ARSENIC, HEALTH AND ADDRESSING COMMUNITY CONCERNS

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Presentation Overview:

1. Arsenic in New Hampshire
2. Arsenic and health
3. State cancer plans
4. Arsenic and health workgroup
5. Response to community concerns about cancer
6. Questions
SECTION 1:
ARSENIC IN NH
Arsenic: The Rundown

• Arsenic is a metalloid
• Arsenic contamination can be both natural and human-caused
• In the US many arsenic health issues are caused by low dose exposure over time
• You cannot see, smell or taste arsenic
• 20% of NH private well owners have arsenic levels at or above the U.S. EPA Maximum Contaminant Level (MCL) of 10 parts per billion
Most arsenic contamination in NH comes from natural sources
SECTION 2: ARSENIC AND HEALTH
Arsenic and Health – Low dose exposure

Low dose, chronic, long term exposure to arsenic in drinking water can lead to:

• Cancers (bladder, skin, kidney, liver, prostate and lung)
• Vascular and cardiovascular disease
• Reproductive and developmental effects
• Cognitive and neurological effects
• Diabetes and other metabolic disorders
• Neuropathy

Arsenic is a carcinogen

• Numerous international organizations have labeled arsenic a carcinogen, or cancer causing agent, including:
  • World Health Organization's International Agency for Research on Cancer
  • The US Environmental Protection Agency
  • The Center for Disease Control and Prevention
Arsenic and Health – Bladder Cancer

Elevated Bladder Cancer in Northern New England: The Role of Drinking Water and Arsenic

Bladder cancer mortality rates elevated in NH-ME-VT for at least five decades. Incidence rates 20% higher than US overall.

Conclusions: Association between low-to-moderate levels of arsenic in drinking water and bladder cancer risk in New England.

Concord, NH – “New Hampshire has the highest rate of bladder cancer cases in the nation and a rate that is 37% higher than the national rate, according to the U.S. Centers for Disease Control and Prevention (CDC). One of the leading causes of bladder cancer in the State is exposure to arsenic in private drinking water wells.”
Arsenic and Health – Skin Cancer

• **Squamous Cell Carcinoma (SCC),** a type of skin cancer, has long been associated with high-dose arsenic exposure.

• A 2013 population-based study in New Hampshire found that low-dose exposure of arsenic also is linked to SCC.

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**SKIN SAFETY**

The Importance of Skin Cancer Screening

1 in 5 will be diagnosed with skin cancer. Spot it now.
Arsenic and Health – Lung Cancer

- High dose arsenic exposure is also linked to lung cancer.
- A 2011 study in the U.S., looking at soil arsenic concentrations and lung cancer, found a significant association between the two, and it was estimated that arsenic may contribute to up to 5,297 cases of lung cancer per year.
- Arsenic can be found in cigarettes.
SECTION 3: STATE CANCER PLANS
What is a state comprehensive cancer plan?

• Identifies how an organization addresses the burden of cancer in a geographic area
• Based on region specific data
• Typically renewed every 5 years
• Funded by the CDC’s Division of Cancer Prevention and Control
• Currently 63 plans total
New Hampshire Comprehensive Cancer Control Plan 2015-2020

The plan is created and managed by members of the New Hampshire Comprehensive Cancer Collaboration (NH CCC) + NH DHHS
New Hampshire Comprehensive Cancer Control Plan 2015-2020

Current plan goals include:

- Foster communities and systems that support and reinforce health lifestyles
- Prevent and detect cancer at its earliest stage
- Optimize quality of life for those affected by cancer
SECTION 4: ARSENIC AND HEALTH WORKGROUP
Why start the Arsenic and Health Workgroup?

- Arsenic is linked to a variety of cancers
- Arsenic can be found in NH
- Environmental factors should be considered when writing a cancer plan
- NH CCC partners have been interested in this topic
- Established funding structure
- Large NH CCC membership
- Engagement with health professionals
The Arsenic and Health Workgroup

Goals:

• Creation of arsenic specific objectives and strategies for the NH Comp. Cancer Control plan

• Implementation and monitoring of said strategies

• To educate health professionals on arsenic issues

• Publication and promotion of Emerging Issue Brief on Arsenic in Food and Water
The Arsenic and Health Workgroup

Participants Include:

- Norris Cotton Cancer Center staff
- NH DES staff
- NH DHHS
  - Biomonitoring, Cancer Control Program, Environmental PH Tracking, Health Surveillance
- American Cancer Society staff
- Public Health Professionals
- Nurses
- Private well testers
- Other NH CCC partners
- Academia
- Policy Makers
Creating Arsenic Objectives for the NH Cancer Plan

Step 1: Assessment

**Process:**
- Review national plans
- Review NH data
- Create draft arsenic objectives
Creating Arsenic Objectives

Step 1: Assessment

Out of 53 plans....

