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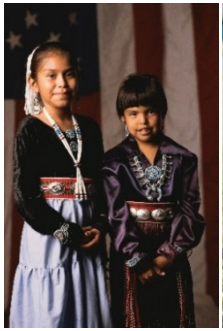
SHC Project 2.63: Assessing Environmental Health Disparities in Vulnerable Groups (Tribal Focus)

Nicolle S. Tulve, Ph.D., Project Lead





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Overview of 2.63

- Overall project goal: To understand how non-chemical stressors act as modifiers of chemical exposures, impacting health and well-being of vulnerable groups
- Key science question: How do the built, natural, and social environments interact to influence health and well-being across the human lifecourse?
- Outputs:
  - 2.63.1: Development of a systems level approach to understanding children's environmental exposures, health and environmental diseases (FY16)
  - 2.63.2: Translational research to incorporate data and information on children's environmental health (CEH) into tools to inform community actions (FY19)
  - 2.63.3: Research to inform Tribal sustainability (FY19)
  - 2.63.4: Evaluation of tested approaches to resolving health disparities in vulnerable populations and lifestages (FY19)
  - 2.63.5: Communication strategies for educating risk assessors, decision makers, and the public on reducing childhood diseases and promoting healthy and sustainable community settings (FY16)

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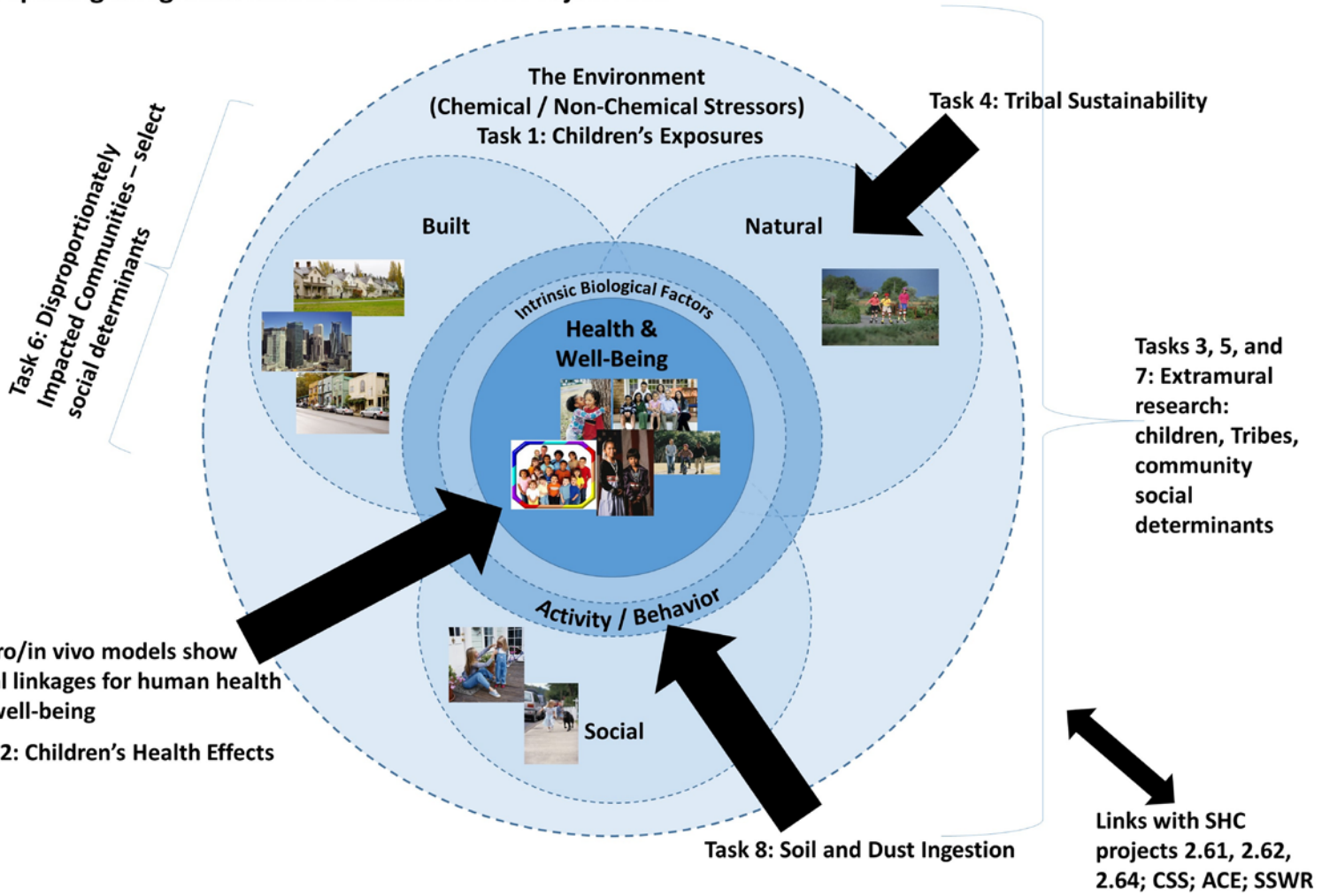
Research Focus Areas

