Meeting community health needs through environmental labs

Wednesday, November 6, 2013: 10:30 AM - 12:00 PM
Oral

A small suburban town (which will remain un-named) sits outside a former industrial complex, surrounded by well-documented air, water & soil pollution. You'd think that once the surrounding municipalities decided to go off the aquifer, this small town would as well, but it hasn't. Complaints of illness and problems with the water have led to reassurances from the water bureau that everything is fine; but they won't release the lab results. The state public health laboratory is willing to do additional testing but the request can't come from the community, it has to come from the health department. Too often APHL learns about situations like these in which public health laboratories might have helped answer questions related to community environmental health concerns. Such stories frustrate scientists in our member laboratories, which are equipped with advanced technology and highly trained chemists dedicated to protecting and improving public health. The question soon became 'how can we better connect these communities with their laboratories?' In order to better meet community environmental health needs, APHL undertook a year-long strategic assessment process. During the first stage, APHL interviewed community advocates and key leaders to identify trends likely to shape the future of environmental health. During the second stage, APHL shared a summary of the interviews with laboratory leaders, asking what they could do to better address community needs, now and in the future. APHL published a document that brings together the results of the first two stages, in order to prepare for the third stage, which involved a one-day, in-person strategic forum in September of 2012. The forum convened environmental health leaders and advocates to identify ways the public health system could better utilize the rich capabilities of laboratories to meet environmental health needs in communities across the country. Since the forum, APHL realizes more and more that this is a systems issue. With participation from attendees, the proposed panel session will inspire dialogue on ways to improve the environmental health system. At the end, we hope to walk away with ideas and volunteers committed to better meeting community health needs through environmental laboratories.

Session Objectives: 1. Describe situations in which community environmental health questions could be addressed through a partnership with public health laboratories. 2. Discuss ideas for better connecting community groups to environmental laboratories. 3. Formulate ways to improve the environmental health system to make it more responsive and accountable to the communities it serves.
Moderator: Megan W. Latshaw, PhD, MHS
Organizer: Megan Latshaw, PhD MHS
Panelists: Stephen Lester, MS, Heidi Klein, MSPH, Suzanne K. Condon, MS and Julie Nassif, MS

10:30am Concerned communities & the environmental health system
Stephen Lester, MS

10:50am Meeting community health needs through environmental labs
Heidi Klein, MSPH

11:10am Connecting communities and the state lab in MA
Suzanne K. Condon, MS

11:30am Meeting community health needs: A lab perspective
Julianne Nassif, MS

See individual abstracts for presenting author's disclosure statement and author's information.

Organized by: Environment
Endorsed by: Socialist Caucus

CE Credits: Medical (CME), Health Education (CHES), Nursing (CNE), Public Health (CPH)
Concerned Communities and the Environmental Health System

Stephen Lester
Science Director
Center for Health, Environment & Justice
Presenter Disclosures
Stephen Lester

The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

No relationships to disclose
Center for Health, Environment & Justice

- Founded in 1981
- Born out of Love Canal Crisis
- Lois Gibbs Executive Director
- Based in Falls Church, VA
- Staff of 11
- Provide organizing and technical assistance to grassroots community groups nationwide
Local Community Group in Western NY

• Concerned about whether their water is contaminated
• Illnesses in her family and in other families that people felt were caused by drinking the water
• History of industrial pollution
• Town well drilled into shallow aquifer
Water Quality

• Many complaints about the water over many years
• Water was high in minerals
• Many residents spend hundreds of dollars a year on home water filters, softeners and purifiers to make their water usable
Source of Drinking Water

• Village well was drilled some time in the 1930s
• Other towns had abandoned wells drilled into this aquifer
Goal of Local Group

• Convince the town to switch to the nearby municipal water system
Options Considered by Town

• Switch to nearby municipal water
• Invest in new water treatment system estimated to cost $4.5 million
Water Testing

• Limited in scope
• Primarily done to meet consumer confidence report standards
• Secondary pollution parameters
• Inconsistent
Community Request

Priority Pollutant Test
Association of Public Health Laboratories
Request Chain

• Community group contacted director of state PHL
• Director of state PHL referred community leader to regional lab director
• Regional state lab director contacted town water director
Outcome

• The state PHL told local community group that tests similar to priority pollutant test had already been done for town water company

• Get the results from the town water company

• The state PHL would not do any testing unless the request came from the town
Final Resolution