• 18 have Environmental Health sections
• 9 mention private well testing
• CO, NC and WA have arsenic and water objectives
  • WA mentions As in soil and water
• 1 mention of researching carcinogens in food
• 1 mention of reducing pesticide exposure
• 2 mentions of need to increase environmental public health data
Creating Arsenic Objectives

Step 2: Drafting Arsenic Objectives

- Review of existing NH Arsenic and Well data
  - Pregnancy Risk Assessment Monitoring System (PRAMS), Behavior Risk Factor Surveillance System (BRFSS), Public Health Lab Data
- Drafting of objectives and data targets (Paul Susca)
- Reviewed by Arsenic and Health workgroup
- Submission of objectives to the NHCCC Board for approval
- Potential strategies were also included with these objectives
Creating Arsenic Objectives

Step 2: Drafting Arsenic Objectives

- **Objective #1**: Increase the percentage of households that report having had their private well water tested for arsenic within the past three years.
  - **Baseline**: 44.2% of those who reported using a private well as the main source of drinking water at home (2014 BRFSS)
  - **Target**: 50%

- **Objective #2**: Increase private well testing for arsenic.
  - **Baseline**: 1,673 private well samples analyzed for arsenic by the NH State Public Health Laboratory in (2016).
  - **Target**: 1840 per year (10 percent increase)
Creating Arsenic Objectives

Step 2: Drafting Arsenic Strategies

Communications

• Update or create new arsenic and well testing communication materials.
• Distribute/promote through a variety of channels for an extended period of time.

Provider Education, Engagement and Support

• Educate providers and health care professionals on the importance of testing and treating for arsenic.
• Identify and address barriers to encouraging patients to test their wells for arsenic.

![Poster showing the importance of testing for arsenic in well water.](image-url)
Creating Arsenic Objectives
Step 2: Drafting Arsenic Strategies

Certified Private Laboratory (CPL) Education, Engagement and Support

• Assess current education capacity and needs of CPL’s in NH regarding arsenic in well water.
• Provide CPL’s with up-to-date communication materials.
• Identify other ways CPL’s can support well owner engagement efforts.
Creating Arsenic Objectives
Step 2: Drafting Arsenic Strategies

Policy

• Educate policy makers on arsenic health effects and the importance of testing private wells for arsenic.
• Assess potential support among key partners for legislation that would require private well testing for new wells and at the sale of a home.

Data Usage and Sharing

• Work with partners to identify all relevant data sources.
• Help create data sharing plan.
Creating Arsenic Objectives
Step 3: Finalizing Arsenic Objectives and Strategies

NEXT STEPS:
• The NH CCC Board accepted the arsenic objectives at their March 2018 Board Meeting

• The Arsenic and Health Work group is finalizing strategy selection
  • A survey will be sent to member of the workgroup and the NH CCC to help identify most popular strategy choices

• The NH CCC Plan will be updated in the summer of 2018 to include these objectives and strategies
Do you want to join the Arsenic and Health workgroup? Sign up today!
SECTION 5: RESPONSE TO COMMUNITY CONCERNS ABOUT CANCER
Division of Public Health Services
Response to Community Concerns about Cancer

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Cancer Cluster Definition

The Centers for Disease Control and Prevention (CDC) defines a cancer cluster as a greater-than-expected number of cancers that occurs within a specific group of people, in geographic area over a defined period of time.¹

Cancer Type:
All of the cases involve the same type of cancer or different types of cancer that science has proven to have the same cause.

- Not a single disease, more than 100 types
- Types defined by location and/or cell type
- Different types have different associated risk factors
Number of Cases:
The observed number of cases is higher than one would typically observe in a similar setting (e.g., a group of people with similar age, gender, and race distribution).

Defined Population:
The cancers are occurring in a carefully defined population.

- A group who we would not expect to be diagnosed
- Factors such as age and gender are considered
**Defined Geographic Area:**
The boundaries for the area are carefully defined based on a perceived or potential exposure.

- Sometimes this involves grouping towns together
- Need to consider plausibility of potential exposure based on location
- Limitations in registry data

**Defined Time Period:**
The time period over which the cases occurred is well defined.

- Consideration of latency period
Potential Reasons for Clustering

Environmental exposures:

- Unfortunately, investigations rarely link cancers with chemical exposures.
- Particular difficulty in linking cancers to low-level environmental exposures experienced over time.
- In the absence of a potential known cancer causing exposure, the CDC does not recommend that health departments conduct open-ended investigations to identify potential contaminants.
Chance: coincidental spatial grouping

Behavioral or lifestyle factors: tobacco use, physical activity, diet, alcohol use, and other behaviors strongly impact cancer risk

Access to care: Higher screening rates → identification of cancer; in some cases, cancers that would never become symptomatic; not a reflection of increased risk
Cancer Clusters: Background Information

The Centers for Disease Control and Prevention (CDC) defines a cancer cluster as a greater-than-expected number of cancers that occurs within a specific group of people, in geographic area over a defined period of time.¹ This definition can be broken down as follows:

- The observed number of cases of a cancer is higher than one would typically observe in a similar setting (e.g., a group of people with similar ages, gender and race).
- All of the cases involve the same type of cancer or different types of cancer that science has proven to have the same cause.
- The cancers are occurring in a carefully defined population. This may include factors such as age, gender, race or ethnicity.
- The boundaries for the area are carefully defined based on a perceived exposure.
- The time period over which the cases occurred is well defined.

