Enhancing Community Involvement through University-Federal Agency Collaboration: Partners in Technical Assistance Program (PTAP)

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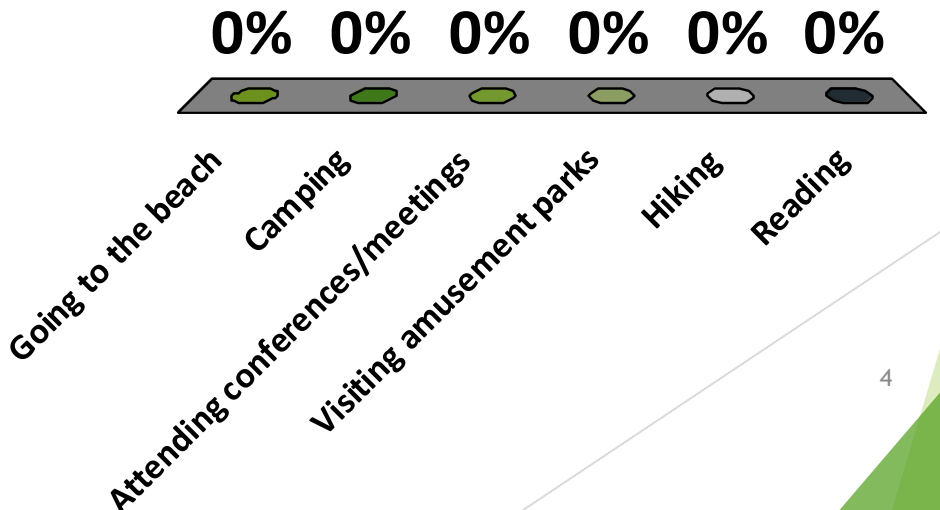
The views expressed in this presentation are those of the author[s] and do not necessarily reflect the views or policies of the U.S. Environmental Protection Agency.

Let’s test the clickers!

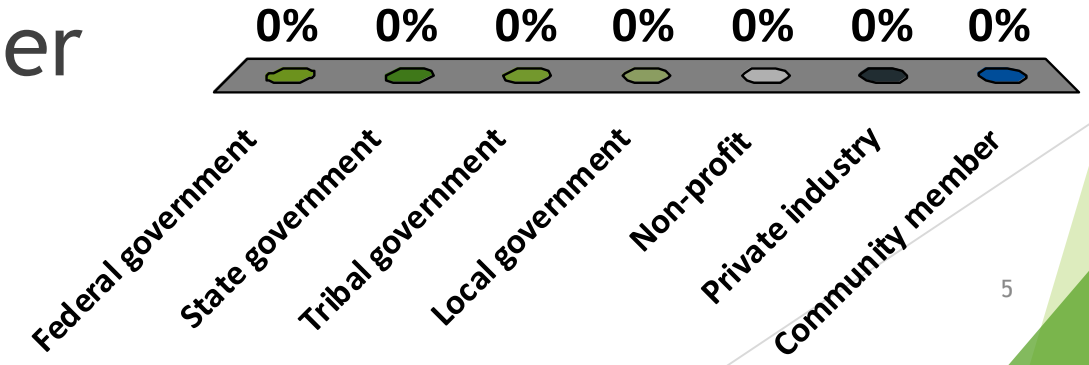
What is your favorite summer activity?

A. Going to the beach
B. Camping
C. Attending conferences/meetings
D. Visiting amusement parks
E. Hiking
F. Reading



What is your affiliation?

A. Federal government
B. State/local government
C. Tribal government
D. Academia
E. Non-profit
F. Private industry
G. Community member

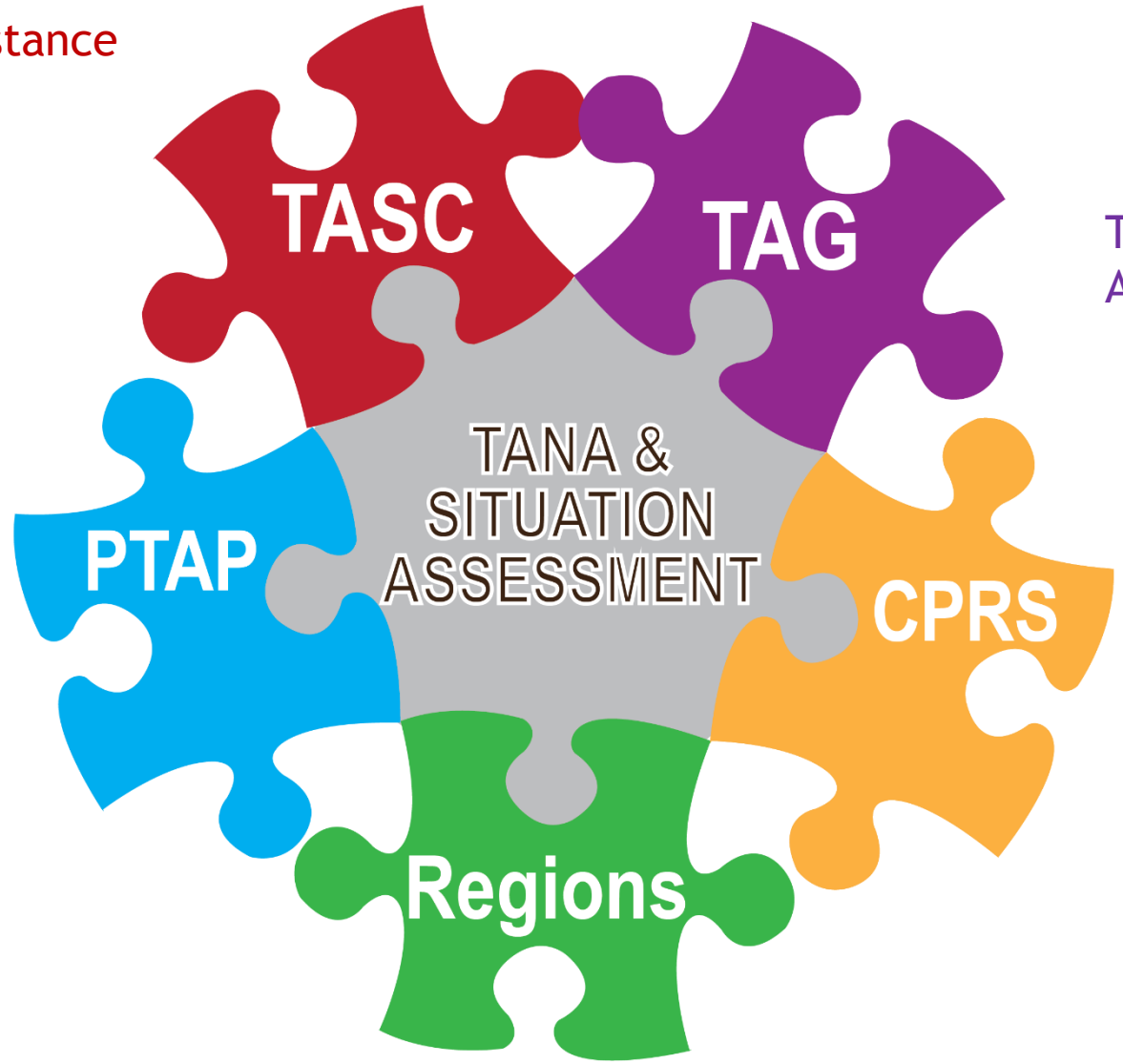


Overview

- Welcome and Introductions
- Background:
  - EPA's Pilot PTAP
  - NIEHS Superfund Research Program
- OSU SRP and Black Butte Mine PTAP project
- Discussion/Questions
- UA and UNC SRP Centers and PTAP Bioavailability Project
- Interactive Activity
- Discussion/Questions
- Wrap-Up