• Goods news
• New mayor elected in March 2013
• Town board voted 4-1 to switch to municipal water system in August 2013
• Switch not made yet, but moving in this direction
Other Communities

Minneapolis, MN
South Carolina
Issues that Came Up

• Who can request the testing?
• What testing is the lab willing to do?
• Trust of the state lab
• Controversy
Lessons Learned

• The issues are complex and bridging the gap between grassroots community groups and the state PHL is not going to be easy

• Some local groups have history working with the state lab and that experience is not always positive

• Trust cannot be taken for granted; lack of trust can be major deterrent
Moving Forward

• There needs to be better communication/clarity between local groups and state PHLs
• State labs should be open to doing testing that local community groups and leaders are asking for
• It needs to be clear what testing the lab may be willing to do
• Consider asking an out-of-state public health lab to do the testing and not use the in-state lab
Conclusion

• These are but a few examples; we need to try this in other states with other circumstances to better understand the potential to bridge the gap between grassroots community groups and the state public health Labs.
Thank You

Stephen Lester, Science Director

Center for Health, Environment & Justice

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Heidi Klein

The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

This presentation is based on work conducted by HK Consulting on behalf of the Association of Public Health Laboratories.
New Directions

Meeting Community Health Needs through Environmental Health Labs

Heidi M. Klein
APHA Annual Meeting
November 6, 2013
We already know the critical issues for laboratories – funding, infrastructure, science base

What we need to understand are community and science demands
STRATEGIC ASSESSMENT

Where do we need to focus in the future?
Three Phase Process

Phase I: EH Leaders
Trends shaping the future of environmental health practice

Phase II: Lab Leaders
Opportunities and challenges in addressing trends and emerging community needs

Phase III: PH System Leaders
Strategies to better utilize the rich capabilities of laboratories to meet communities’ needs
PHASE I

CHANGES IDENTIFIED

Questions they raise
Rapid Shipment Options

Implications
Shipping distance and time are no longer critical factors

Questions for Laboratory Practice

- *Which services are necessary in each and every state?*
- *Which services should remain a governmental function?*
- *Which services could be offered regionally or by specialty laboratories?*
Data And Information Technology

Implications

- Expectation of real time data manipulation
- Effectively analyzing and interpreting data

Questions for Laboratory Practice

- How will labs address increasing public expectations for real-time data?
- What data should labs share with which publics?
- Are labs able to interpret data which is increasingly available to the public?
Affordable Care Act

Implications
- Electronic exchange of data
- Effectively analyzing and interpreting data

Questions for Laboratory Practice
- *What data could your laboratory contribute to population monitoring?*
- *Is there other data that could be shared in the future?*
Scientific Advances

Implications

- Connecting advances to public health policy and action

Questions for Laboratory Practice

- How can environmental laboratories engage in applied research?
- How to improve the usefulness of laboratory results for public health decision-making and policy?
Biomonitoring

Implications

- Finding results
- Interpreting results

Questions for Laboratory Practice

- *How can laboratories assist in the tracking of total chemical body burden?*
- *What additional skills or partners will be needed?*
Emerging Issues

Critical Issues

- Consumer Products
- Nanotechnology

Questions for Laboratory Practice

- *Is there a role for laboratories in the testing and analysis of consumer products?*
- *Can laboratories play a part in testing environmental and human samples for the residues of nanotechnology?*
- *How can laboratories enhance testing of environmental samples for chemicals?*
Community Expectations

Implications

- Transparency
- Engagement

Questions for Laboratory Practice

- How can laboratories work as part of a team that works to help concerned community members assess and understand exposures, as well as interpret testing results?
Key Questions Moving Forward

- How can laboratories improve the usefulness of results for public health decision-making and policy?

- How can laboratories be part of a team that works to help concerned community members understand risks, interpret testing results, and take protective action?
Key Questions Moving Forward

- What would laboratories need to engage in new areas for testing including environmental samples for chemicals, biomonitoring, consumer products, nanotechnology?

- What new users could benefit from laboratories’ capability and expertise at the federal, state and community levels?
November 6, 2013

Meeting Community Health Needs Through Environmental Labs

Connecting Communities and the State Laboratory in Massachusetts

Suzanne K. Condon, Associate Commissioner
Director, Bureau of Environmental Health
Massachusetts Department of Public Health
I. Intro to the long standing partnership between the Bureau of Environmental Health and the Bureau of Laboratory Sciences

II. Community questions where biomonitoring more completely addressed exposure concerns
   • Am I being exposed to PCBs as a result of building materials in my school building?
   • Did a mercury spill at my child’s school cause exposures of health concern?

