"> - Replace alarms within 15 days if not working - Make sure alarms are operable at move in

Contacts



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Contact for Lead/HH Task Force & listserv