Tools and Resources for Enhancing Community Involvement at Superfund Sites

Technical Assistance Services for Communities contract



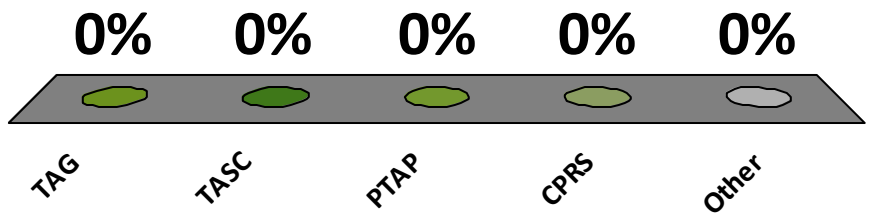
Technical Assistance Grants

Pilot Partners in Technical Assistance Program

Conflict Prevention and Resolution Services

Which EPA technical assistance services have you utilized?

A. TAG
B. TASC
C. PTAP
D. CPRS
E. Other
F. None



Partners in Technical Assistance Program (PTAP) Pilot

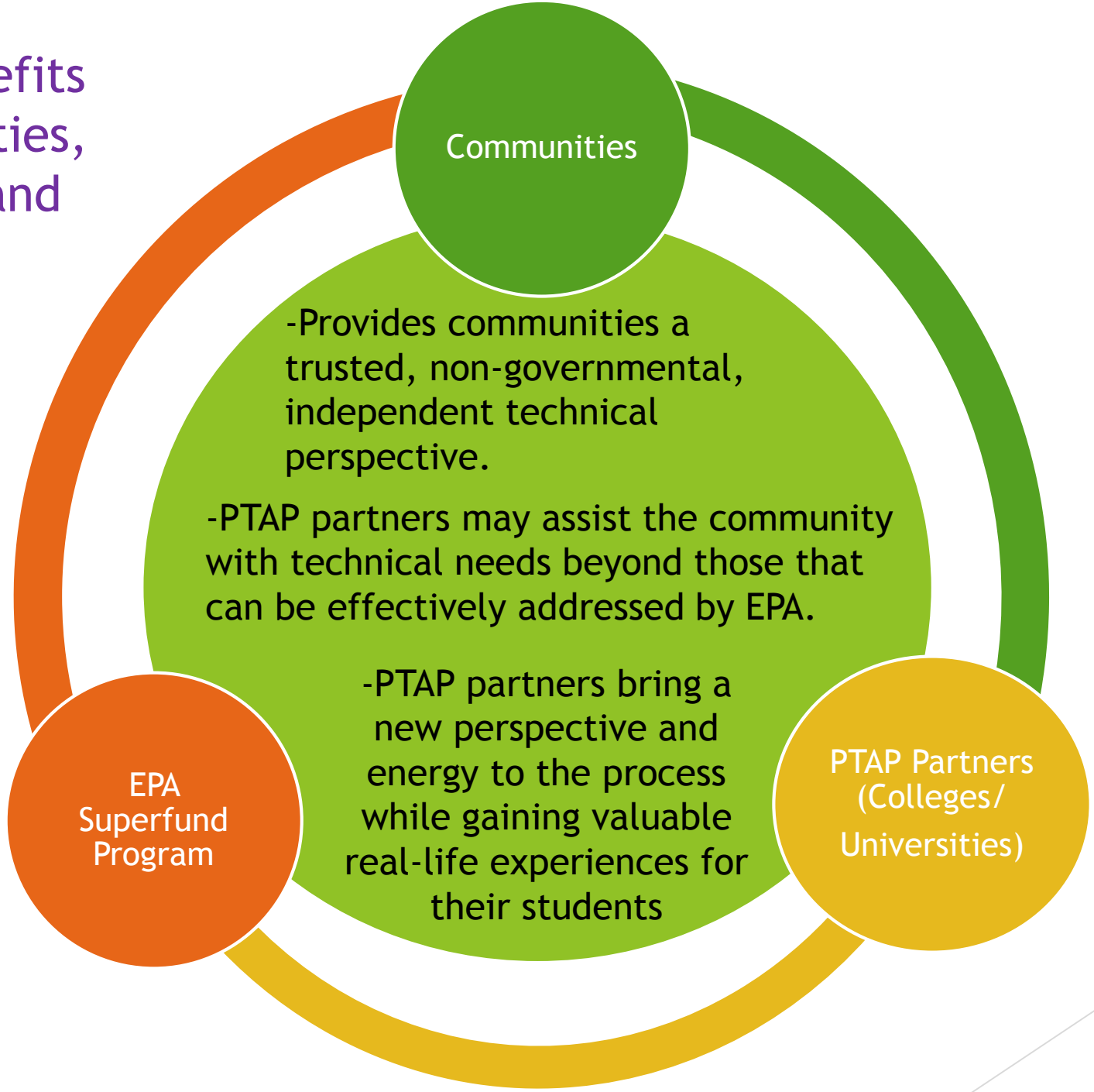
- Objective of PTAP: To expand opportunities for cooperation between EPA and colleges and universities with the shared goal of assessing and addressing the unmet technical assistance needs of impacted communities.
- Colleges and universities cooperate with EPA and *voluntarily* commit to assist communities with their unaddressed technical assistance needs.
- Best for sites with limited funding or where technical assistance needs are outside EPA's scope of work.
- Currently piloting the PTAP approach with the NIEHS Superfund Research Program (SRP) grantees at Superfund sites

Examples of Technical Assistance Services Provided by PTAP

- Training on environmental issues
- Researching public health and risk
- Redevelopment planning
- Neutral facilitation and mediation services
- Reading and explaining technical reports
- Community outreach and involvement
- Researching scientific/technical issues
- Building capacity of community groups

Access to sites to sample for research purposes is beyond the scope of PTAP

PTAP Benefits Communities, Partners and EPA



Current PTAP Partners
(18 SRP Centers)