III. Summary
Selected Examples of BEH and BLS Collaborative Response

- 1978-present  Blood lead screening for children
- 1981  Pilot study New Bedford Harbor – NPL (Serum PCB analysis)
- 1984-87  New Bedford Harbor Exposure Prevalence Study (Serum PCB analysis)
- 1994-97  Determining arsenic exposure in relation to Baird McGuire (Hair & nail sample analysis)
- 1996  Breast Cancer Pilot Study (Serum PCB analysis)
- 2006-07  Lead in jewelry and children’s toys (Blood lead levels)
- 2010  Arsenic and uranium in private wells (Urine sample analysis)
- 2011  Keith Middle School – PCBs in building materials (Serum PCB analysis)
- 2013  Multiple emergency events (Urine mercury analysis)
Community questions where biomonitoring more completely addressed exposure concerns

- Sherwood Middle School – Shrewsbury, MA
  - Am I being exposed to PCBs as a result of building materials in my school building?

- Grafton Elementary School – Worcester, MA
  - Did a mercury spill at my child’s school cause exposures of health concern?
Evaluation of indoor environmental and health concerns
The MDPH Bureau of Environmental Health (BEH) was contacted by the Shrewsbury Board of Health (BOH) and asked to evaluate indoor environmental conditions (i.e., PCBs in building materials) due to health concerns, particularly breast cancer at the Sherwood Middle School.

MDPH also offered to conduct biomonitoring of staff to determine serum PCB levels.

Although the epidemiological evidence is sometimes conflicting, most health agencies have concluded that PCBs may reasonably be anticipated to be a carcinogen, i.e., to cause cancer.

Some studies have also been conducted to understand more about possible environmental influences on breast cancer risk suggesting that PCBs’ estrogen-like properties may affect breast cancer risk.
Project Components

- Indoor Air Quality Evaluation
- Exposure Assessment
- Serum PCB Testing Program
- New Guidance on PCB-Containing Materials in Schools and Public Buildings
Samples were collected starting in late afternoon on a Friday, outside of regular school day activities, to avoid disruption and restrict access to sample locations to prevent cross-contamination of media.

All sample results were well below the U.S. EPA regulatory clean up level (10 µg/100cm²).

Results revealed that samples taken from more frequently accessed areas were generally ND or similar to the CA clean up guideline (0.1 µg/100cm²).

<table>
<thead>
<tr>
<th>Location</th>
<th>Result</th>
<th>Screening Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room 120</td>
<td>0.27 µg/m³</td>
<td></td>
</tr>
<tr>
<td>Room 138</td>
<td>0.23 µg/m³</td>
<td>0.01 µg/m³ (ATSDR CREG)</td>
</tr>
<tr>
<td>Background (Outdoor)</td>
<td>ND</td>
<td></td>
</tr>
</tbody>
</table>

Indoor air results for classrooms 120 (0.27 µg/m³) and 138 (0.23 µg/m³) exceed the ATSDR screening value (CREG = 0.01 µg/m³).

*Test America, with locations in Burlington, VT and Westfield, MA performed the analysis for both air and wipe samples.*

20 wipe and 3 air samples (2 indoors, 1 outdoors) were collected on June 12th and 13th, 2009.
MDPH/BEH calculated a cancer risk estimate for the Sherwood Middle School by assuming a worst case scenario:

- Adults were exposed to these levels for 35 years for 8 hours per day, 180 days per year
- Children were exposed to these levels for 8 hours per day, 180 days per year for 4 years

For adults, the cancer risk is estimated at 1 excess cancer in a population of 100,000.

For children, the estimated cancer risk is 1-2 excess cancers in a population of one million.
Serum PCB Testing for School Staff

- Environmental Health staff collaborated with MDPH Environmental Chemistry Lab staff to ensure sample collection and transportation was consistent with lab protocol.

- Took place over 4 days in December 2009 at Sherwood.

- School nurse collected blood samples.

- 52 school staff participated:
  - Signed consent forms
  - Pre-draw interviews
Summary of Serum PCB Testing Results

- Sherwood Middle School participants were almost all within 95th percentile of serum PCB levels available from NHANES data.

- Two participants slightly exceed the NHANES 95th percentile; based on exposure questionnaires, most likely due to dietary factors.