- Children's environmental health
- Tribal populations and sustainability
- Cumulative exposures in disproportionately impacted communities

Assessing Environmental Health Disparities in Vulnerable Groups

Figure Depicting Integrated Research Tasks in SHC Project 2.63



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2.63.4: Understanding the Interrelationships between Ecological and Human Health for Tribal Sustainability

- Task Lead: Dan Heggem, NERL
- Purpose and Goal: To conduct research on ecological and human health issues of importance to Tribal sustainability
- Products
  - Fish consumption and climate change impacts on Tribal health and well-being
  - Proper functioning condition of ecosystems which provides ecological assessments centered on Tribal culture and values to help manage ecosystem and human health issues
  - Forecasting natural toxin blooms on Tribal lands
  - Interactions of arsenic, microcystin exposures, and dietary fat levels in mammals

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2.63.4: Understanding the Interrelationships between Ecological and Human Health for Tribal Sustainability

- Products
  - Chemical and non-chemical stressors measured in licensed child care centers in Portland Area Indian Country
  - Factors that confer greater environmental public health risk in Tribal areas and Native American communities
- Task Team Members: Dan Heggem, Ken Bailey, Neil Chernoff, Donna Hill, David Diaz-Sanchez, Tammy Jones-Lepp, Georges-Marie Momplaisir, Jade Morgan, Charlita Rosal, Nicolle Tulve, Jim Xue, Valerie Zartarian

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2.63.5: Research to Understand Ecological and Human Health for Tribal Sustainability and Well-Being (Tribal Science Program; STAR)

- Task Lead: Cynthia McOliver, NCER
- Purpose and Goal: To develop sustainable solutions to environmental problems that affect tribes
- 3 Products
  - Progress review meeting summary report for the STAR tribal grants
  - Joint STAR-NERL/SED factsheet on tribal restoration and sustainability
  - Synthesis report of key findings and recommendations from the STAR tribal grants

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Research Focus Areas for Intramural Tribal Research

- Fish consumption and climate change
- Proper functioning conditions (PFC)
- Natural toxin blooms
- Dietary interactions research
- Environmental health assessment of tribal child care centers
- Factors related to public health risks in Tribal areas and Native American communities