- Boston University
- Brown University
- Dartmouth College
- Duke University
- Harvard University
- Louisiana State University
- Michigan State University
- Northeastern University
- Oregon State University
- University of Arizona
- University of California-Berkeley
- University of California-Davis
- University of California-San Diego
- University of Iowa
- University of Kentucky
- University of North Carolina-Chapel Hill
- University of Pennsylvania
- University of Washington

National Institutes of Health
National Institute of Environmental Health Sciences
Superfund Research Program

Fundamental Knowledge → **NIH Research Mission** → **Health Outcomes**

…with environmental exposures

…including health, risk assessment, remediation and detection

National Institute of Environmental Health Sciences

Superfund Research Program (SRP)
SARA Legislation

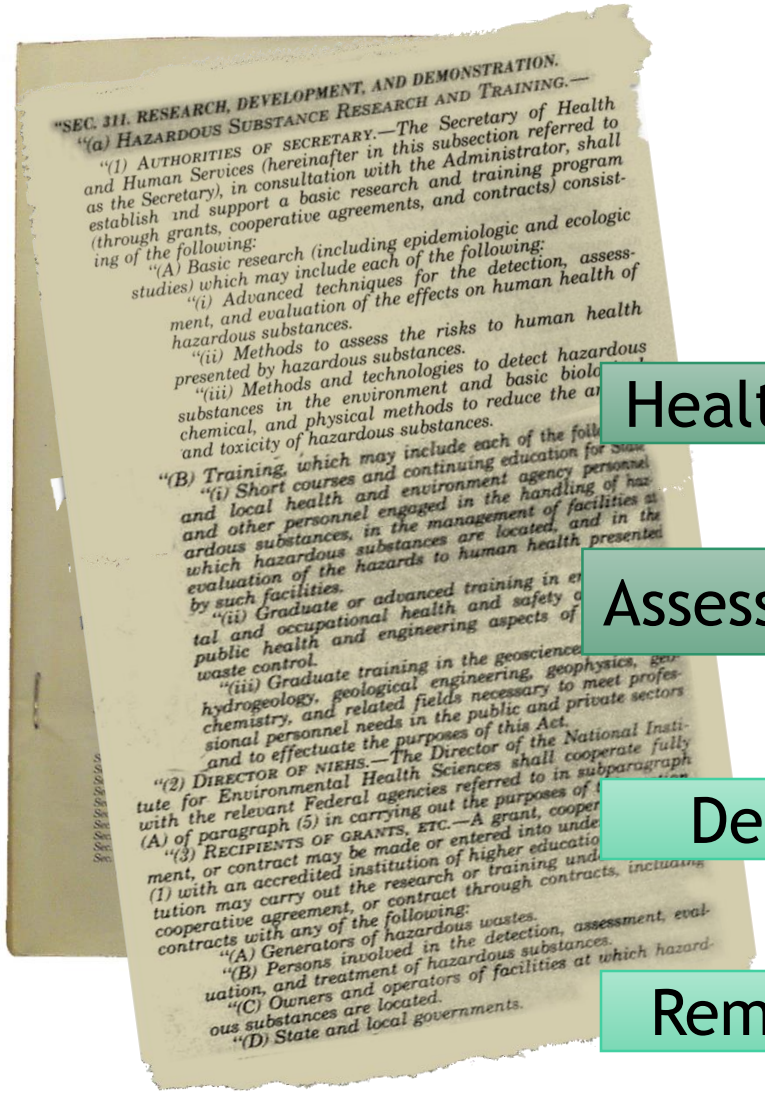
…caused by hazardous substances

…relevant to Superfund stakeholders

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

SRP Mandates under SARA



"SEC. 311. RESEARCH, DEVELOPMENT, AND DEMONSTRATION.

"(a) HAZARDOUS SUBSTANCE RESEARCH AND TRAINING.—

"(1) AUTHORITIES OF SECRETARY.—The Secretary of Health and Human Services (hereinafter in this subsection referred to as the Secretary), in consultation with the Administrator, shall establish and support a basic research and training program (through grants, cooperative agreements, and contracts) consisting of the following:

"(A) Basic research (including epidemiologic and ecologic studies) which may include each of the following:

"(i) Advanced techniques for the detection, assessment, and evaluation of the effects on human health of hazardous substances.

"(ii) Methods to assess the risks to human health presented by hazardous substances.

"(iii) Methods and technologies to detect hazardous substances in the environment and basic biological, chemical, and physical methods to reduce the amount and toxicity of hazardous substances.

"(B) Training, which may include each of the following:

"(i) Short courses and continuing education for State and local health and environment agency personnel and other personnel engaged in the handling of hazardous substances, in the management of facilities at which hazardous substances are located, and in the evaluation of the hazards to human health presented by such facilities.

"(ii) Graduate or advanced training in environmental and occupational health and safety and public health and engineering aspects of waste control.

"(iii) Graduate training in the geosciences, including hydrogeology, geological engineering, geophysics, geochemistry, and related fields necessary to meet professional personnel needs in the public and private sectors and to effectuate the purposes of this Act.

"(2) DIRECTOR OF NIEHS.—The Director of the National Institute for Environmental Health Sciences shall cooperate fully with the relevant Federal agencies referred to in subparagraph (A) of paragraph (5) in carrying out the purposes of

"(3) RECIPIENTS OF GRANTS, ETC.—A grant, cooperative agreement, or contract may be made or entered into under (1) with an accredited institution of higher education. Any institution may carry out the research or training under a cooperative agreement, or contract through contracts, including contracts with any of the following:

"(A) Generators of hazardous wastes.

"(B) Persons involved in the detection, assessment, evaluation, and treatment of hazardous substances.

"(C) Owners and operators of facilities at which hazardous substances are located.

"(D) State and local governments.

University-based basic research program established in 1986 under Superfund Amendments Reauthorization Act (SARA)

Development of:

- **Health Effects**: Advanced techniques for the detection, assessment, and evaluation of the human health effects of hazardous substances
- **Assessing Risks**: Methods to assess the risks to human health presented by hazardous substances
- **Detection**: Methods and technologies to detect hazardous substances in the environment
- **Remediation**: Basic biological, chemical, and physical methods to reduce the amount and toxicity of hazardous substances

SRP Funding Mechanisms

Multi-Project Centers (P42)

Designed for integration across disciplines: Biomedical and Environmental Science Research; Community Engagement, Research Translation, and Training. Basic and application-oriented. Request for Applications. Annual RFA.

