



National Institute of Environmental Health Sciences
Your Environment. Your Health.

Our Environment, Our Health, Our Future *Children's*

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National Institute of Environmental Health Sciences and
National Toxicology Program

Children's Environmental Health Centers Webinar: 8 July 2015

The National Institute of Environmental Health Sciences

- One of the 27 NIH Institutes and Centers
- Wide variety of programs supporting our mission of environmental health:
 - Intramural laboratories
 - Extramural funding programs
 - Disease prevention
 - Clinical research program
 - National Toxicology Program
 - Public Health Focus





NIEHS Strategic Plan

Mission

The mission of the National Institute of Environmental Health Sciences is to discover how the environment affects people in order to promote healthier lives.

Strategic Themes for Environmental Health Sciences

Vision

The vision of the National Institute of Environmental Health Sciences is to provide global leadership for innovative research that improves public health by preventing disease and disability.



Cause for real concerns

- **Increased Incidence of Disease** – Autism, asthma, ADHD, obesity, ...
- **Ubiquitous Exposure** - Chemicals are *widely dispersed in our Environment*
- **Mixtures** – Can have *potentiating* effects
- **Sensitive Populations** – Children, pregnant women, tribal communities, elderly, genetic predisposition, ...

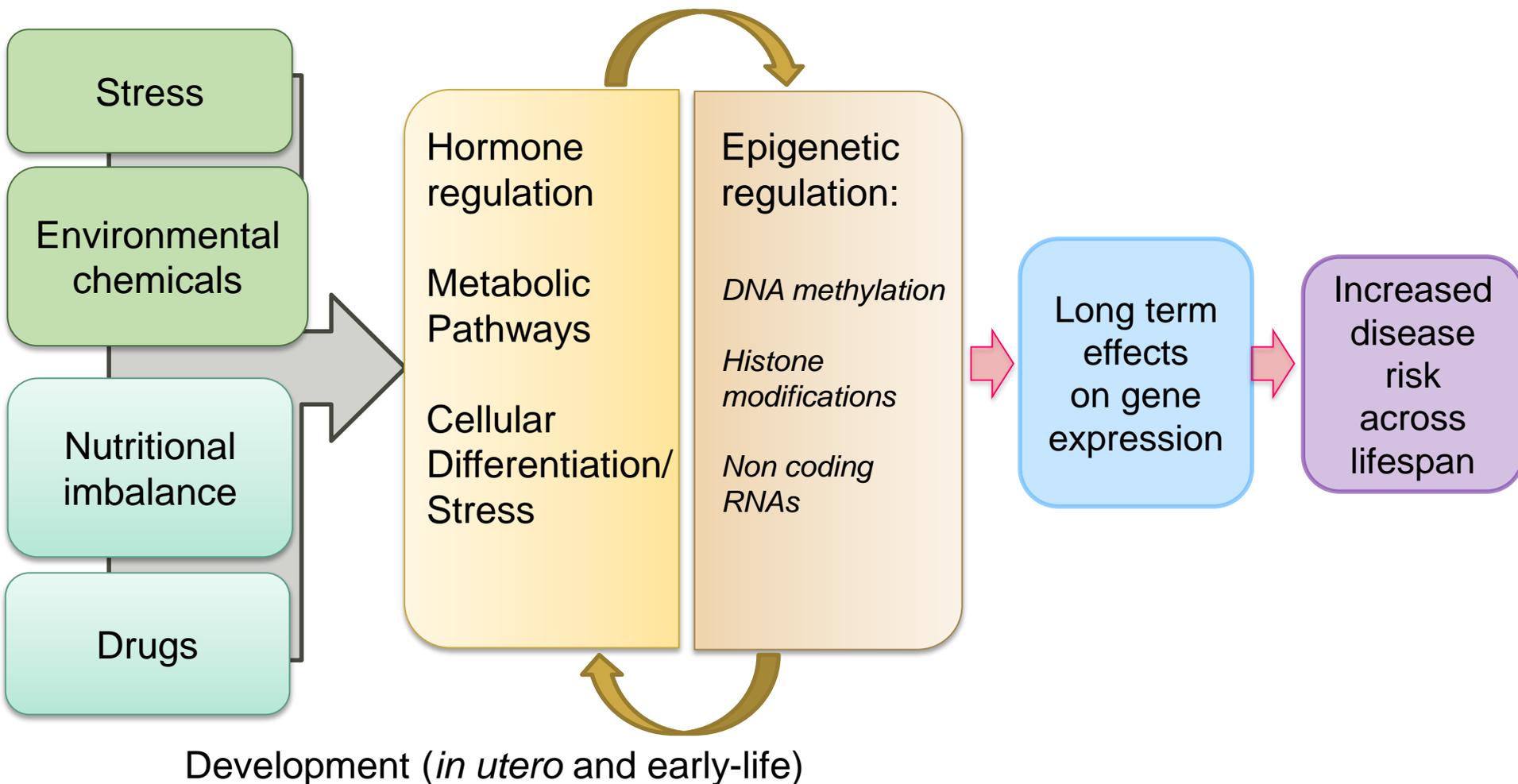


Windows of Susceptibility

- Development is sensitive time for exposure
 - Rapid Growth
 - Active and extensive cell differentiation
 - Increased metabolic rate
 - Developing immune system
 - Opportunities for initiation of lesions and promotion of altered cells
 - Development is a highly integrated process
 - Programming (epigenetic marks set)
- *In utero*, infants, childhood, adolescence, pregnancy, old age

