biomonitoring New Hampshire

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biomonitoring (noun) - a method for assessing human exposure to chemicals by measuring the chemicals or their metabolites in human tissues or specimens, such as blood or urine (CDC 2005).
Why do biomonitoring?

- Emergency Response
- Targeted Exposure Investigation
  - Known source of contamination
  - Potential disease cluster
- Surveillance
  - Background levels
  - Identify emerging issues and trends
  - Inform and evaluate public policy interventions
Pediatric Lead Levels – (national data) sharp decline in levels concurrent with elimination of tetraethyl lead in gasoline

Cotinine Levels – (New York) - 47% decrease in cotinine levels in non-smokers between 2003-2007

Clean Indoor Air Act (2003)
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- Project of the NH Public Health Laboratories

- Technical & financial assistance from CDC
  - 5-yr cooperative agreement, possibility of renewal
  - September 1, 2014 – August 30, 2019
  - NH, MA, NJ, VA, CA, UT (Four Corners States Consortium)
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- Hire 5 project staff
- Purchase equipment & computers
- Supplies & reagents
- Training
- Methodology
- CDC subject matter experts
- Analytical standards
- Proficiency testing
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- **Targeted study**
  - southern NH residents reliant on private wells for drinking water
  - Total As, U, speciated As

- **Statewide surveillance**
  - analytes of concern
  - nutritional biomarkers
Biomarker Selection
Targeted Program

- Awareness of drinking water contamination
- Recognized health effects associated with consumption of contaminated water
- Non-invasive specimen collection
- Accepted biomonitoring methods
- Viable treatment options for highly exposed
- National Exposure Report
- Preliminary NH data indicating cause for concern

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Potential for Arsenic and Uranium Exposure

- Forty-six percent of the state population is reliant on bedrock wells for drinking water
- Geologic formations, past land use practices provide opportunities for exposure
- NHPHL data (2005-2006) 31% of 121 samples collected in southern NH exceeded MCL
- Significant correlation between elevated drinking water arsenic and higher than average total urinary arsenic

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Proposed Study Area
Targeted Biomonitoring

Affected Communities

Arsenic Contaminated Wells
Study Design

- Recruit from High Risk Areas
  - Age, race, gender, sensitive sub-populations
  - 500 participants
  - Control population – Nashua, other communities on public water
  - Trusted partners

- Questionnaire
  - Residential, occupational & recreational histories
  - Food diary and drinking water patterns
  - Demographic, educational, socioeconomic status
  - Behavioral risk factors

- Collect urine & drinking water
  - Incent participation

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Surveillance Biomonitoring Project

- Baseline information, NH specific ranges
- Statewide recruitment
  - Challenging
    - Trusted partners
    - Traditional & social media
    - Incentives
- Representative recruitment
  - BRFSS data
- Opportunistic recruitment
  - Blood donation centers
  - College campuses
  - State employee complex
- Clinical collaborators & academic partners

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Surveillance Program Biomarkers

- Collecting blood & urine
- Metals
- Pesticide metabolites
  - Organophosphate
  - Pyrethroid
- Environmental tobacco smoke
  - Cotinine
- Industrial chemicals
  - PFCs
- Nutritional biomarkers
  - Iron
  - Folate

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How can you help?

- Be a trusted partner in your community
  - Facilitate introductions to municipal officials
  - Identify community leaders and advocates
  - Share information in the community
  - Advise as to best practices

- Serve on an advisory board
  - Technical
  - Community

- Spread the word!!!

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