Small Business Research Grants SBIR/STTR (R41-44)

Foster the commercialization of technologies, relevant to hazardous substance clean-up and monitoring. Ongoing Funding Opportunity

Individual Research Project (R01)

Designed to address specific issues to complement the multi-project research program; tackle issues of emerging concern for Superfund. Most recent solicitation:

Biogeochemical Interactions Affecting Bioavailability for in situ Remediation of Hazardous Substances (R01)

Occupational Training (R25)

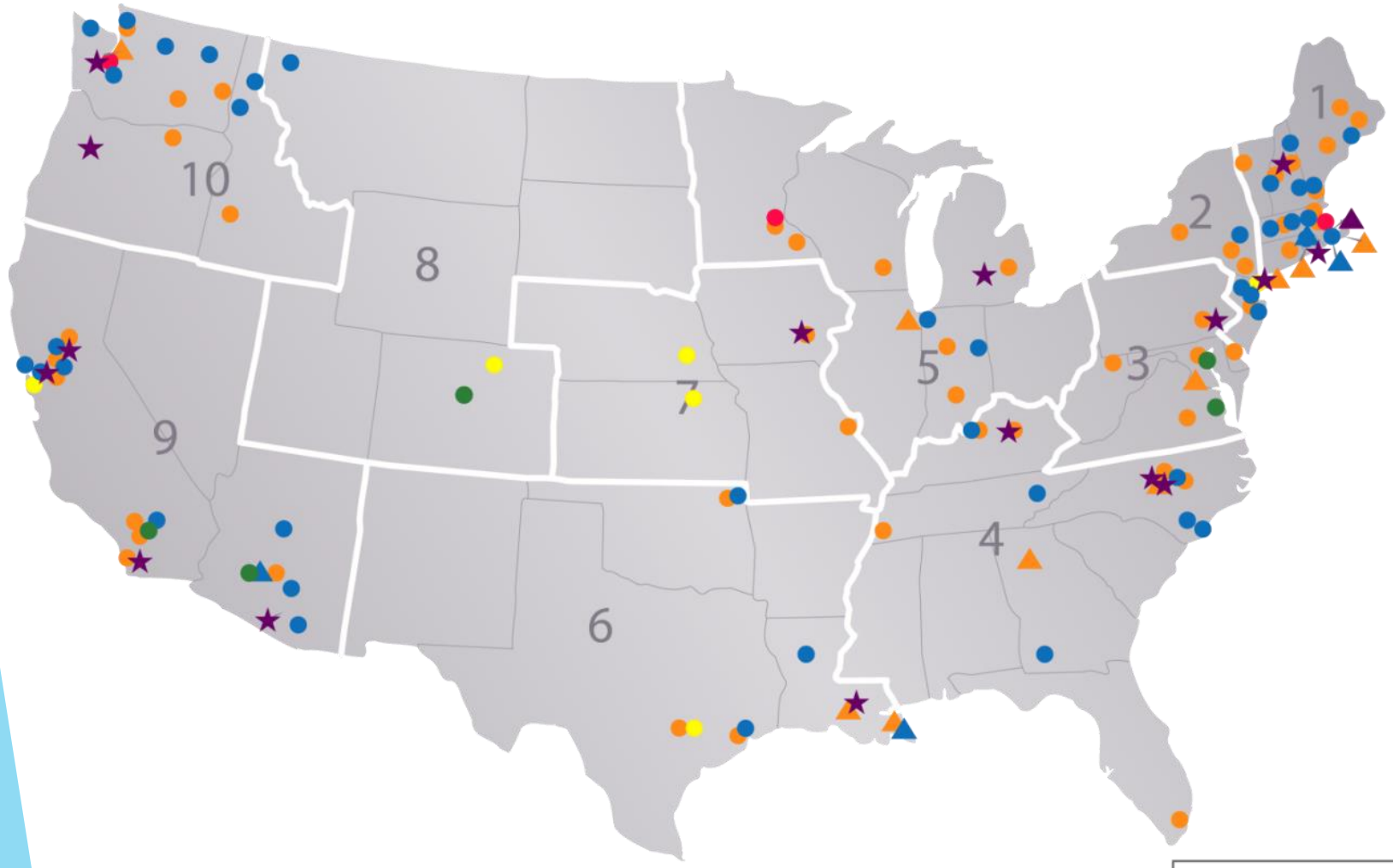
Emerging issues in EHS training.

Supplement Awards

Trainee externships/work exchanges, technology transfer opportunities.

Funding Opportunities:
http://www.niehs.nih.gov/research/supported/dert/cris/programs/srp/funding/index.cfm

SRP Across the Country

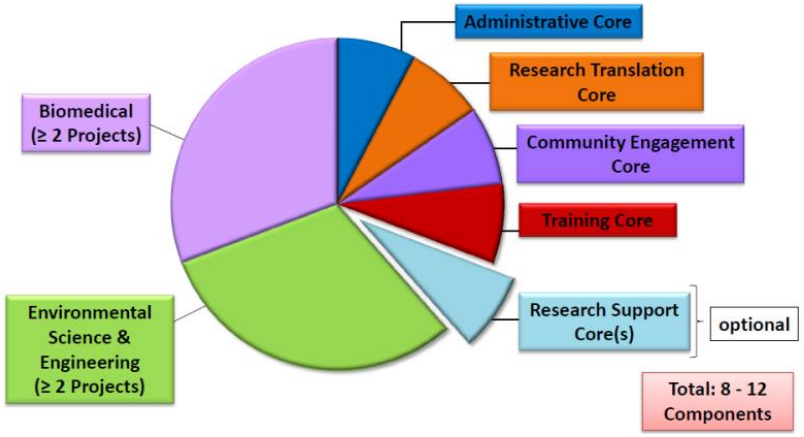


- Superfund Multiproject Research Centers
- Individual Research Projects
- Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR) Projects
- Research Education Programs in Emerging Technologies
- SRP Partnering Institutions
- SRP Research and Outreach at Hazardous Waste Sites

Community Engagement Core

Community Engagement Core Function:

To enhance knowledge exchange and to support community needs with regard to the science emanating from the Center



Target communities

SRP defines target communities as those impacted by sites contaminated with hazardous substances.

- **Members of the affected community**
- **May also include:** local government, tribal councils, community service groups, non-governmental organizations

http://tools.niehs.nih.gov/srp/outreach/outreach2.cfm

SRP Contact Information

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Heather F. Henry, Ph.D.
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henryh@niehs.nih.gov

Alicia Lawson, MPH
Health Specialist
(919) 316-4593
Alicia.lawson@nih.gov

http://www.niehs.nih.gov/research/supported/dert/programs/srp/about/contacts/contact_staff/index.cfm

PTAP Pilot Project: Black Butte Mine Site

- Former mercury mine site – Cottage Grove, OR
- July 2012 – Community information session with residents of Lane County and Cottage Grove
- How can we best inform & keep residents updated on EPA activities?
- Laurie Briggs (former Principal, London School) – suggested materials to educate students about the mine

"The way to reach the London community is through the children."
~Laurie Briggs

PTAP Pilot: Getting Started

- March 2013 - Technical Assistance Needs Assessment
- June 2013 - PTAP Request for Response, OSU responded
- December 2013- OSU, EPA, Laurie Briggs first meeting
  - Outcome and Outputs
  - Expectations
  - Timeline
  - Roles
- September 2014 – project completed