Some cancer clusters occur simply by chance. In these situations, clusters are not the result of a single, external cause; instead, the cluster simply reflects coincidental spatial grouping among individuals who have been diagnosed with cancer. The smaller the number of cases the more likely this is to occur.

Other cancer clusters could be due to environmental exposure; however, cancer cluster investigations
Response Process

Initial contact & Response
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Assessment
Determine feasibility of conducting a study

Conduct study
Phase I: Initial contact and response

- Contact
- Gather information
- Literature review
- Basic analyses
- Determine next steps
Phase II: Assessment

Further analysis (trend, SIR)
- Consider factors used in defining a cluster
- Convene the Cancer Cluster Review Team
- Develop recommended next steps

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<th>Question:</th>
<th>Conclusion:</th>
<th>Notes:</th>
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<td>Does the initial information suggest an unusual pattern regarding number and types of cancer, gender, or ages at diagnosis?</td>
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<td>Is there an identified exposure of concern from the reporter?</td>
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<td>Has there been any reported community concern high regarding the cancer type or the environmental exposure?</td>
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<td>Is there any known risk factor for this cancer? If so what are they? (cite CDC, NCI, ACS, SEER etc. sources)</td>
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<td>Should any additional information be gathered to help determine a next step (e.g., cancer site, date of diagnosis, gender, age at diagnosis, address at time of diagnosis, residential history, occupational history, smoking status)? Why or why not?</td>
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<td>Are there at least 5 cases of one type of cancer or related cancers, OR at least 3 cases of one type or related types of childhood cancers?</td>
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<td>Is there a plausible reason to suspect more than normal fluctuation of cases?</td>
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<td>Is there a defined geographic area of concern? Is this possible to look at in a meaningful way?</td>
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<td>What period of time were the cases diagnosed during? Is there reason to suggest a different timeframe for possible analysis?</td>
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<td>Are the latency issues potentially consistent with a common factor (e.g., ages, dates of diagnoses and residency)?</td>
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<td>Recommended Next Steps (e.g., inform local health officer of concern; contact neighboring state health officials; send general information packet with cancer information; gather additional information).</td>
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Phase III: Feasibility Assessment

- Further review of literature
- Define a study hypothesis
- Gather community input
- Define study parameters
- Collect information
- Report findings to the community

Executive Summary

Purpose: The Seacoast Cancer Cluster Investigation questionnaire was designed by the New Hampshire Department of Health and Human Services (NH DHHS) with input from community members. The questionnaire was developed to gather information on characteristics and potential exposures of those diagnosed with rhabdomyosarcoma (RMS) or pleuropulmonary blastoma (PPB). The questionnaire was based on community concerns and the limited scientific understanding of the causes of RMS and PPB.

Case Finding: A case definition was created to allow NH DHHS to investigate potential clusters of these conditions. A case was defined as a person with laboratory-confirmed RMS or PPB who was a person younger than 20 years old who spent at least 28 days (cumulatively) in one of the following ten New Hampshire towns (10-town seacoast area): Greenland, Rye, New Castle, Newington, North Hampton, Portsmouth, Rye, Seabrook, Hampton, and months prior to diagnosis.

A total of 40 individuals diagnosed with RMS or PPB were identified. The Seacoast Cancer Cluster Investigation team notified these individuals of the study. Individuals were invited to participate if they self-identified as also meeting the geographic exposure criteria (unlike cancer diagnosis criteria, geographic exposure could not be evaluated through cancer registry data). Twenty-six questionnaires were mailed and hand-delivered to individuals identified through the NH Cancer Registry and to former NH residents who reached out to DHHS about participation; 14 letters were mailed to individuals in York and Essex counties. A total of 7 questionnaires were returned to NH DHHS with informed consent for individuals meeting the case definition.
Phase IV: Conduct a Study

- Move on to conducting a formal study if previous phases indicated that there was a likely common exposure, and that further study was feasible
- Develop study protocol → Conduct study → Disseminate findings

Key Points:

- We have a process in place to respond to concerns
- Responding to community concerns is of the utmost importance to us
- There are limitations that we face in terms of resources available to us, data, and also the complexity of the disease
- It’s not a one-size-fits-all process, each reported concern is different and warrants a different response
Contact Information

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Questions?

DARTMOUTH TOXIC METALS
SUPERFUND RESEARCH PROGRAM

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