



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

# **NIEHS and Environmental Health Disparities in Alaska**

**Linda S. Birnbaum, Ph.D., D.A.B.T., A.T.S.**  
**Director**

**National Institute of Environmental Health Sciences and  
National Toxicology Program**

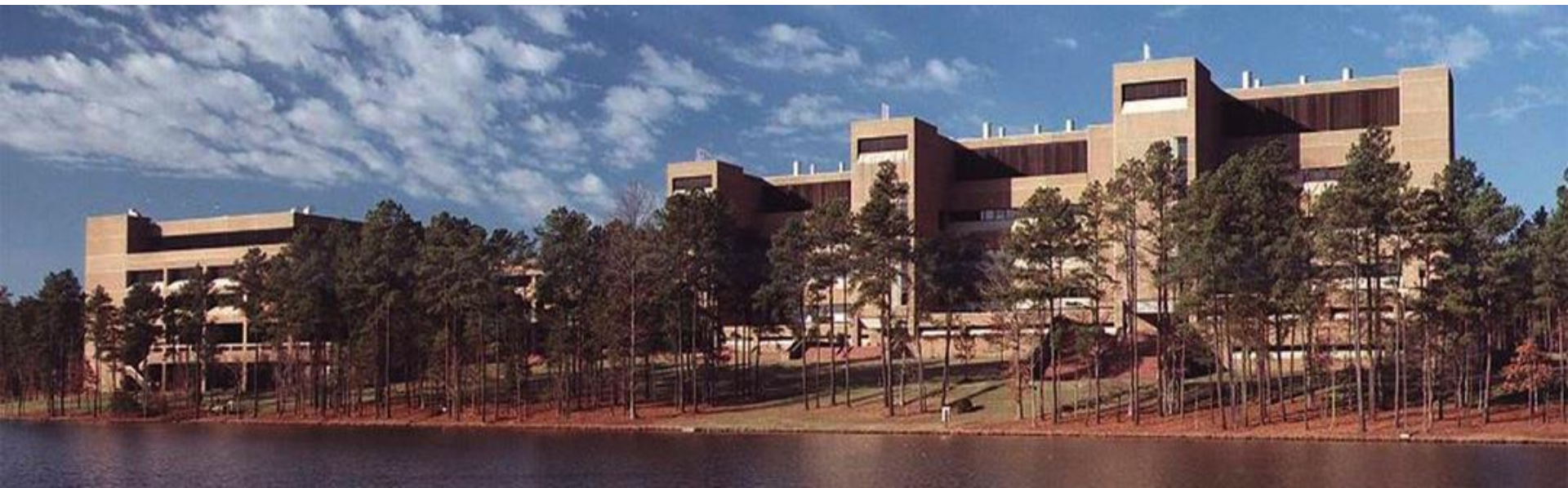
**Alaska Collaborative on  
Health and the Environment  
1 October 2014**



## The National Institute of Environmental Health Sciences

- One of the 27 National Institutes of Health, but located in Research Triangle Park, NC
- 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

**Mission: To discover how the environment affects people in order to promote healthier lives.**



## Why Environmental Health Matters

- 13 million deaths could be **prevented** per year by improving our environment
- Environmental factors influence 85 out of the 102 non-communicable diseases in WHO report
- Environmental factors account for at least 2/3 of cancer cases in the United States
- You can't change your genes, but you **CAN** change your environment



## “ENVIRONMENT” Includes:

- Industrial chemicals
- Agricultural chemicals
- Physical agents (heat, radiation)
- By-products of combustion and industrial processes (dioxin)
- Infectious agents
- Microbiome (gut flora)
- Foods and nutrients
- Prescription drugs
- Lifestyle choices and substance abuse
- Social and economic factors