PTAP Pilot: Project Outcomes & Outputs

Address community and educational needs

- Curriculum related to the science of Black Butte Mine Site
- Instructional materials on mercury contamination
- Model project for other rural, small schools

  "Mercury, the Community, and Me" curriculum modules for grades K-8 covering Environmental Health, Mercury and Health, and Mercury in the Environment

Educate students and community and build sustainable partnerships

- Potential citizen science project and school science fair

Expose students to career opportunities in environmental/life sciences

- "Careers in Environmental Sciences" and "Black Butte Mine" videos

Provide SRP trainees opportunities to gain outreach experience

Mercury, the Community, and Me

Section 1:
Environmental Health

Section 2:
Mercury in the Environment

Section 3:
Mercury and Human Health

Mercury, the Community, and Me

Black Butte Mine Video

Quiz

CONCLUSIONS

The program created a framework to:

- Leverage existing resources to support community education
- Incorporate environmental health literacy into K-8 programs
- Expand local knowledge regarding a historical environmental contaminant and human exposure
- Provide student trainees with on-the-ground experience in communities
- Enhance EPA/community/PTAP partner relationships to the benefit of all parties involved

Project Update:

Educational materials met needs and teachers were pleased with the products. The school is planning to begin the curriculum during the 2016 school year. Earth Day 2015, Science Fair and Family Night. EPA & OSU science judges.

Biomedical

Project 1
PAHs in Humans at Environmental Levels: Pharmacokinetics, Metabolism and Susceptible Individuals

Project 2
Cross-Species and Life Stage Comparisons of PAH Dosimetry

Project 3
Systems Approach to Define Toxicity of Complex PAH Mixtures

Core A
Administration

Core B
Research Translation

Core C
Biostatistics & Modeling

Core D
Chemistry

Core E
Community Engagement

Core F
Training

Non-Biomedical

Project 4
Bridging Superfund Site Based Bioavailable Extracts with Biology

Project 5
Formation of Hazardous PAH Breakdown Products in Complex Environmental Mixtures at Superfund Sites

Oregon State University OSU

http://superfund.oregonstate.edu

Contacts

U.S. EPA Black Butte Mine PTAP Team

Region 10
Alanna Conley
503-326-6831

Kira Lynch
206-553-2144

Office of Superfund Remediation and Technology Innovation
Melissa Dreyfus
703-603-8792

PTAP Project Team Members

Community Engagement Core

Tribal-University Evaluation of Chemical Exposures to Improve Community Health

Anna Harding, PhD, Core Leader, OSU
Molly Kile, PhD, Co-Leader, OSU
Diana Rohlman, PhD, Program Coordinator, OSU
Greta Frey and Andres Cardenas, grad students
Corey Fisher, former MPH student
Jamie Donatuto, PhD, Community Liaision, Swinomish
Barbara Harper, PhD, Co-Leader, Oregon State University
Stuart Harris, B.S., Consultant and Tribal Member of CTUIR

Research Translation Core

Justin Teeguarden, Ph.D, DABT, Leader, PNNL
David Stone, Ph.D, Co-Leader, OSU
Naomi Hirsch, EdM, Project Coordinator, OSU
Sean Ross, Network Admin, OSU

Questions/Comments?

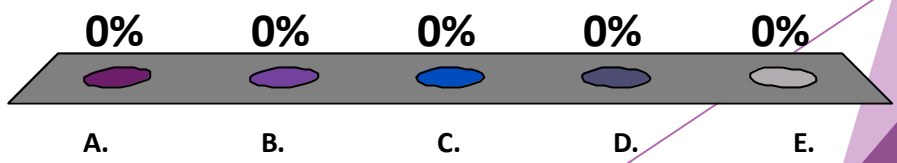
Second PTAP Project: Communicating Bioavailability of Arsenic and Lead in Soil at Superfund Sites

University of Arizona Superfund Research Program

University of North Carolina at Chapel Hill Superfund Research Program

What is relative bioavailability?

A. Amt. of contaminant in the body vs. amt. in the body after exposure
B. Amt. of contaminant absorbed into the body from soil vs. from food/water
C. Amt. of contaminant absorbed into the body by children vs. adults
D. Amt. of contaminant absorbed into the body in human vs. animal models
E. Hold on – what's bioavailability anyway?



Second PTAP Project: Communicating Bioavailability of Lead and Arsenic in Soil

Background

What is (absolute) bioavailability? Generally, bioavailability is defined as the amount of a contaminant that is absorbed into the body following skin contact, ingestion, or inhalation.

What is relative bioavailability? Relative bioavailability is how much of a contaminant is absorbed from soil as compared to how much of that contaminant is absorbed from food or water.

EPA incorporates bioavailability information to refine risk estimates and cleanup levels while maintaining human health protectiveness at Superfund sites.

EPA Technical Review Workgroup: Bioavailability Committee (BAC)

- Goal: promote consistent applications of best science practices in assessments of oral bioavailability of metals in soil for site investigations and human health risk assessments.
- The initial focus of BAC activities was on validation of methods for assessing soil arsenic and lead bioavailability.
- Provide technical expertise in support of regional requests, and identify research needs to address data gaps relevant to contaminant bioavailability in soil site assessment activities
- BAC includes members from the EPA Regions, and Headquarters (Office of Superfund Remediation and Technology Innovation and other program offices)

UNC Superfund Research Program

Advancing biologically-based risk assessment

- Exploring how our bodies respond to toxic chemicals
- Identifying biological signals that show we have been exposed
- Developing sampling techniques that reflect actual exposures
- Evaluating effectiveness & by-products of bioremediation

