

BREAKOUT SESSIONS

Overview

Breakout sessions comprised four hours of the seven hour meeting the majority of the day. During the breakout groups, participants provided input on the topics of future *National Conversation* work groups. Participants could choose to attend any of the following group discussions:

Topic	Description
Monitoring	Collecting information on chemical use, exposure pathways, exposure levels, and health outcomes
Scientific Understanding	Filling knowledge gaps on the health effects of chemicals
Policies and Practices	Reducing harmful chemical exposures and adverse health outcomes, eliminating inequities, and spurring the development and use of safer alternatives
Chemical Emergencies	Preventing, preparing for, and responding to acute chemical incidents
Serving Communities	Addressing local chemical exposure concerns to promote environmental justice and improve health
Education and Communication	Ensuring a well-informed public and a competent network of health care providers

Session Summaries

Summaries of discussions held in each of the six breakout groups follow. These summaries serve as compilations of the points raised by the participants in each session. They do not provide direct quotations, and they may not reflect the opinions of all participants in that group.

National Conversation work groups may not address each point raised in the breakout session discussions. Work group members will receive these session summaries and will refer to them to help guide their work. The session note takers and facilitators reviewed these summaries. In most cases the work group chair and NCEH/ATSDR senior staff liaison reviewed them as well.

The views expressed in this summary are not necessarily those of the Centers for Disease Control and Prevention or the Agency for Toxic Substances and Disease Registry and do not reflect any agency determination or policy.

Monitoring

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Framework for Discussion

Information on chemical use, exposure pathways, exposure levels, and health outcomes is collected for a variety of reasons, including regulatory, clinical, and public health purposes. To address issues related to public health and chemical exposures, there is a need to better use the data already being collected, and to further broaden the information that is collected. This discussion explored what a comprehensive monitoring system might look like, and how we might move toward such a system.

Key Themes

Chemical Use and Release

A broad examination of chemical use and disposal is essential to address proactively environmental public health. Examination of chemicals from the point of their use and release also is necessary for providing screening tools and for assessing progress.

Environmental Monitoring

Monitoring of environmental media occurs through a variety of initiatives carried out by local, state, and federal agencies. Knowing which chemicals are present in air, water, soil, dust, food, and elsewhere is an important step in determining to which chemicals people are exposed and how exposure might occur.

Biomonitoring

Efforts to measure exposure to chemicals by directly studying substances in human blood, urine, or other specimens are underway at CDC and other agencies. Identifying and addressing data gaps and issues of biomonitoring data interpretation will be important tasks as biomonitoring efforts continue to advance.

Health Outcome Surveillance

Examining human health outcomes is a critical component of monitoring. Surveillance of health impacts is useful as a back up screening tool for sentinel health outcomes, for research linking levels of exposure to specific health outcomes, and for program evaluation.

Items for Consideration

Items for consideration were organized by theme. They appear in the order in which they were recorded in the session.

Chemical Use and Release: Efforts

- U.S. Environmental Protection Agency
 - EPA Inventory Update Reporting (IUR)
 - EPA Biennial Reporting System (BRS)
 - EPA Toxics Release Inventory (TRI)
 - EPA Chemicals Assessment and Management Program (ChAMP)
 - EPA National Pollutant Discharge Elimination System (NPDES)
 - Pesticides programs
 - EPA National Emissions Inventory (NEI)
- U.S. Department of Agriculture's Pesticide Data Program
- Occupational Safety and Health Agency (OSHA) – Incident reporting
- U.S. Food and Drug Administration – Additive registry
- FDA's Center for Food Safety and Applied Nutrition (CFSAN)
- PHARMA – Pharmaceutical use
- Household Products database – National Library of Medicine
- Hazardous Substances Data Bank (HSDB) – National Library of Medicine
- TOXMAP – National Library of Medicine, Chemical Safety Board