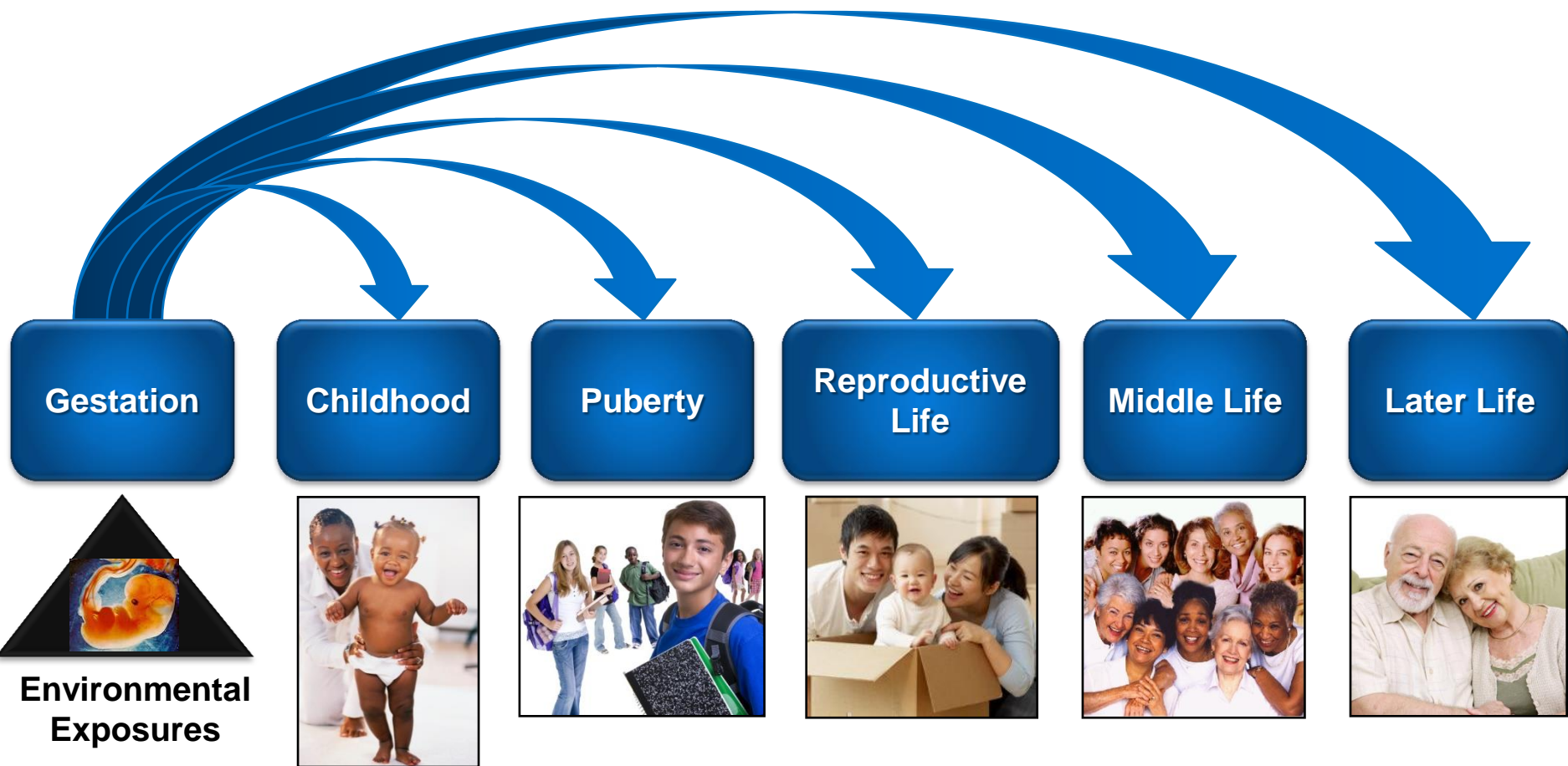


# Environmental Exposures: One Size Does Not Fit All

- Thousands of chemicals in our environment:
  - EDCs, Mixtures...
- Many modes of exposure:
  - Air, water, food, pathogens, etc...
- Exposures differ depending on,
  - Dose, timing, the individual
- Disease and dysfunctions are not the same:
  - Many disease endpoints and mechanisms
  - Occur over a long range of time