Director: Jim Swenberg, PhD
Deputy Director: Rebecca Fry, PhD

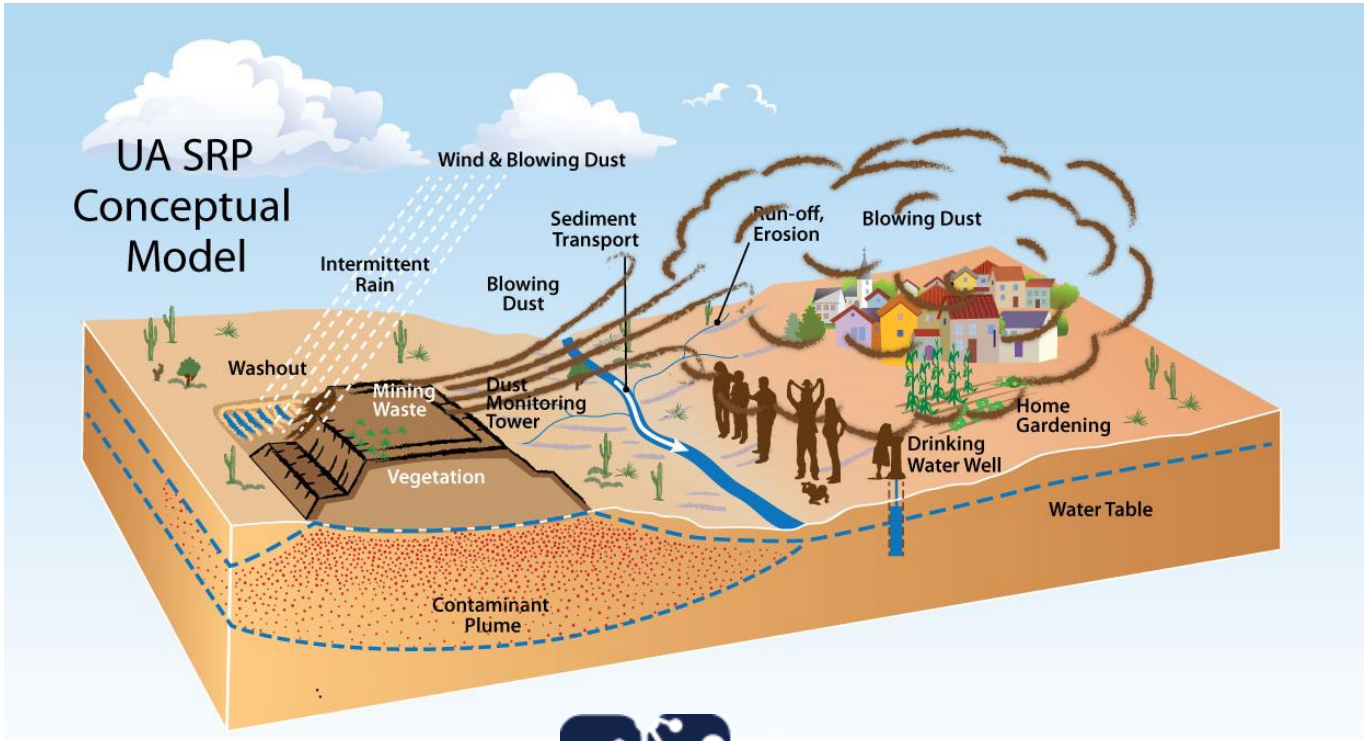
UNC GILLINGS SCHOOL OF GLOBAL PUBLIC HEALTH

Srp Superfund Research Program

NIEHS Superfund Research Program at the University of Arizona:

Hazardous Waste Risk and Remediation in the US Southwest

Theme: Mitigation of the human health and environmental impacts resulting from hardrock mining with an emphasis on arid and semiarid environments.



Director: Raina M. Maier, PhD
Associate Director: R. Clark Lantz, PhD

Superfund Research Program
The University of Arizona

Original Task:

Develop educational materials for the general public on **relative bioavailability** of arsenic and lead in soil at Superfund Sites (non site-specific)

Is the audience at this technical level?

Revised Task:

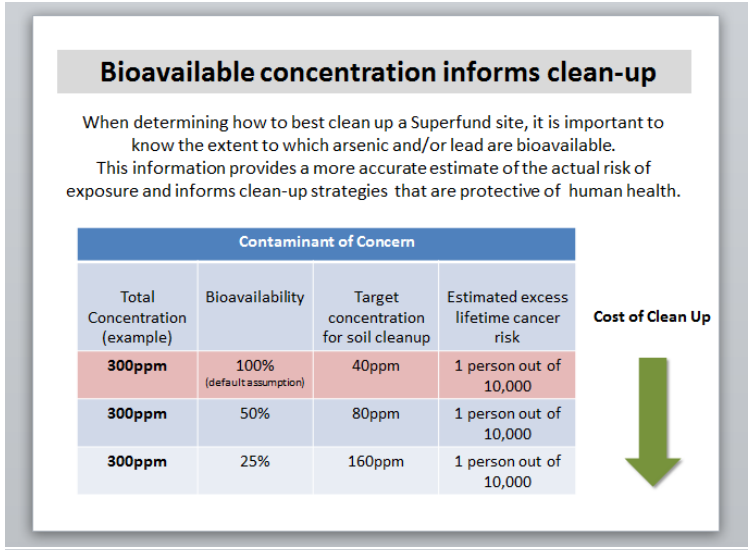
Develop educational materials for the general public on **bioavailability** of arsenic and lead in soil at Superfund Sites (non site-specific)

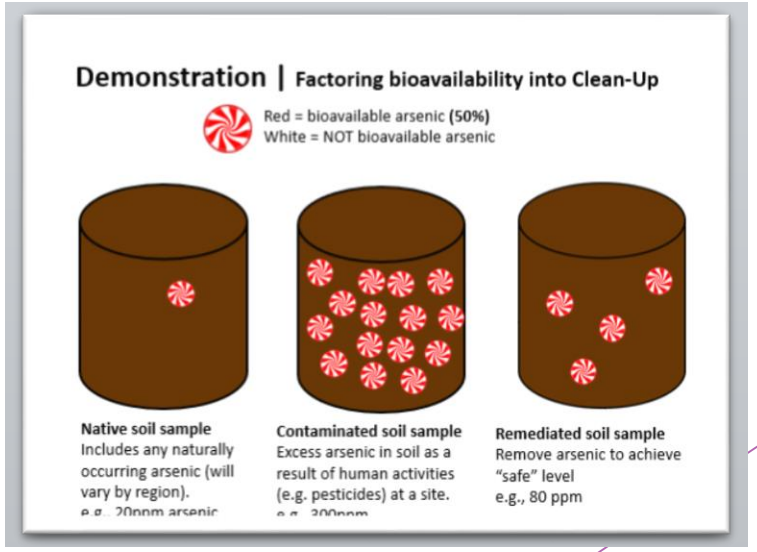
Communicating about Bioavailability of Arsenic and Lead in Soil at Superfund Sites

Key messages

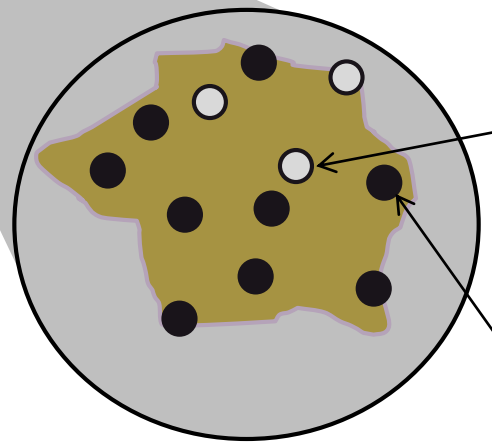
1. Arsenic/lead present in soil must be bioavailable in order to pose a risk to human health.
2. Bioavailable forms of arsenic/lead will be absorbed into the body following exposure.
3. EPA incorporates bioavailability information to refine risk estimates and cleanup levels while maintaining human health protectiveness.
4. Individuals can take steps to limit their exposure to these contaminants.