Chemical Use and Release: Issues

- Confidential Business Information (CBI)
- Reporting rules
- Are people downstream of chemical use and releases aware of what's going on upstream?
- European Union's Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) regulation – implications for U.S.
- Lots of information available – Toxic Substances Control Act (TSCA) Section 8
- Voluntary nature of toxics release reporting outside of TRI
- Consumer products – consumer exposure data needed
- Precautionary principle
 - Chemical production data
- Gaps in hazard data
 - Reconstruct hazard communication standard
- Food as exposure pathway
 - Contamination of food/feed
 - Begin monitoring

Chemical Use and Release: Potential Approaches or Solutions

- Shift burden of disclosure

Environmental Monitoring: Efforts

- EPA

- Air
 - EPA – National Ambient Air Quality Standards (NAAQS)
 - EPA – Air Toxics (modeling, schools monitoring, etc.)
- Water
 - State and local
 - U.S. Fish and Wildlife Service
 - U.S. Geological Survey (USGS)
 - U.S. FDA – Total Diet Study “Market basket” (CFR and Comprehensive Epidemiologic Data Resource (CDER))
 - Consumer Product Safety Commission (CPSC)
 - National Institute for Occupational Safety and Health (NIOSH)
 - USDA – Food Safety and Inspection Service (FSIS) – National Residues Program

Environmental Monitoring: Issues

- Indoor environment
 - Need to update state of indoor air programs, National Human Exposure Assessment Survey (NHEXAS) type programs at EPA, etc
- Workplace – National Occupational Exposure Survey (NOES)/integration
- Connection federal to state/local/tribal

Biomonitoring: Efforts

- CDC – National Health and Nutrition Examination Survey (NHANES)
- States
- Workplaces
- Clinical
- U.S. DOI/USGS – Fish/Wildlife integrate sediment and water
- National Children’s Study

Biomonitoring: Issues

- Banking samples
- Health Insurance Portability and Accountability Act (HIPAA)
- Institutional Review Board (IRB)
- Confidential Business Information (CBI)
 - CBI prevents distribution of data
 - Revisit CBI provisions of national chemical policy
 - “Reasonably available” information
- Green chemistry
- Gaps in information on chemical use
- Identify and take action on chemicals of concern
- National Biomonitoring Program not state-specific
 - Have resources for lab capabilities
 - Field work on exposure (expensive)
 - Partnering for population-specific data
 - Community-specific concerns
- Spatial Resolution
- State-level HANES → Environmental
 - States
 - Partnerships
 - NHANES

- Timing
- Work on exposures happening in the past; cumulative exposure, aggregate
- Vulnerable populations
- Interpretation
 - For non-blood samples
 - For non-persistent
 - Risk
- Expanding effect marker surveillance
- Public education and communication
- Cost/constraints on storage
- Look at Association of Public Health Laboratories (APHL)
- Draft report (Google.org)
 - Syndromic surveillance –National Biosurveillance Strategy for Human Health (NBSHH)

Health Outcome Surveillance: Efforts

- Environmental Public Health Tracking
- Vital stats
- Pulsenet
- Foodnet/Outbreaknet model for chemicals
- CDC/National Center for Health Statistics (NCHS)
- National Health Interview Survey (NHIS)
- National Hospital Discharge Survey (NHDS)
- Surveillance Epidemiology and End Results (SEER)
- Agency for Healthcare Research and Quality (AHRQ)
 - Healthcare Cost and Utilization Project (HCUP) data
- Clinical
 - Individual
 - Events and Incidents
- Poison Control Centers
- ATSDR/State/Local community studies
- CPSC
 - Numerous databases exist, but they are not accessible without a Freedom of Information Act (FOIA) request
 - Incident reports (not integrated)
 - National Electronic Injury Surveillance System (NEISS)
- NIOSH/SENSOR
- Purdue University Center for Environmental and Regulatory Information Systems (CERIS)
 - National Pesticide Information Retrieval System (NPIRS)

Health Outcome Surveillance: Issues

- Physicians as reporters
 - Education
 - Time
 - System
 - Do physicians have necessary training and access to testing needed?
 - Training and labs needed
- Emergency room surveillance system – improve data collection on chemical hazards
 - Physicians, nurses, and other care providers can play critical role
 - Education and way to report (e.g. hotline and website)

