Center for Children's Health, the Environment, the Microbiome, and Metabolomics (C-CHEM^2)

MAKING A HEALTHIER FUTURE FOR MOTHERS AND CHILDREN

MICROBIOME

the community of bacteria and other microorganisms that live in and on the human body.

METABOLOME

the community of metabolites, the small molecules involved in and produced by the body's metabolic processes.

When a woman is pregnant, everything from the food she eats to the air she breathes affects her health and that of her child. From the moment that child is born, the bacteria, viruses, fungi, and other microorganisms they encounter influence the development of their microbiome—the community of bacteria inside and on their bodies—which in turn affects everything from how often they get sick to whether they grow up to develop depression. Recent studies have shown that children delivered by C-section are more likely to develop asthma than their peers because initial exposure to bacteria and other microbes in the birth canal during childbirth are essential for immune system development.

The Center for Children's Health, the Environment, the Microbiome, and Metabolomics (C-CHEM^2) at Emory University is working to improve children's health and reduce health disparities by better understanding how environmental exposures during and after pregnancy affect African American women and their children in Atlanta. The center, the first of its kind in the Southeast, brings together the expertise of four Emory University schools and aims to explore how environmental exposures prior to conception, during prenatal development, and postnatally may affect infant health and development.

C-CHEM^2 is a collaboration between the Nell Hodgson Woodruff School of Nursing, Rollins School of Public Health, Emory College of Arts and Sciences, and Emory School of Medicine.

The School of Nursing was awarded over $5 million from the National Institute of Environmental Health Sciences and the U.S. Environmental Protection Agency (EPA) to establish a children's environmental health center. The grant is the largest National Institutes of Health grant ever received by the school.

C-CHEM² projects

- Characterizing Exposures and Outcomes in an Urban Birth Cohort **(CHERUB)**
- Microbiome, Environment, and Neurodevelopmental Delay **(MEND)**
- Metabolic, Microbiome, and Toxicant-Associated Interactions **(MATRIX)**
- Community Outreach and Translation Core **(COTC)**

RESEARCH SPOTLIGHT

Environmental exposures among residents of the urban Deep South are distinctive from other parts of the country, and factors like race and socioeconomic status appear to translate into significant health disparities for African American women and children. According to the EPA, for example, black children have nearly twice the rates of asthma as white children, are twice as likely to be hospitalized, and are four times as likely to die from asthma as white children. Even so, no studies have examined pre and postnatal exposures among minorities within this region.

To address this scarcity of research, Emory's C-CHEM² has mobilized an interdisciplinary team of investigators with expertise in environmental health, neurodevelopment, maternal-child health, and preventive medicine. The team has enrolled 500 African American women and their children living in metropolitan Atlanta to investigate how behavioral factors and the microbiome impact preterm birth and how genetic factors affect the microbiome.

C-CHEM² researchers are working to understand the complex interactions among components of the prenatal and postnatal environment—toxin exposures, the microbiome, and the metabolome—and their influence on birth outcomes, infant health, and brain development. Emory's center is one of only fifteen children's environmental health centers nationwide and is the only center focused on the microbiome and African American mothers and babies.

Program outcome highlights

- **Educating** and exposing nursing students to children's environmental health research through a summer undergraduate research fellowship program
- **Fostering** research development through pilot grants for junior faculty to conduct children's environmental health studies
- **Engaging** and educating the target audience through outreach projects, including:
  - › STAKEHOLDERS, a film highlighting environmental health disparities affecting African American women and children. STAKEHOLDERS was selected for screening at the National Institute of Environmental Health Sciences Environmental Health Fest in 2016 and at the American Public Health Association in 2017.
  - › "Know Better, Live Better," a social impact campaign to raise awareness of children's environmental health concerns for African American mothers and infants to provide simple solutions for reducing exposures.
- **Creating a community mini-grant program** providing funding to organizations conducting outreach, promoting community awareness, or collecting information to address local environmental and maternal child health concerns in DeKalb and Fulton counties. Grantees include:
  - › The Center for Black Women's Wellness, which will conduct a breastfeeding course focused on exposures that can be transferred to infants through breast milk.
  - › Collier Heights Association for Revitalization, Resilience, and Sustainability, which has selected ten students to participate in the Collier Heights Environmental Health Outdoor Classroom
- **Hosting the First Annual EnviroME Symposium** to explore the connection between the environment and personal health. Attendees included African American high school students who are pregnant and/or have young children; educators; and social workers.
- **Developing a series** of environmental health literacy trainings to integrate into existing public health and family support services

To learn more about C-CHEM², visit **nursing.emory.edu/c-chem2** or contact:
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