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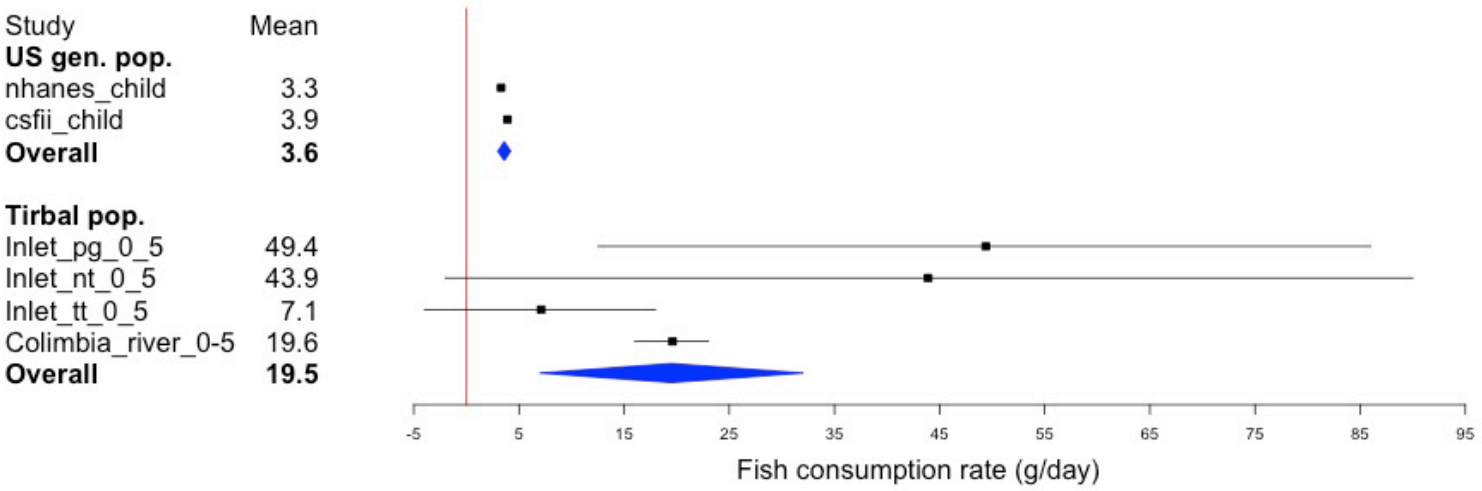
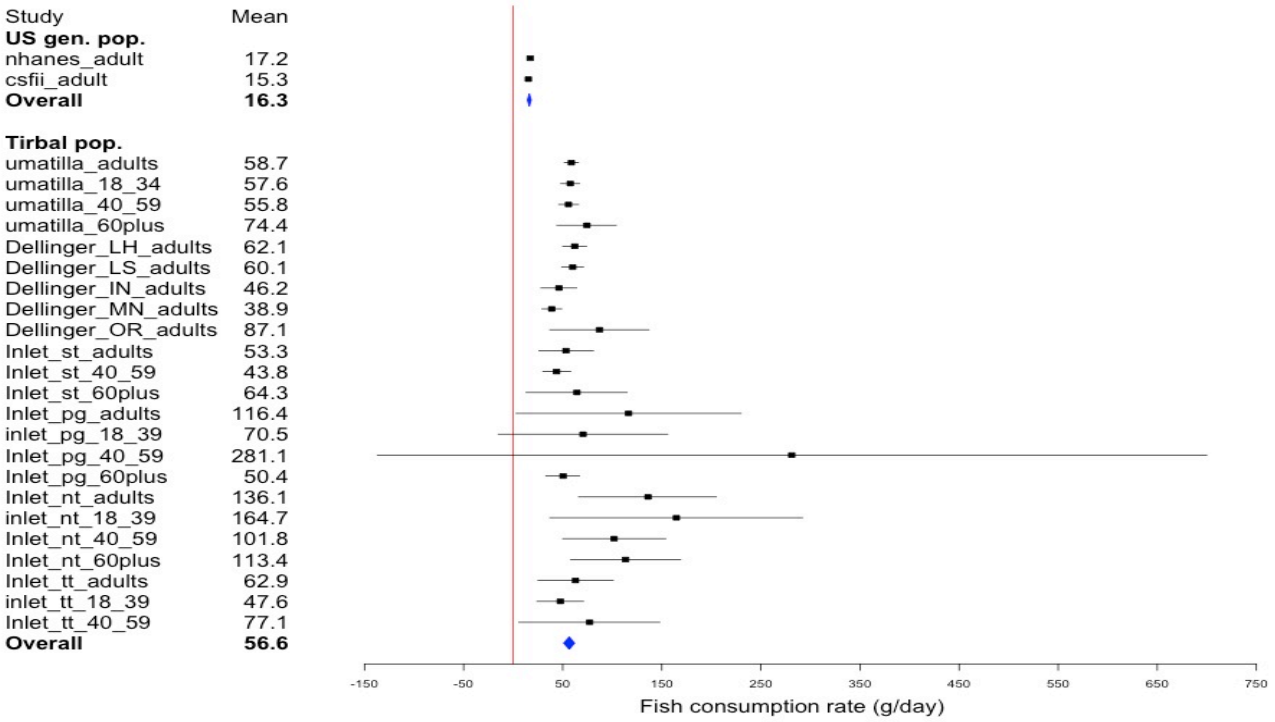
Fish Consumption and Climate Change

