

The Southern Environmental Health Study: A comprehensive investigation of environmental exposures and cancer risk

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Humans are exposed to large numbers of chemical and physical substances and their mixtures, typically at low levels over extended periods of time. Previous environmental epidemiologic studies have mostly evaluated exposures one at a time. However, because of a typically weak association of a given exposure with disease risk, coupled with limited tools and biomarkers for environmental assessments, most studies have failed to provide convincing evidence to link environmental exposures to cancer risk. To overcome these challenges, we have established a large cohort study, projecting to recruit ~35,000 participants with an extensive collection of survey and geospatial exposure data, as well as biological and environmental samples, to address critical issues in the environmental etiology of cancer. The Southern Environmental Health Study (SEHS) is one of five new Cohorts for Environmental Exposures and Cancer Risk (CEECR), a collaborative consortium co-funded by the National Institute of Environmental Health Sciences (NIEHS) and the National Cancer Institute (NCI). One key novel exposure assessment method in the SEHS is the use of passive silicone wristband samplers that can detect >4,000 chemical signals, including large numbers of known/suspected carcinogens, providing a comprehensive assessment of the external exposome for cancer epidemiologic studies. By integrating environmental exposure data from multiple sources, including personal exposure assessments and biologic markers of environmental exposure and responses, this study will allow us to comprehensively and rigorously investigate environmental exposures in relation to cancer risk and provide substantial novel data to improve the understanding of both external and internal exposomes, paving the way for future remediation of environmentally induced cancer.

OBJECTIVES

- Comprehensively investigate environmental exposures in relation to cancer risk
- Incorporate exposome approach in population-based cancer research
- Provide substantial novel data to improve the understanding of both external and internal exposomes
- Identify key biomarkers to measure external exposures
- Examine associations of external and internal metrics with cancer-related biological responses
- Develop cumulative exposome risk scores for cancer

EXPOSOME

The EXPOSOME is an integrated function of exposure on our body, including what we eat and do, our experiences, and where we live and work.

Ecosystems Food outlets, alcohol outlets Built environment and urban land uses Population density Walkability Green/blue space estyle Lifestyle Socia Physical activity Sleep behavior Diet)VII Drug use Smoking Alcohol use Social Household income Inequality Social capital Social networks Cultural norms Cultural capital

Psychological and mental stress

Vermeulen et al. The exposome and health: Where chemistry meets biology, Volume: 367, Issue: 6476, Pages: 392-396, DOI: (10.1126/science.aay3164)

ABSTRACT



RECRUITMENT

- Goal of 35,000 participants
- Partnership with community health centers and other community groups across the South
- Community outreach events at food banks, churches, health fairs, expos, and many more
- Social media advertising



Map of participants enrolled as of 1/16/2025

>13,000 participants wristbands enrolled

>8,000 returned >1,500 blood >1,500 urine samples samples donated donated



PROGRESS

>3,000 saliva samples donated

Data as of 01/15/2025

DATA AND BIOSPECIMEN COLLECTION

Surveys to collect residential history and health and behavioral characteristics

Saliva samples (optional) to assess genetic risk

Blood and urine samples (optional) to measure internal exposome and responses

Geospatial analysis to conduct spatial environmental exposure assessments

Wristbands to assess personal exposure/external exposome

What is the wristband?

- Polydimethylsiloxane (PDMS) wristbands for measuring air and contact exposures
- Participants wear for 7 days
- Chemicals "stick" to the wristband
- GC-HRMS methods measure >4,000 chemical signals
- Can compare individual chemicals or combinations of chemicals

STUDY CONTACT INFORMATION

SEHStudy.org



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