- Way for physicians to feed information – look for patterns
 - Database of chemical hazard information to share
- Right outcomes?
 - Environmental illness
 - Neurodevelopmental disorder disease registries
 - Birth outcomes
- Restrictions on use of data
 - HIPAA
- Making better use/integrating what's out there on acute exposures/events
- Ability to interpret trends for chronic issues

Cross-Cutting Issues

- Helpful to have framework
- Need to identify all of the questions
 - Tailor data collection to questions and models
- Integrating occupational health
 - Work more with NIOSH
 - Studies needed - massive focus on prioritized worker HANES
 - NIOSH exposure study/data – outdated
 - Web survey under consideration
- Challenge of reporting to more than one place
- Mixtures
- Time-sensitive exposures – hard to get time consistency
- Need information to get at vulnerability
- How do we determine impacts of all chemicals/compounds including those we don't know?
 - Education of the public
- Monitoring and modeling
 - More attention to modeling needed
 - Tool to assess options, non-detects
 - Stressors → outcomes, etc.
- Coordination/redundancy
 - Unified prioritization and data collection (including modes of action, production volume and potency) scheme across agencies
 - Disconnect of data (e.g. National Health and Nutrition Examination Survey [NHANES] and American Housing Survey)
 - Integrated survey system (e.g. health and housing)
 - Connect dots – exposures, chemicals, health effects: Where are data?
 - Need single surveillance system – chemical effects (especially acute)
 - National system (e.g. Hazardous Substances Emergency Events Surveillance System [HSEES])
 - Identify surveillance gaps and collectively go after resources
- Well-managed collection of samples – ID new chemicals
 - e.g. placenta
 - National sample bank
 - e.g. fish archives/banks
 - NHANES
 - National Child Longitudinal Study
- Time/space scale, format
- Technology – GIS, nanotechnology – cell phone technology to monitor sudden events and alert people

- Light Detection and Ranging (LIDAR)
- Kid-Safe Chemicals Act
 - Many provisions similar to REACH – precautionary principle, etc.
 - Opportunity to integrate these discussions
- Public access and usability
 - Should be lots of data available, but kept confidential
 - Balance of proprietary data and right to know
 - Communicate benefits of sharing data to companies
 - Agencies don't know how to help people get monitoring data
 - No control of application of pesticides in homes/buildings
 - Funding for testing
 - No guidance/support
 - Mechanism of action/response
 - Immediate feedback on syndromes/exposure
 - What information gets fed back?
 - CDC
 - Sentinel events (but doesn't help with surveillance)
 - Doesn't associate exposures with syndromes
 - Collaborate in designing input
- Situational awareness

Scientific Understanding

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Framework for Discussion

The discussion of scientific understanding revolved around several themes, but two main themes emerged: (1) the need to re-examine the current risk assessment paradigm and its link to decision making; and (2) the opportunity for enhanced data-mining from established data sets, ongoing research, and new research. Discussion included various ideas about how rapidly changing science can better inform both regulatory and non-regulatory decisions made by a range of actors, including federal agencies; state, local and tribal governments; industry, and the public. Deliberations also highlighted the critical role science plays in addressing public health and chemical exposures, and therefore, the importance of evolving risk assessment models to better take into account many key pieces of information, such as emission rates and sources of chemical pollutants; exposure pathways; timing and level of exposures; effects of emerging issues such as nanomaterials; the power of various tools and health studies; which dose-response curves best explain the toxicity of a pollutant; health impacts of chemical mixtures; and identification of vulnerable populations, among others.

Key Themes

Data Mining

Gaps in scientific data and understanding must be clearly identified and then strategically addressed wherever possible. Both obtaining more epidemiological and clinical data from currently existing studies and performing additional studies are necessary, as is linking currently fragmented data sets to provide more robust information.

Revisiting the Risk Assessment Paradigm

The current risk assessment paradigm needs to be re-examined and enhanced to better assess public health consequences related to chemical exposures. Ways to address risk at the individual, population, community, and global levels are all necessary.