# Lifelong Effects of Early-Life Exposures



  
**Environmental Exposures**

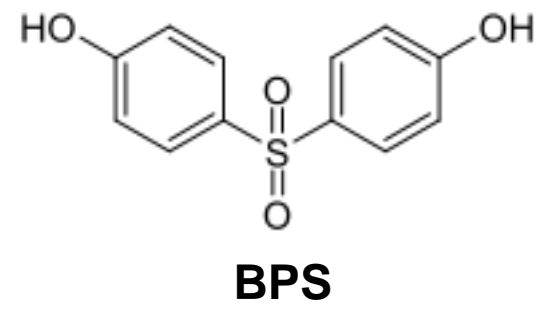
# Early Life Exposures Can Have Lasting Effects: Developmental Basis of Adult Disease

- Early life is a sensitive time for exposure:
  - Organs are forming
  - Gene expression programs are being established
  - Epigenetic reprogramming is occurring
  - Changes occurring during development permanently alter the potential of an organ



# Important Questions To Ask of Environmental Chemicals

- Are new or “replacement” chemicals safer than the chemicals they are replacing?
- How long are these chemicals going to remain in the environment after they are banned or no longer used in commerce?
- Can exposure to certain chemicals hurt me or my family? How can I protect myself?



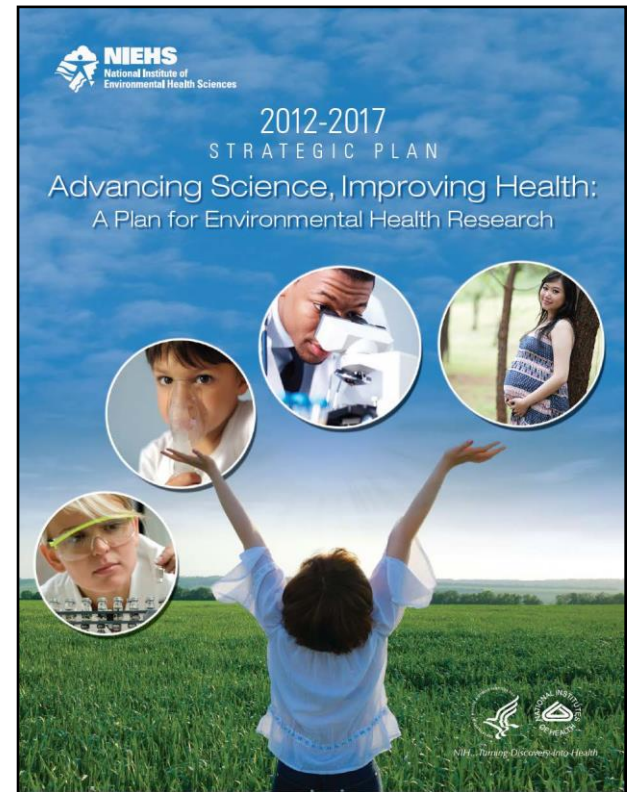
***NIEHS is helping answer these questions!***

# New Strategies for Environmental Health Sciences

**OLD...** chemicals act by overwhelming the body's defenses by brute force at very high doses

**NEW...** chemicals can act like hormones and drugs to disrupt the control of development and function at very low doses to which the average person is exposed

**NEW...** susceptibility to disease persists long after exposure (epigenetics) and may lead to multi-generational effects



# Savoonga, Nome, Chickaloon & Anchorage

**Five days, eight speaking engagements, twelve community meetings**



## St Lawrence Island: meeting with Elders



Triple threat:

- Abandoned military base

- Air pollution from Asia  
& North America

- Toxins in traditional marine diet

## Women's Talking Circle



Meetings with...