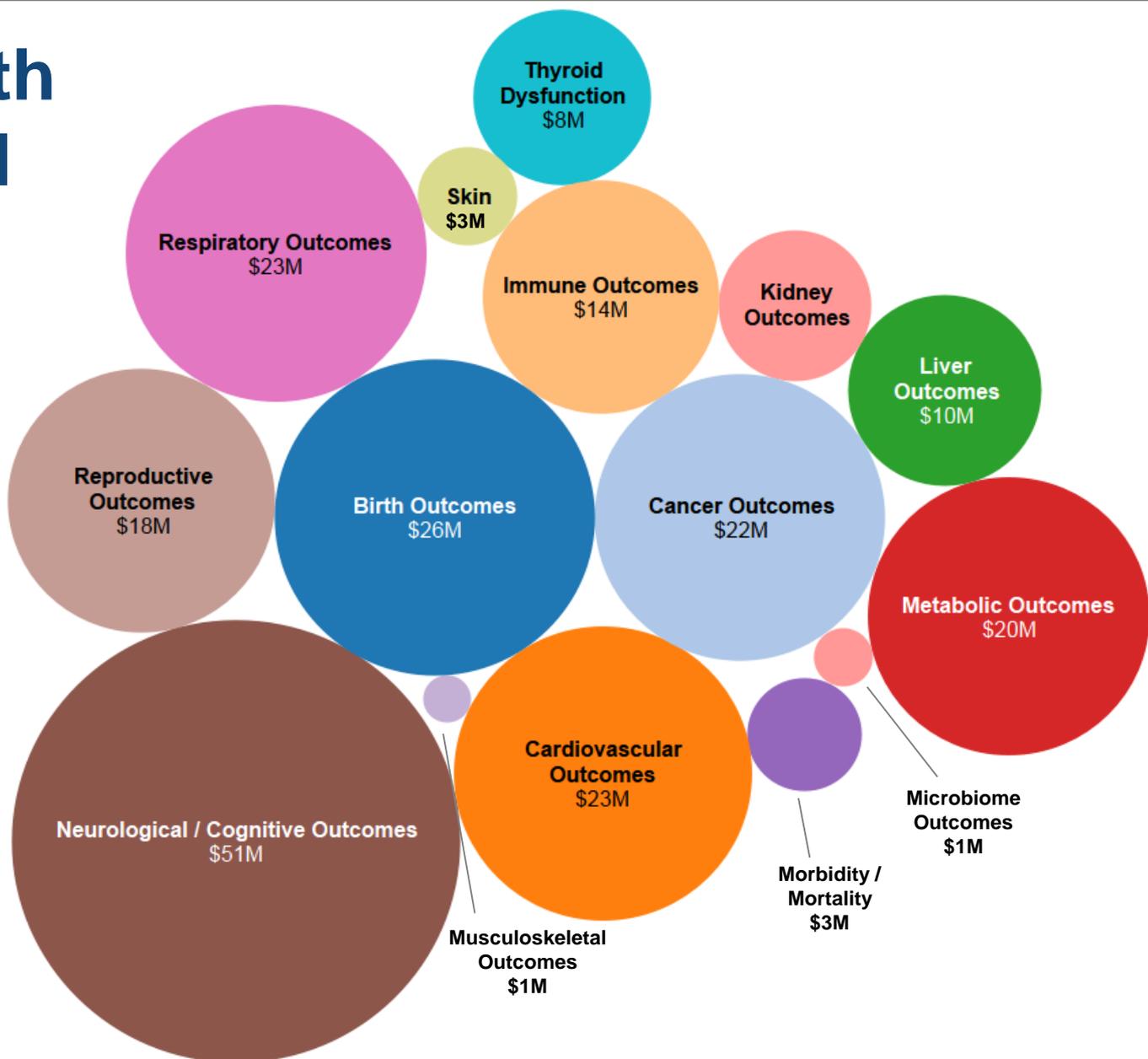


Developmental Origins of Health and Disease

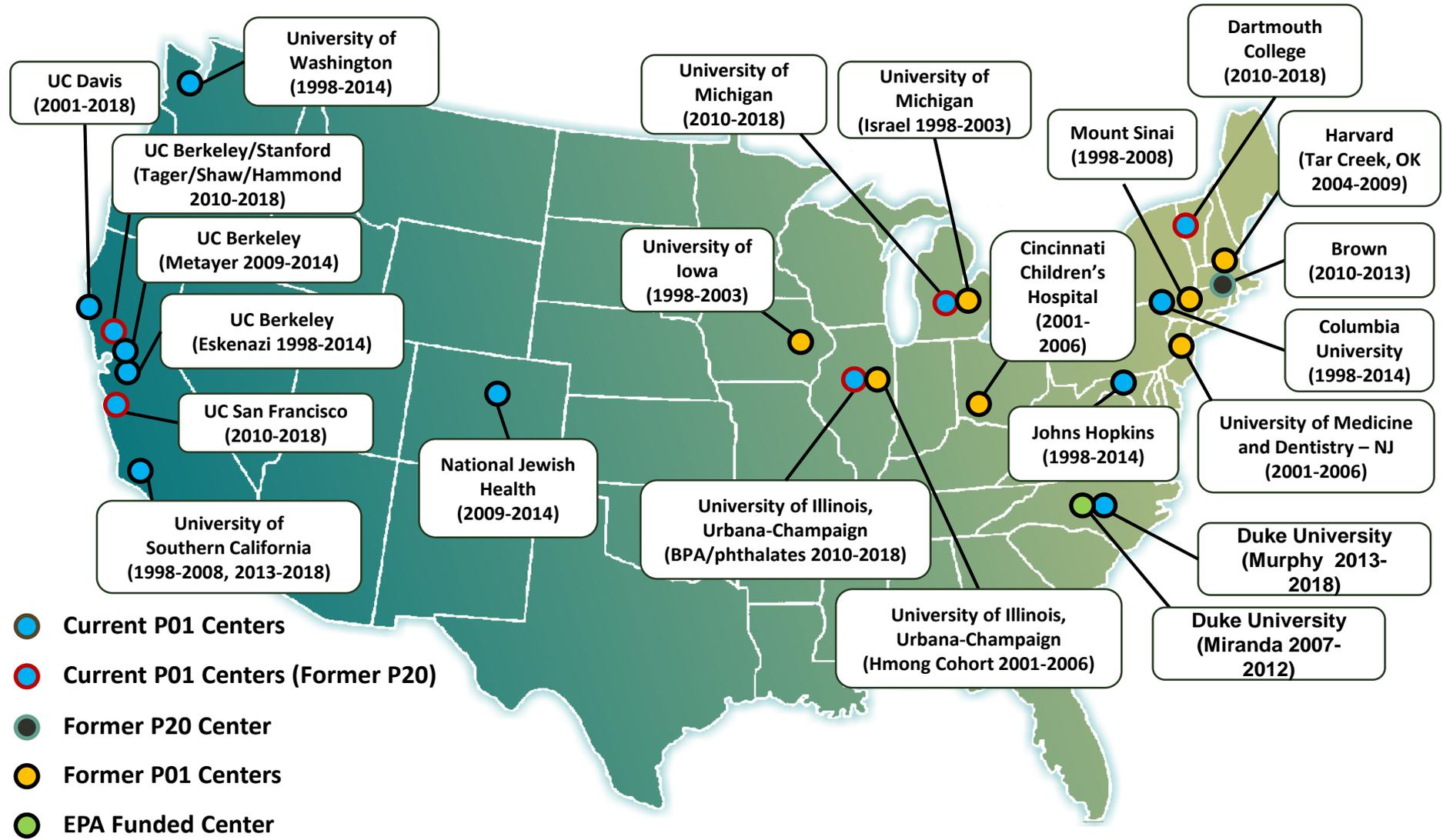




Child Health Extramural Research Studies, FY14



Current and Former NIEHS and EPA Children's Centers



BCERP History

- Jointly funded by NIEHS and NCI
- Program began in 2003 (4 Centers)
- Renewed in 2010 as multi-RFA program:
 - Windows of Susceptibility (8 projects)
 - Puberty cohort study (3 collection sites)
 - Coordinating Center
- All projects involve extensive community engagement