- As a result of environmental test results and biomonitoring, school personnel were reassured that indoor environmental conditions were not likely to be associated with breast cancer among staff.
Evaluation of exposure and health concerns among children and adults resulting from a spill of mercury in a Worcester, MA elementary school.
First Day of Incident

- A student brought pint bottle of elemental mercury to school
- Mercury reportedly spilled on the floor - not known to school personnel
- Child showed mercury to teacher who then contacted the Assistant Principal
- Assistant Principal opened/confiscated the bottle, but left it in the office overnight not realizing it contained mercury
- School officials contacted the Worcester Fire Department the following morning
Second Day of Incident

- Worcester Fire Department arrived on scene, suspected mercury, due to appearance and weight. A Jerome meter was used to confirm mercury.

- State HazMat Officials paged MDPH Associate Commissioner to request assistance.

- Environmental sampling demonstrated that mercury had been spread throughout the building by custodial staff mopping and sweeping the evening before.

- Air samples for mercury ranged from ~2,000 to 44,000 ng/m³ (federal residential occupancy guideline is 1,000ng/m³).

- That evening, parents were called by local health and school officials and asked to send student clothing, shoes and backpacks to school for mercury sampling.
Urinary Mercury Testing

Students and Staff

- The children in the affected school building were in grades 2-6; in addition to school exposure, possible contamination of homes

- MDPH/BEH staff contacted partners at the state laboratory to coordinate urinary mercury testing for individuals (students, staff) concerned about potential exposure

- MDPH/BEH staff picked up sample kits and blank consent forms at the State Laboratory and transported them to the school prior to the children arriving

- MDPH staff and nurses from the school and local health department set up a coordinating center to obtain medical consent forms and to collect urine samples
Urinary Mercury Samples

- MDPH/BEH staff remained at the school until 8:30 pm to collect samples

- Final batch of samples was transported to the MDPH/SLI for analysis at 11:00 pm. Laboratory staff worked until early morning hours to prepare samples for analysis

- 188 samples were collected
  - 151 of 226 (66.8%) students from the affected building provided urine samples
  - 37 faculty and siblings of students were also tested
Thursday September 23, 2010
- Received 188 specimens
- Log-in
- Analysis

Friday September 24, 2010
- 3 shift day (minimum of 3 staff/shift)

Saturday September 25, 2010
- Completed testing
- Creatinine correction
- Data cleaning
Results of Urine Samples

- All samples analyzed were reported as non-detect (i.e. less than reporting limit)

- Thus, no health effects were expected for any participants based on the urine analyses
  - This included those at greatest risk of exposure to mercury (i.e. 3rd Floor) where air concentrations were the highest

- Individual results letters explaining the urine results were mailed to all participants (or their parents/guardians)
The partnership between environmental health programs and environmental labs is critical in designing optimal exposure assessment.

Having protocols in place in advance of emergencies allows for more rapid response.

Use of biomarkers as indicators of exposure along with interview data allows for more comprehensive assessment of environmental exposure and health risk.

With more comprehensive response, health officials can better address community concerns.
Meeting Community Environmental Health Needs
A Laboratory Perspective

Julianne Nassif
Environmental Health Consultant
141st Meeting of the American Public Health Association
Boston, MA 11.06.13
Essential Components of a Successful Environmental Health Investigation

- Well established relationships
  - Environmental Health Programs & Laboratory
  - Community input
  - Mutual respect & trust

- Defined protocols
  - Sampling
  - Analysis
  - Reporting

- Flexibility

- Communication
Clinical Specimen Collection Protocol

Clinical Testing Following a Suspected Chemical Exposure Event

If you suspect exposure to a chemical, you must contact the State Laboratory Institute before collecting and submitting samples.

24/7 BT/CT Phone: 617-398-6390
24/7 BT/CT Pages: 617-228-1576

Step 1: Collection
- Blood Tubes: 4 mL or larger purple top
- Urine Cups: sterile, plastic, screw-capped

Step 2: Packaging and Documentation
- Pack and ship clinical specimens as "Biological Substance, Category B"

Blood Specimens
- Primary Receptacle
- The blood tubes and urine cups are the primary receptacles. Do not pack urine cups and blood tubes in the same box.
- Secondary Packaging
- Leakproof packaging for primary receptacles - also contains cushioning and absorbent material
- Add absorbent material (enough to absorb entire contents of tubes)
- Secure packaging with one strip of evidence tape
- Freeze immediately

