

**Promoting environmental health literacy through science communication and intergenerational learning in a K-12 safe drinking water citizen science project (Communicating Data)**

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**National Institute for Nursing Research (NINR) #R25NR021077**

**Website:**  
[www.allaboutarsenic.org](http://www.allaboutarsenic.org)



**URL for project on [https://nihsepa.org/](https://nihsepa.org/nihsepa.org/project/promoting-environmental-health-literacy-through-science-communication-and-intergenerational-learning-in-a-k-12-safe-drinking-water-citizen-science-project-communicating-data)**

**Program Description:** Communicating Data is a **school-based** citizen science effort that collects **drinking water** samples to test for arsenic, lead, manganese, and uranium, among other toxic metals. Students learn to **analyze data** and **communicate their findings** through **outreach** to help **improve public health** in their communities.

**Program and Participant Characteristics**

**Program type:**  Curriculum  Teacher PD  
 Research experiences for students or teachers

**Setting(s):**  Formal

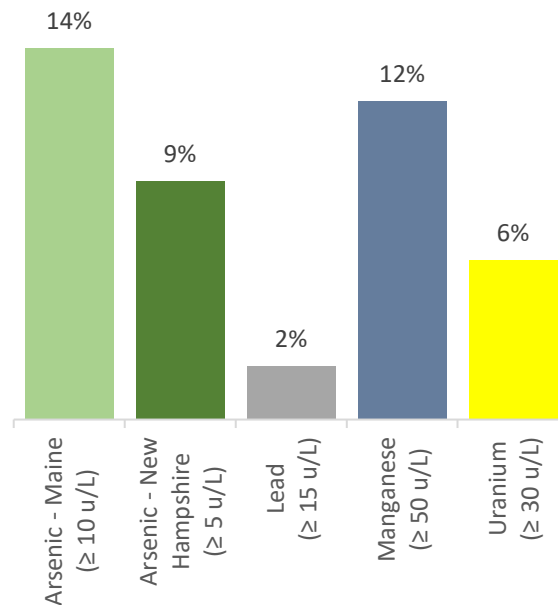
**Types of participants:**  Students  Teachers  
 Scientists  Families

**Grade level(s) of participants:**  
 Middle (6-8)  High (9-12)

**Characteristics of the populations you serve relative to DEIA-rural populations in ME & NH**



Percent of Student Drinking Water Samples with Toxic Metal Exceedances



**Program Activities**

- Since 2019, we have:
- worked with 41 schools and 5,200 students,
  - connected 45 teachers with 22 scientist partners,
  - held 6 annual week-long DataCom workshops with teachers and scientist partners,
  - developed Science Communication Curriculum.
- Our 5,200 students have:
- collected over 4,300 drinking water samples,
  - conducted bioassays with *Daphnia*, lettuce seeds, *Drosophila*, planaria, and annelids,
  - reached thousands of community members through PSAs, tri-fold displays, brochures, letters to the editor, and op-eds,
  - worked with Municipal Water Committees and Public Health Officers,
  - presented at academic conferences,
  - proactively engaged local- and state-level decision-makers in discussions about well water contamination,
  - testified at legislative hearings in Maine,
  - become citizen scientists!

Evaluation	Key Accomplishments and/or Findings
<p><b>Constructs measured:</b></p> <p>√ Content knowledge      √ Skills  √ Career awareness      √ Attitudes</p>	<p><b>Key Accomplishments:</b></p> <ul style="list-style-type: none"> <li>- Following testimony from students participating in the project, \$400,000 was allocated to the Maine State Housing Authority to provide one-time grants to eligible owners of single-family homes or landlords with private well water that shows evidence of contamination. LD 1891, HP 1401.</li> </ul>
<p><b>Methods:</b></p> <p>√ Tests/surveys    √ Interviews/focus groups    √ Observations  √ Artifacts (e.g., student work, curriculum, outreach products)</p>	<div data-bbox="947 326 1297 399" style="border: 1px solid black; background-color: #90EE90; padding: 5px; display: inline-block;"><b>REPLICATION IN ALABAMA!</b></div> <p>Dr. Azita Amiri of the University of Alabama Huntsville is submitting a grant to replicate our SEPA project in northern Alabama.</p>
<p><b>Design characteristics:</b></p> <p>√ Pre/post surveys or assessments  √ Other (describe): <u>Utilization-focused</u>  √ Other (describe): <u>Principles-focused</u></p>	<p><b>Project Tools Developed by our Project:</b></p> <ul style="list-style-type: none"> <li>- <u>Anecdata.org</u> - an innovative online platform for collecting, managing, and sharing citizen science data developed at the MDIBL.</li> <li>- <u>Tuva Drinking Water Data Platform</u> - an online data literacy tool developed by Tuva Labs. All of our data from Anecdata.org are uploaded to a dedicated platform on the TUVA site. Students use advanced yet accessible data analysis tools to explore the dataset and understand overall trends in arsenic and other data.</li> <li>- <u>Lab Central</u> - an online enterprise system developed at the MDIBL where teachers, scientists, and project managers can join in a common workspace and have private discussions and share materials, as well as provide quarterly reports and share case studies.</li> </ul>
Project Lessons Learned	
<ul style="list-style-type: none"> <li>• Teachers are important to have as part of the leadership team.</li> <li>• Relationships between the teachers and the participating scientists from academic institutions were reframed as partnerships rather than mentor-mentee relationships, as both groups had expertise to share.</li> <li>• The project must meet teachers' needs and recognize that different teachers have different needs.</li> <li>• Positive word-of-mouth has led to several new schools each year asking to join the project. Lesson learned – budget for more schools than you're planning!</li> <li>• Students are ready to fight for clean drinking water! In one school, students found toxic metals in their school drinking fountains and encouraged the school administration to hang safety warning signs.</li> <li>• Parents are influenced by children through intergenerational learning.</li> <li>• Specific metals are more of a concern than others in some communities. We've expanded our focus beyond arsenic to include lead, manganese, and uranium.</li> </ul>	<p><b>Evaluation Findings:</b></p> <ul style="list-style-type: none"> <li>- Significant progress in addressing public health concerns related to environmental toxins.</li> <li>- The project is effective at getting people to test their water so that they have basic information to help them make informed decisions about treating their water.</li> <li>- A significant association between perceived program impact and taking remediation actions for households that first became aware of arsenic in their water through the program.</li> <li>- The project is strengthening teachers' knowledge in: <ol style="list-style-type: none"> <li>1) content knowledge about the health impacts of toxic metals in drinking water and</li> <li>2) helping students learn to use data and communicate findings.</li> </ol> </li> <li>- Teachers now place a greater emphasis on environmental health risks in their curriculum than they did before this project.</li> <li>- Teachers from geographically dispersed districts in Maine and New Hampshire are engaged, helping bring the project to multiple communities.</li> </ul> <div data-bbox="1352 818 1923 992" style="border: 1px solid black; background-color: #FFD700; padding: 10px; text-align: center;"> <p><b>“THIS HAS BEEN A FABULOUS EXPERIENCE FOR ME, FOR MY STUDENTS AND FOR MY COMMUNITY!”</b></p> </div>