- Includes an Opportunity Fund, meetings and conference calls to promote additional interaction



Early Onset of Breast Development

- Early pubertal maturation increases the risk of breast, ovarian, and endometrial cancers, as well as obesity and hypertension
- Studies report a trend towards earlier age of breast development linked to the increase in BMI and prevalence of obesity
- Girls in 3 BCERP puberty cohorts were followed to determine the impact of BMI and race/ethnicity in the timing of breast development





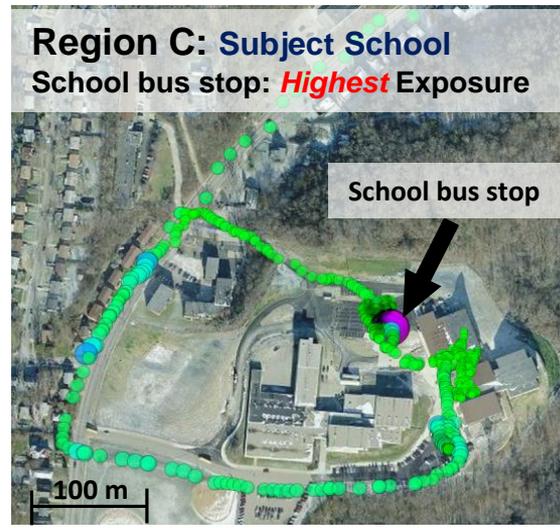
NIEHS Core Centers (P30): Building Collaborations

- **Purpose to provide infrastructure and core facilities to EHS research** - *annual RFA; new sliding scale funding*
- **Working Group on Emerging Environmental Health Issues** - *Provides guidance, gauges interest*
- **COEC Webinars** - *Topics of Community Concern*
- **NIEHS Core Center Meetings** - *Facilitates Collaboration, NIH Updates, Working Group Activities*