Chemicals in Communities

The US approach to understanding the local public health consequences of chemical exposures has shortcomings. Better interaction and ongoing dialogue between scientists and concerned community members should yield increased understanding, better assessment, and decision making. Scientific knowledge, along with information about the limitations of science, must be disseminated to all parties, including people affected or potentially affected by hazardous chemicals.

Specific Items for Consideration

Priorities/Unmet Needs by Theme

Data Mining

- Greatest number of people exposed must help drive priorities
- Collaborative efforts (cross-agency)
- Existing data
 - We need a national inventory of current data and a plan outlining how to act on existing data a timely fashion.
 - How can National Health and Nutrition Examination Survey (NHANES) data be used?
 - Access to data (e.g. physician data)
- Expansion of data currently being collected (e.g. NHANES – pool data for sample)
 - More extended analysis and collection of data → look at the tails of NHANES study; but there are confidentiality issues with doing this.
 - Look at number of chemicals present in a single person
 - Complete greater in depth studies
 - Morbidity/mortality data are collected but not linked to environmental data
 - Link with other efforts (e.g. state/local efforts)
- Exposure information
 - Look at new exposure scenarios and different populations (e.g. mobile versus non-mobile sources, elderly populations)
 - Essential for understanding health outcomes
 - Lacking for consumer products
 - We need to know more about sources; information about industrial chemicals is lacking
 - Models of exposure
 - Identification of highly vulnerable/highly exposed populations – consider lifestyle, nutrition, housing, work, etc.
- Need to better understand upstream outcomes and health impacts, as well as downstream impacts
- Need to consider an array of outcomes (i.e. understand outcomes beyond cancer)
- Biomonitoring and how to interpret data
- Data generators and data users should be sitting in this room together
- Science around low exposure and changing environment to increase health in communities
- Bring environmental physicians into discussion and have them help design clinical studies – We can mine lots of data and information from experience
 - Consider molds and mycotoxins and other “natural” toxic materials.
 - Establish positions for these physicians at government agencies
- House dust

- Key pathway, especially for children. We need more research.
- Multiple mechanisms that affect a single disease (e.g. thyroid diseases) allow population level shifts
- Factors of susceptibility for endocrine disruption
- Chemical mixtures
 - How to best look at mixtures/classic compounds that act same (e.g. thyroid hormone disruption)
 - Maximize analysis of samples already collected
 - Collapse → what's in 1 sample
 - Models: short-term assays
- Computational toxicology – changing language
- Translational research
- Simple models (toolkits)/maximum data – collapse data to extract most
- Funding for collaborations

Revisiting the Risk Assessment Paradigm

- Broaden model to involve communities and whole populations and their problems
- Need different models – can't do chemical by chemical
- How to develop most effective models and engage communities
- Changing use of biomarkers for disease
- How do we accelerate the risk assessment process? → Action
- Approach shift → Does REACH have something to offer?
- Look beyond inferential statistics; impacted people are not normally distributed
- A pathways paradigm
- Confidence in tools
- New paradigm to address community risk assessment - cumulative impact assessment?

Chemicals in Communities

- How to communicate information to those who need it
- Technical assistance to communities
 - EPA Technical Assistance Grants (TAGs) are only for Superfund sites so other communities fall through the cracks
 - Interpretation
 - Conduct own analyses
 - Training
- Engage and listen to communities
- NIEHS and other agencies need to do community-based participatory research (CBPR) to learn how to communicate scientific information
- Community partnerships
- Protocols for community engagement (e.g. Superfund sites)

Ideas/Possible Solutions by Theme

Data Mining

- Extract data and merge information collection and interaction with community – link to health IT so the appropriate data fields are integrated
- Follow up NHANES tails of distribution/cross section of longitudinal design
- Environmental public health tracking
- Collaborative effort among stakeholders

