NIEHS and Environmental Health Disparities in Alaska

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Alaska Collaborative on Health and the Environment
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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

- Gestation
- Childhood
- Puberty
- Reproductive Life
- Middle Life
- Later Life
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

Muir and Riggs Glaciers, Alaska.

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

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

1906 photograph by Charles Wright, 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
Thank You
Challenging environmental health issues on the edge of the last frontier