Environmental Toxicology

Office of Environmental Health

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ADHS’ Relationship with ATSDR

• **Funding:**
  – ADHS OEH’s Risk Assessment and Health Consultation Services Program is funded by a cooperative agreement with the ATSDR (The Agency for Toxic Substances and Disease Registry)

• **Purpose:**
  – To respond to requests to evaluate potential environmental impacts on public health and provide technical guidance for site activities, while using the best available science

• **Outcome:**
  – This partnership provided ADHS with the necessary resources to investigate environmental health concerns and report findings
ADHS’ Relationship with regulatory agencies

• ADEQ: the Arizona Department of Environmental Quality (state agency)
• EPA: the Environmental Protection Agency (federal agency)
• ADEQ and ADHS
  – Directors both report to the governor of Arizona
  – ADEQ is primarily regulatory, ADHS is primarily advisory
Environmental Toxicology Program

• Responds to communities where people might be exposed to hazardous substances in the environment
• Determines how hazardous a site is or has been
• Recommends actions that need to be taken to safeguard the health of community residents
Environmental Toxicology Program (continued)

- Educates communities statewide about hazardous chemicals and substances
- Involves communities when responding to their environmental public health concerns
How we get involved

• A site is on or proposed for the U.S. Environmental Protection Agency’s Superfund National Priorities list (EPA’s NPL)
• Other federal, state or local agencies request our help
• A community member requests help
Environmental health

Q: What are hazardous substances?
A: Air, soil, water, food

Q: Where do you find hazardous substances?
A: Eating, drinking, breathing, touching

Q: What is an exposure pathway?
A: Eating, drinking, breathing, touching

Q: What is exposure?
Environmental Toxicology Program

• Gathers community concerns and information about the site
• Identify ways people might come in contact with hazards and the effects of that contact;
• Communicate final results and recommendations, and complete follow-up activities
How we will communicate with communities

- Public meetings
- Fact sheets
- Web site
- Other
Evaluating health impacts

- Public health assessments
- Health consultations
- Technical Assists
- Health Education
Once it appears that a hazardous substance has been released, we ask:

**Is environmental data available to evaluate the potential exposure?**

- **NO**
  - Other agency (such as U.S. EPA) is requested to do sampling

- **YES**
  - How much data are available?
    - A lot of data and or multiple pathways
    - 1-2 pathways OR specific question

- Public health assessment
- Health consultation
What is a Health Consultation?

• Specific public health issue
• Current exposures to toxic material
• A way for ADHS to provide health information and to make recommendations for actions to protect the public's health
Health Consultation Process

- Gather available data
- Identify chemicals of concern
- Evaluate exposure pathways and duration
- Calculate dose
- Make a health conclusion
- Finalize and distribute report
Analyzing the data

• Data come to us in “raw” format and are studied by our toxicologist.

• They are then compared to information we know about the community.
  – Remember: A contaminant cannot affect someone unless they come into contact with it.
Determining exposure

• Exposure pathways
  – Who are the exposed people?
  – How were these people exposed?

• Exposure Dose
  – How often did the exposures occur?
  – How much of the chemical were people exposed to?
  – How long did the exposures last?
Information Needed to Evaluate Exposures and Health Effects

- Environmental Sampling Data
- Site History
- Toxicological Data
- Health Outcome Data
- Fate and Transport Data
- Exposure and Demographics Data
- Medical / Epidemiologic Data
Exposure Pathways

1. Source (drums)

2a. Release & Migration (volatilization)

2b. Environmental Media (air)

3. Exposure Point (ambient air)

4. Exposure Route (inhalation)

4. Exposure Route (ingestion)

5. Potentially Exposed Population (residents)

2b. Environmental Media (groundwater)

3. Exposure Point (Private wells)

2a. Release Mechanism (leaching)
Health Based Comparison Values vs. Exposure Dose

- NOAEL = No Observed Adverse Effect Level
- LOAEL = Lowest Observed Adverse Effect Level

- Assess the relevance of the critical study
- Review other dose-response data

Uncertainty Factor (3 - 1000 X)
Response

• “Dose makes the poison”
• Chemicals cause their effects (either harmful or beneficial) by changing the way cells function

<table>
<thead>
<tr>
<th>Toxicant</th>
<th>Acute Toxicity</th>
<th>Chronic Toxicity</th>
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</thead>
<tbody>
<tr>
<td>Ethanol</td>
<td>CNS depression</td>
<td>Liver cirrhosis</td>
</tr>
<tr>
<td>Arsenic</td>
<td>gastrointestinal damage</td>
<td>Skin/liver cancer</td>
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</tbody>
</table>
Health Consultation Conclusions

**Hazard**
1: Urgent Public Health Hazard
2: Public Health Hazard

- Health advisory
- Measures to stop or reduce exposures
- Health education
- Health studies / surveillance

**No Hazard**
4: No Apparent Public Health Hazard
5: No Public Health Hazard

- Health education
- Possible health surveillance
- Measures to prevent future exposures

**Unknown**
3: Indeterminate Public Health Hazard

- Further characterization of site-related exposures, where possible
- Health education
- Health studies / surveillance
Final steps

• Present the final report to the community
  – Answer questions
  – Provide contact information for follow-up questions
• Post final report on ADHS website
• Return as needed to the community
  – Ex. Site updates
Contact Information

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