Urine Specimens
- Primary Receptacle
- The urine cups are the primary receptacles.
- Secondary Packaging
- Leakproof packaging for primary receptacles - also contains cushioning and absorbent material
- Add absorbent material (enough to absorb entire contents of cups)
- Secure packaging with one strip of evidence tape
- Freeze immediately

Step 3: Shipping Preparations
1. Secure outer packaging top and bottoms with packing tape.
2. Affix labels on the same side as the shipped/container addresses.
3. Place a UN3373 diamond marking on the box.
4. Place the shipping name, Biological Substance, Category B, next to the UN3373 marking.
5. For packages containing dry ice, place a Class A Hazard label and a UN1843 Dry Ice marking on the same side as the UN3373 marking. Write the weight of the dry ice (in lb) on the UN1843 marking.
6. Place orientation arrows on the two adjacent sides of the box from the markings and labels.

Step 4: Shipping Specimens
- Call the BT/CT 24/7 phone number to notify the lab when samples are being shipped.
- Ensure the counter signs off on the hospital chain of custody.
- Each entity retains their own chain of custody.

Ship to:
- Chemical Terrorism Response Lab
  Atttn: Dr. Jennifer Janssen
  Wake Laboratory Institute
  305 Smith Street, Room 305
  Jamaica Plains, MA 02130
- CT Lab 24/7 Phone: 617-839-1283
APHL Biomonitoring Initiatives

- Biomonitoring Position Statement
- National Biomonitoring Plan
  - 5-year action agenda
- Biomonitoring Guidance for Laboratories
- CSTE Biomonitoring Guidance for Epidemiologists
- Guide for Legislators
- Biomonitoring Toolbox
Laboratory Contributions to Environmental Health Investigations

- Engage the laboratory early in the process
- Feasibility of testing
  - Biomarker selection
  - Capacity
  - Logistics
  - Sampling protocols
  - Training (sampling)
- Quality assurance plan
- Reporting
How Do Communities Express Environmental Health Concerns

- **Multiple methods**
  - Telephone calls
  - Letters
  - Email
  - Centralized portals
    - Triaged
    - Tracked

- **Established relationships**
Building Partnerships in the Community

- Clinicians
- Public Health Partners
- Environmental Partners
- Poison Control
- Law Enforcement
- Military
- Medical Examiners
- Academic partners
Expand Partnerships in the Community

- Residents
- Advocates
- Civic Organizations
- Community Leaders
- Businesses
- Educators
Piggy-back

- ATSDR Publications
- CDC *Solve the Outbreak* App
- Professional Meetings
- Community Events
ATSDR Community Resources

- How to Reduce Your Exposure to Chemicals at Home, Work and Play
- Health Effects of Chemical Exposure
- Sensitive Populations and Chemical Exposure
- Chemicals Cancer & You
Development of Custom Materials

- Internal Communications Department
- MIYO – *Make it Your Own*
- Low Cost /Free Tools
  - Infographics
  - Presentations
  - Materials
Farmers Markets

- Resurgence in popularity
- Intimate by design
- Ample foot traffic
- Attract shoppers interested in healthy, nutritious foods & products
- Likely to be receptive to EH information
Educational Settings

- Middle & High Schools
- Key age group
- APHL Presentation
  - Prezi
  - SPHL Presenters
- Teachers enthusiastic
  - Real-world examples
  - Alignment with curriculum frameworks
  - STEM Initiatives
Adult Education Programs

- Engaged audience
- Often underserved populations
- Proven model for success

CELEBRATING ADULT LEARNERS
Civic Organizations

- Chamber of Commerce
- Rotary Clubs
- Medical Reserve Corps
- League of Women Voters
Grand Rounds

- Poison Control Fellows
- Teaching Hospitals
- Medical Examiners
Community Events

- Town Days
- Road Races
- Recycling Events
- Fairs & Festivals
- Blood Drives
- Flu Clinics
- Library Events
Open Houses

- Laboratories could consider open houses
  - Showcase activities in a secure way
  - Invite a broad audience
    - Press
    - Legislators
    - Students
    - Residents
    - Local health
    - Partners
  - Highly visual presentations
    - Posters, hands on activities
Public Health Partners

- Joint presentations with partners
  - EH Programs
    - Epidemiology, Toxicology & EPHT
    - Lead Poisoning Prevention
    - Food Protection
    - Local Health
    - Occupational Health

- Federal Partners

- Poison Control Centers

- Schools of Public Health
Interns

- College students
- APHL fellows
- High school students?
Potential Resources

- Medical Reserve Corps
- America Corps
- City Year
- Teachers
Yes, we can!