Daily Fish Consumption Rates for the U.S. General Population and Tribal Children (0-6 years old)



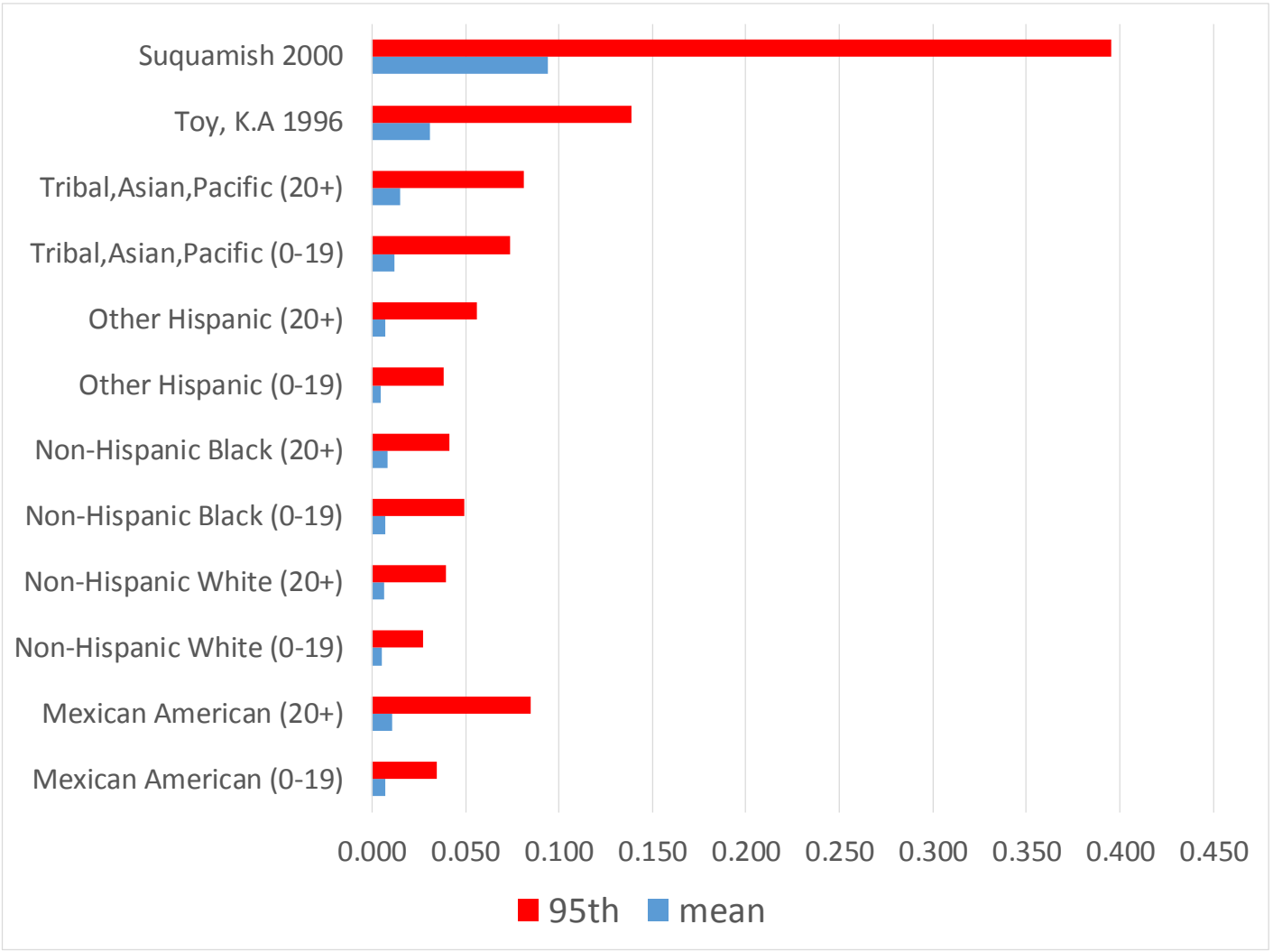
Presented at the ISES 2015 meeting, Xue *et al.*, 2015