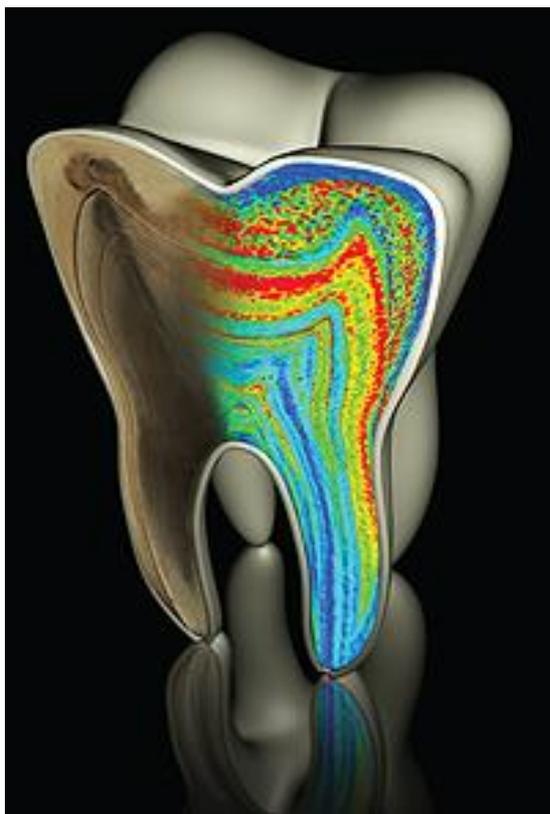


Better Tools for Research

- In 2014, researchers at Oregon State University developed a silicone bracelet that monitors a wide range of environmental exposures
- Scientists at University of Cincinnati developing personal ultrafine particle counter
- Field test indicated highest exposures at bus stop when worn by a child



Barium Distributions in Teeth Reveal Early-life Dietary Transitions (Arora)



- Method for measuring early-life changes in diet based on chemical signatures of barium in teeth.
- Objective retrospective biomarker provides a major advance to studies on children's health to understand the health consequences of early-life diet, including breastfeeding, and chemical exposures.

National Toxicology Program Efforts

- Better coordination of testing across the Federal government
- Increase understanding of “*exposome*”
- Develop alternative methods of assessment
- Integrate results from new “data rich” techniques with traditional toxicology data
- Toxicity for the 21st Century or “Tox21”
 - MOU between NTP, NCATS, EPA and FDA
 - High throughput, robotic testing of toxic compounds in cell and molecular assays
 - Using knowledge of biological response to identify toxicity pathways
 - Prioritization for further testing



Improvements in Evaluating Environmental Health Questions: Systematic Review

- Address the breadth of relevant data
 - Wide range of human study designs (e.g., clinical, observational)
 - Animal studies
 - Mechanistic studies (in vitro and other relevant data)
- Approach to reach hazard identification conclusions
- Procedure to integrate evidence streams



Human studies



Animal studies



Mechanistic studies



Vulnerable Populations

NIH National Institute of Environmental Health Sciences

Environmental Health Disparities and Environmental Justice Meeting

July 29-31, 2013

Co-sponsored by

National Institutes of Health • U.S. Department of Health and Human Services

NIH National Institute of Environmental Health Sciences

Communication Research in Environmental Health Sciences: Environmental Health Literacy

September 22-24, 2014
8:00 a.m. – 5:00 p.m.
NIEHS Building 101, Rodbell Auditorium

Individuals with disabilities who need accommodation to participate in this event should contact David Kinnamont at 919-541-3254 or david.kinnamont@nih.gov. TTY users should contact the Federal TTY Relay Service at 800-877-8339. Requests should be made at least 5 business days in advance of the event.

Any individual seeking access to the NIEHS campus to attend this seminar will need to be prepared to show a photo ID, e.g., driver's license, or company, government, or university ID, and to provide pertinent information about the seminar, e.g., title of seminar, speaker name, or host of the seminar.