- Village elders
- Women & children
- Local officials
- Community groups
- Health care providers
- Traditional councils
- Researchers & students
- Public health officials

## Village of Savoonga, St Lawrence Island



Yupik people suffer from exposures to...

- Mercury
- Arsenic
- PCBs & other toxins

Water & sewer infrastructure is heated and above-ground in village of Savoonga.

## Chickaloon: coal mining region



When this community health worker asked officials to mitigate a stream, polluted from mining operations, they were told to first give up their tribal rights to the land.

## Meeting with Elders in Chickaloon



Tribal & community members concerned about...

- Increasing rates of pancreatic & bladder cancers
- Metallic-smelling ponds
- Underground fires

## Chickaloon: Proposed strip mine



The director conveyed what she heard to the CEOs of the health care corporations for St Lawrence Is & Chickaloon

-One result is two evaluation teams are being sent to the island to run a series of tests looking for environmental contaminates

-CEO will also set up two 3-day health clinics on the island

## Challenging environmental health issues on the edge of the last frontier



Meeting with leadership of Alaska Native Tribal Health Consortium and Southcentral Foundation...

-talked about sharpening focus on environmental health

-air pollution

-community engagement

-other environmental exposures that affect health

## University of Alaska Anchorage grantees



Talking with researchers looking at...

-Air pollution

-Early childhood health

-Pesticides

-Heavy metals

-Gene-env interactions

-Env assessments of impacted populations on St Lawrence Island and other Alaska communities



# Global Environmental Health

## Training and Capacity Building



Children's Environmental Health



Climate Change



Developmental Origins of Health and Disease



Electronic Waste



Indoor Air Pollution and Cookstoves

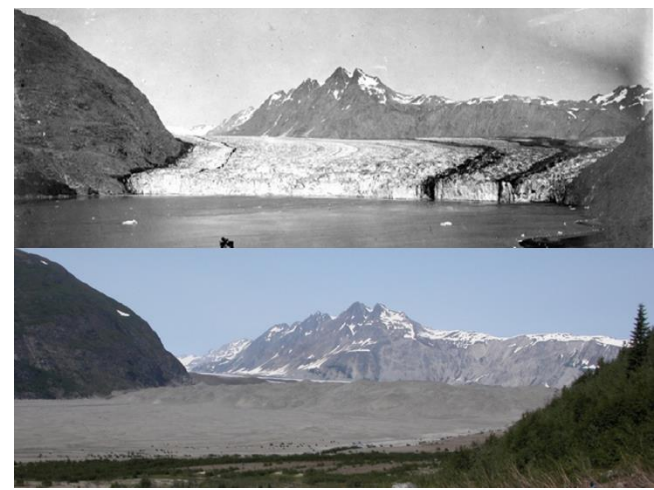
# Glacial Retreat

## Mendenhall Glacier, Alaska 1894 and 2008



1894 photograph by William Ogilvie, 2008 photograph by Gary Braasch

## Carroll Glacier, Alaska. August 1906 and June 21, 2004



1906 photograph by Charles Wright,  
2004 photograph by Bruce F. Molnia

## Muir and Riggs Glaciers, Alaska.

August 13, 1941

August 4, 1950

August 31, 2004.



1941 and 1950 photographs by William O. Field, 2004 photograph by Bruce F. Molnia

# Climate Change: Meeting Research Needs

- Asthma, respiratory allergies and airway diseases
- Cancer
- Cardiovascular disease and stroke
- Foodborne diseases and nutrition
- Heat-related morbidity and mortality
- Human development effects
- Mental health and stress-related disorders
- Neurological diseases and disorders
- Vectorborne and zoonotic diseases
- Weather related morbidity and mortality





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# Thank You



National Institute of  
Environmental Health Sciences



National Toxicology Program  
U.S. Department of Health and Human Services



# Challenging environmental health issues on the edge of the last frontier