Daily Fish Consumption Rates for the U.S. General Population and Tribal Adults (18+ years old)



Presented at the ISES 2015 meeting, Xue *et al.*, 2015

Total PCB Exposures by Percentiles for U.S. (NHANES) and Tribal Populations



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Observations on the Fish Consumption Research

- Tribal peoples consume ~4 times more fish than the U.S. general population
- Predicted PCB dietary exposures of tribal populations are ~2 to 10 times higher than other ethnicities

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Re-introduction of Pre-Dam Construction Saltwater Food Sources of the Penobscot Indian Nation

- Collaborative effort to remove dams downstream from the Tribe's island reservation
- Install a fish ladder
- Reintroduce a food source that has been absent for hundreds of years
- Anadromous fish
- Concerns about exposure of these fish to contaminated waters and health concerns to the people
  - Methyl mercury
  - Dioxins
  - PCBs
  - Furans
- Climate change effects of contaminant movement, fish exposure, and human health

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Proper Functioning Conditions (PFC)

Riparian Proper Functioning Condition

- Traditional Ecological Knowledge (TEK) is key to understanding and implementing adaptive management for sustainability
- Sustainability is built into Tribal Values
- P(roper) F(unctioning) C(ondition) process is about building resilience and managing ecosystems for sustainability. PFC is the western science connector to TEK - how we all can work to make a difference

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Slide courtesy of Dan Heggem, Ph.D.

PFC Assessment and Restoration Sites

La Posta Band of the Mission Indians

Gertie's Creek, Chippewas of Georgina Island First Nation

Confederated Tribes of Warm Springs, Oregon

Slide courtesy of Dan Heggem, Ph.D.

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Natural Toxin Blooms

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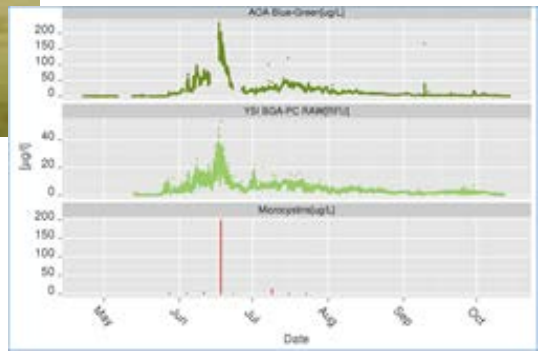
Natural Toxin Blooms

- Occur naturally from algae, golden algae, and cyanobacteria
- Influenced by human activity
- Research focuses on management, modeling, analysis, and monitoring



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Dietary Interactions Research

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Dietary Interactions Research

- Cumulative effects of chemical and non-chemical stressors on Tribal health
  - Chemical stressor – Arsenic
  - Non-chemical stressor – Algal toxin
  - Diet – High fat and control
  - Health endpoint – Liver function

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Environmental Health Assessment of Tribal Child Care Centers

Tribal Child Care Center Study

- Collaborative effort between EPA R10, EPA ORD/NERL, and the Portland Area Indian Health Service
- Builds on the 2001 National Survey by conducting an environmental health assessment of Portland Area Indian Country child care centers
- Evaluate the levels and potential exposures to lead, allergens, pesticides, PCBs, and other chemical and biological agents

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Factors Related to Public Health Risks in Tribal Areas and Native American Communities

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Factors Related to Public Health Risks in Tribal Areas and Native American Communities

- Research that details the increased risk from environmental pollutants that are experienced by Native American communities
- Include a case study
- Chemical and non-chemical stressors will be considered

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