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Redistribution of the FY15 Funding for the National Children's Study - NIEHS

- **Tox21** – Enhance understanding of in-utero and post natal development
 - Development and deployment of development program; NCATS and NTP (\$8M towards assays in Tox21)
- **Supplements** – Leverage existing Resources
 - Expansion of Extant Children's Health Research – NIEHS (\$5M)
- **CHEAR** – Tools to measure environmental exposures in children's health research
 - Building a resource for exposure assessment for studies of children's health for studies supported across NIH; NIEHS (\$48M)

Redistribution of the FY15 Funding for the National Children's Study - NIH

- **PRISMS** – Development and deployment of personal sensors in studies of children's health; NIBIB and other ICs (\$28M)
- **PROMIS** – Validation of Pediatric Patient Reported Outcomes in Chronic Diseases Consortium (U19); NIAMS (\$12M)
- **Human Placenta Project** - Developing Paradigm Shifting Innovations in Human in-vivo Placental Assessments in Response to Environmental Influences; NICHD and NIBIB (\$39M)



NIEHS-WHO Collaborating Centre Focus Areas



Climate Change

Children's Health

E-Waste

Cookstoves and Household Air Pollution

Chemical Risk Assessment Network

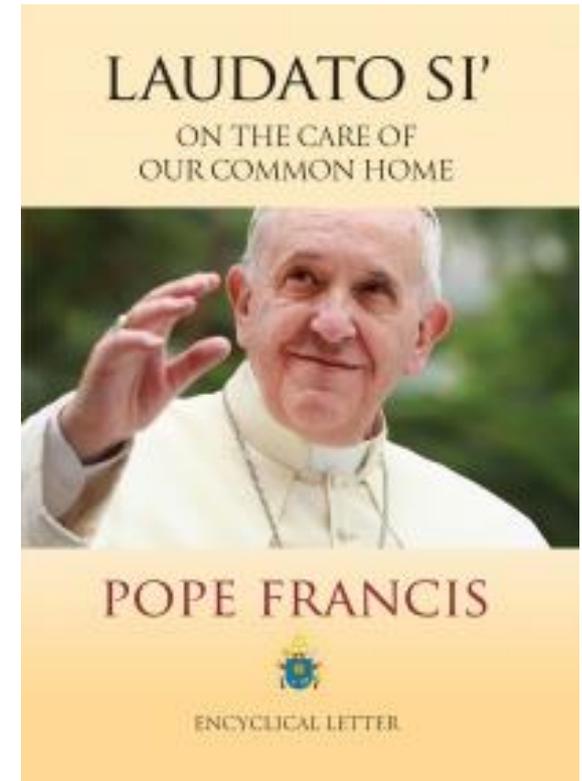
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Training and Capacity Building

Communicating the Need for Environmental Health

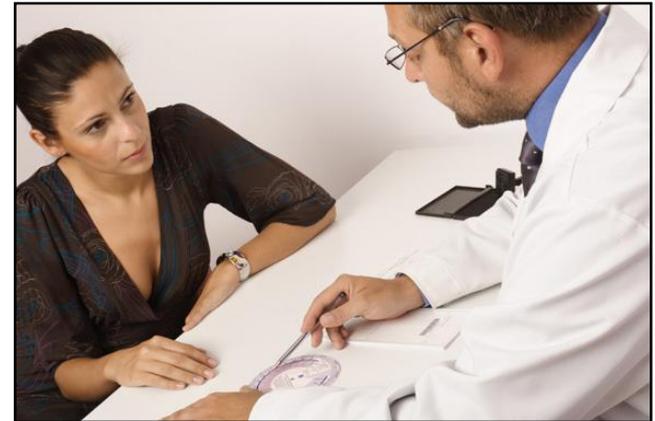
"We are not faced with two separate crises, one environmental and the other social, but rather one complex crisis which is both social and environmental."

"What kind of world do we want to leave to those who come after us, to children who are now growing up? The question not only concerns the environment in isolation; the issue cannot be approached piecemeal."



Prevention is the Key

- Genetic and environmental factors individually contribute and interact with each other to increase risk
- The impact of exposures can vary based on timing of the exposure within critical windows
- Identifying the hazards associated with chemicals to which humans are exposed is critical
- *Environmental factors are more readily identified and modified than genetic factors and therefore present a tremendous opportunity to prevent non-communicable disease*



You can't change your Genes,...
but you **CAN** change your Environment!!!



National Institute of Environmental Health Sciences
Your Environment. Your Health.

Thank You!