Creation of Educational Materials for Impacted Communities: Infographics





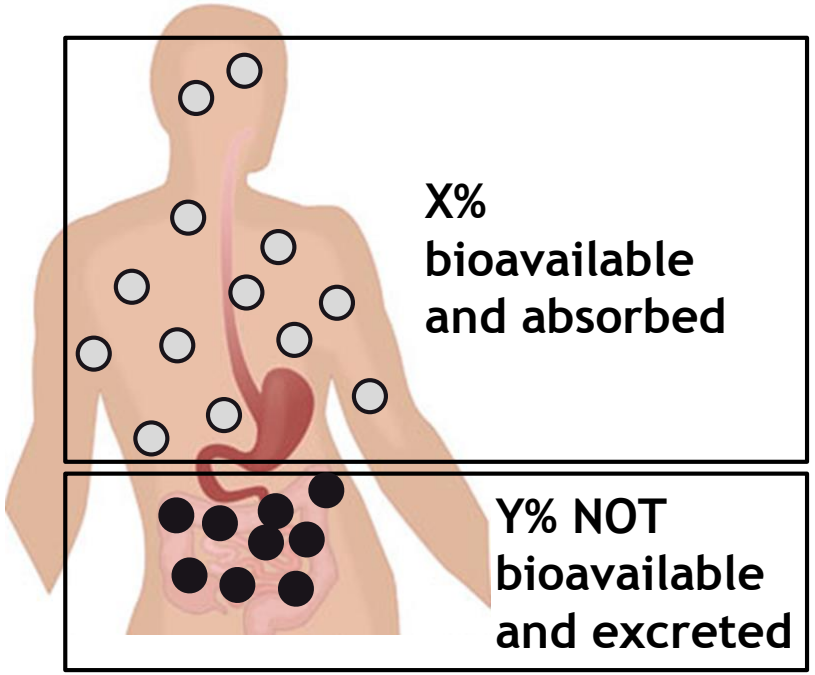
What happens when total soil concentration is **greater than bioavailable concentration?**



Contaminated Soil Sample

Bioavailable (light circle)

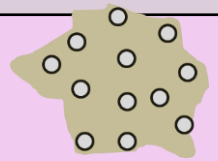
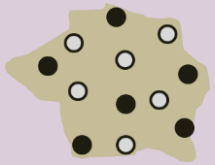
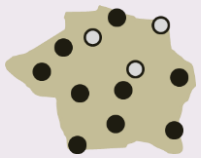
Not bioavailable (dark circle)



Bioavailable Concentration Informs Cleanup

When determining how to best clean up a Superfund site, it is important to know the extent to which arsenic and/or lead are bioavailable. This information provides a more accurate estimate of the actual risk of exposure.

EXAMPLE ONLY

Example Arsenic Contamination				
Total Concentration (example)	**Bioavailability**		Target concentration for soil cleanup (example)	Formula for target concentration
200ppm	**100%** (default assumption)		40ppm (state specific target)	-
200ppm	**50%**		80ppm	If 50% bioavailable then site can be cleaned to 80 ppm (40 ÷ 50%)
200ppm	**25%**		160ppm	If 25% bioavailable then site can be cleaned to 160 ppm (40 ÷ 25%)

Interactive Activity

Bioavailability Demonstration

One Candy = 20ppm arsenic

Red part = **bioavailable arsenic (25%)**
White part = NOT bioavailable arsenic

Red part = **bioavailable arsenic (50%)**
White part = NOT bioavailable arsenic

Native soil sample includes any naturally occurring arsenic	**Contaminated soil sample** human activities result in excess arsenic	**Remediated soil sample** excess arsenic removed to achieve target clean-up level
20ppm **arsenic**	200ppm **arsenic**	40ppm **bioavailable arsenic**

How many candies in each soil sample?

Bioavailability Demonstration

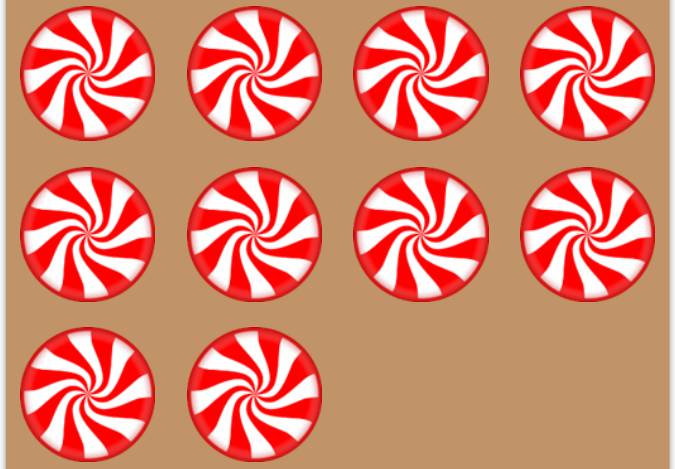
One Candy = 20ppm arsenic 

Red part = **bioavailable arsenic (50%)**
White part = NOT bioavailable arsenic

Native soil sample
includes any naturally occurring arsenic

20ppm **arsenic**

Contaminated soil sample
human activities result in excess arsenic



200ppm **arsenic**

Remediated soil sample
excess arsenic removed to achieve target clean-up level

40ppm **bioavailable arsenic**

Bioavailability Demonstration

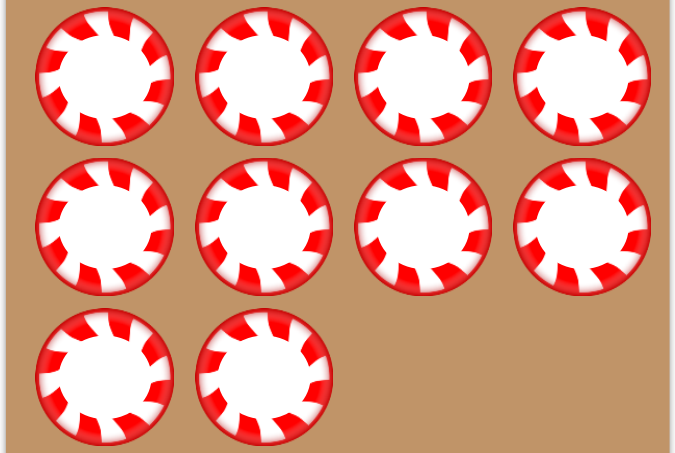
One Candy = 20ppm arsenic

Red part = **bioavailable arsenic (25%)**
White part = NOT bioavailable arsenic

Native soil sample
includes any naturally occurring arsenic

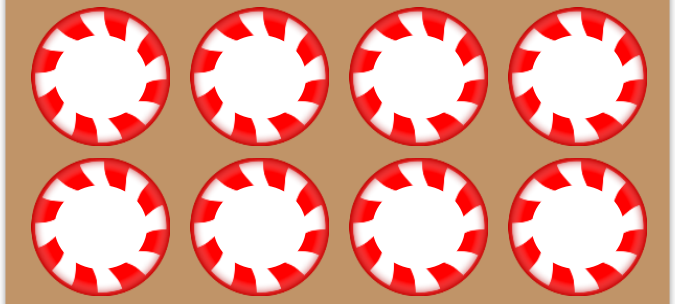
20ppm **arsenic**

Contaminated soil sample
human activities result in excess arsenic



200ppm **arsenic**

Remediated soil sample
excess arsenic removed to achieve target clean-up level



40ppm **bioavailable arsenic**

Comparing Bioavailability

bioavailable arsenic (50%)

bioavailable arsenic (25%)

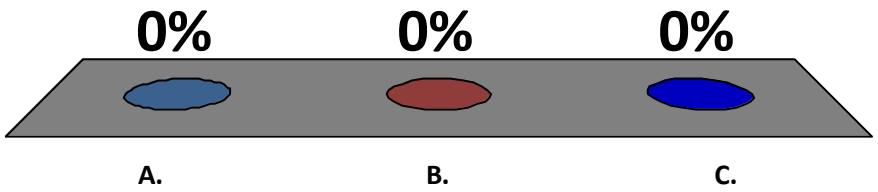
One Candy = 20ppm arsenic

Remediated soil sample
excess arsenic removed to achieve target clean-up level

Remediated soil sample
excess arsenic removed to achieve target clean-up level

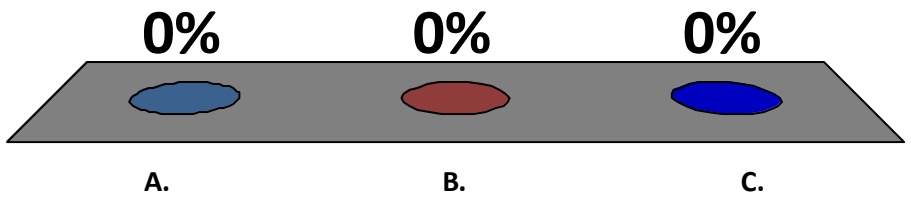
Did this activity help you better understand the concepts of bioavailability?

A. Yes
B. No
C. Yes, but it still needs work



Can you envision using this activity in community settings?

A. Yes
B. No
C. Yes, with some changes



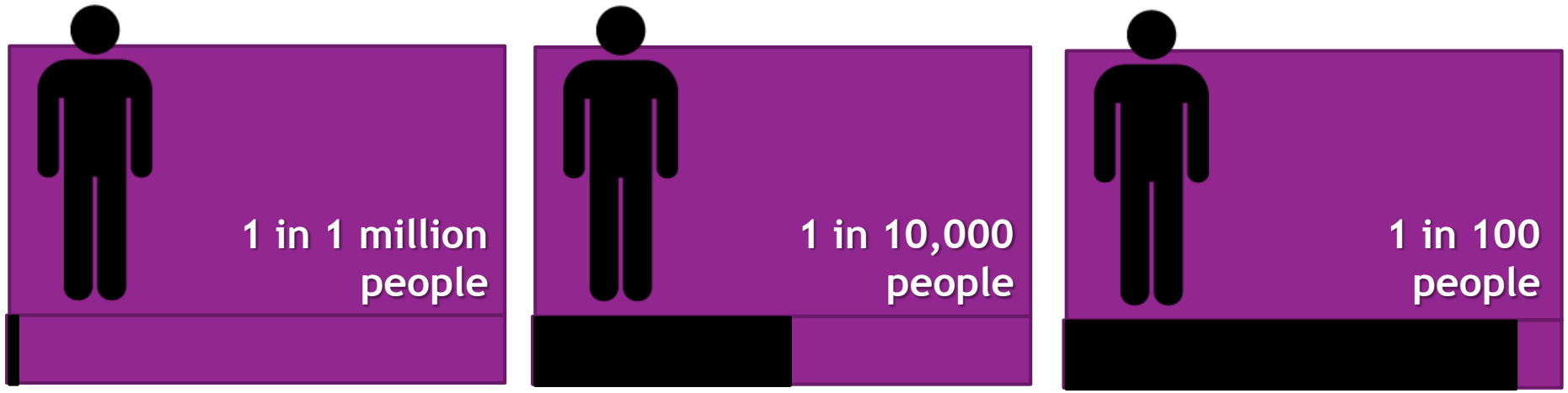
Adjusted Soil Cleanup Level Is STILL Protective of Human Health

Factoring bioavailability into adjusted cleanup goals does not alter cancer risk.

EXAMPLE ONLY

Example Arsenic Contamination			
Arsenic Total Concentration (example)	Arsenic Bioavailability	Target concentration for soil cleanup	**Estimated excess lifetime cancer risk**
200ppm	100% (default assumption)	40ppm (state specific target)	**1 person out of 10,000**
200ppm	50%	80ppm	**same**
200ppm	25%	160ppm	**same**

Estimated Excess Lifetime Cancer Risk & Implications for Site Cleanup



Very Low
Need for cleanup action is unlikely at a site.

Low to Moderate
Long-term risk is still low but need for cleanup is more likely.

High
Need for cleanup action is likely at a site since shorter term and/or acute health effects may be possible.

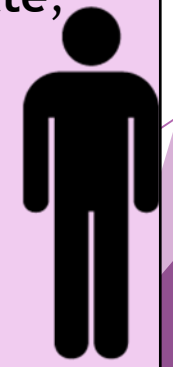
Adjusted Soil Cleanup Level Is STILL Protective of Human Health

Factoring bioavailability into adjusted cleanup goals does not alter cancer risk.

Note: This slide is an alternative approach compared to slides above that address excess lifetime cancer risk

EXAMPLE ONLY

Example Arsenic Contamination			
Arsenic Total Concentration (example)	Arsenic Bioavailability	Target concentration for soil cleanup	Cancer Risk
200ppm	100% (default assumption)	40ppm (state specific target)	**Low to moderate,** even if exposed to the soil for decades
200ppm	50%	80ppm	
200ppm	25%	160ppm	



You can take simple steps to reduce your exposure to contaminated soils or dust.

Practice safe gardening:

-Don't eat food, chew gum or smoke when working in the yard

-Wash and peel all garden produce

Take shoes off at the door

Clean pets' feet and fur at the door

Wash hands after handling soil or playing outside

Use damp (not dry) mopping / dusting

Be aware of other sources of exposure (e.g. drinking water) and seek to minimize your total exposure

Thank You!

University of Arizona Superfund Research Program

University of North Carolina at Chapel Hill Superfund Research Program

PTAP Pilot Lessons Learned

- **Leverage existing resources/Conduct thorough research on existing resources and expertise prior to beginning the project**
- **Scoping meeting is important**-Set expectations and plan project parameters at a meeting with EPA site team, project leads, and interested PTAP partners.
- **Provide Opportunities for Trainees**-OSU graduate students worked on the videos and materials and were able to interact with the community and learn more about the site
- **Work with other colleges/universities**-It benefits colleges/universities to have better collaboration amongst themselves, and benefits the PTAP projects by sharing resources and their wealth of expertise

Thank You!

Questions?