- Disease incidence registry for all US
- Inventory of resources (fragmented) – how to better connect?
- Accessibility to data
 - Cross agencies
 - International
 - Public – community level
- Privacy must be balanced with data mining and can be accomplished in the development of electronic records
- Need quality controls for data collection
- NAS “Toxicology Testing in the 21st Century: A Vision and a Strategy” – concerted global effort to implement could change the playing field; very concerted effort would mean better science feeding into risk assessments
- Standardization of protocols to make possible mining of data
- How to integrate new models with current models to make complete decisions
- Communication and coordination to minimize duplication
- Exposure
 - Natural substances – mold and mycotoxin exposure needs to be brought into assessment
 - Getting exposure in different locations (indoor/outdoor, etc.)
 - Baseline exposure and other exposure/problem
 - Look at consumer products
 - More reliance on lifecycle analysis
 - How to interpret biomonitoring data
 - How radiation changes health impact when exposed to toxics?
- Multiple impacts at health sites
 - Cumulative exposures
 - What effects do we see?
 - Normal
 - Adaptive
 - Problem
 - We have new tools to do this → incorporate in human models
- Individual (body) – impacts on particular areas
 - Thyroid
 - Nervous system
 - Cumulative evaluation of impact on biological system or tissue
 - Rethink models

Revisiting the Risk Assessment Paradigm

- Approach from individual health perspective
- Assessment of ill individuals should inform risk assessment
- Paradigms for risk assessment
 - Incorporating new methodologies
- What would we need to know from individual health paradigm – granularity of information is important
- Paradigm change → How to add susceptibility/exposure information for community decisions?
- Use past experience with similar problems to develop approach to emerging issues (i.e. diesel particulates and asbestos can inform our approach to nanotech)
- Green chemistry → evaluate more rapidly
 - Paradigm: Encourage greener substances
- Different ways of conducting risk assessment (community impacts, non-inferential/small groups)

- There is a gap between the precautionary principle and strict science.
- It is not precaution versus science; it is what action we can take based on what we know.
- NAS framework has gotten us somewhere – we shouldn't throw out 25 years of work

Chemicals in Communities

- Develop productive exchanges between community and scientists
- Find out what is not being addressed
- Explain who does what in government agencies
- Do we need to reconfigure missions to better serve community needs?
- Intermediaries (e.g. media) between communities and scientists compounding problem of complicated information
- Communities need access to a pool of independent scientists with resources and time to listen to and discuss issues with the community
- Currently ATSDR and states do assessments
 - Re-think this – Consider competitive grants to have other groups (e.g. local universities) compete for opportunity to do health assessment
- Community representatives on independent review boards for studies/health assessments
 - Provide study design to review board before study is done
- When approaching community for community-based decisions, gather/exchange information at the level of the individual; ask, “What can you do to improve your health?”
- Dialogues between communities and scientists; share/access research
 - Avoid loopholes in any consent decrees to ensure people are protected

Additional Thoughts

- Occupational environment must be included
- Recognize and come to grips with the limitations of science
 - How do we do this?
- Failed public health infrastructure
 - Need to address gaps we see and improve public health
- Make sure science is timely so we can implement the best interventions/actions
- What is the role of science and what needs to change to better achieve health outcomes?
- Can EPA issue a policy statement that people need to reduce their individual toxic load?
- Short-term versus long-term
- Clarification of ATSDR's role at sites – re-write the mission?
- Levels of action
 - Community
 - Nation
 - New product – have an understanding of chemicals in products before they are released

Policies and Practices

Participants*

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Framework for Discussion

Policies and Practices is a very broad topic, encompassing the extensive array of tools that is used or might be used to address public health as it relates to chemical exposures. Policy instruments might affect many exposure issues, including the nature and levels of exposure and associated health risks and effects; the elimination of inequities, including considerations of individual susceptibility and broader issues of justice and disparities; and attempts to prevent exposures from ever occurring. Furthermore, information gaps between government agencies and the public can make more difficult the important tasks of assessing current policies and recommending steps for improvement. Participants offered advice on approaches for framing the discussion, specific suggestions of actions to consider, and advice about the process for the National Conversation.

Key Themes

Reducing Harmful Exposures and Health Risks/Effects

Steps should be taken so that policies and practices achieve the desired outcome of decreased health impacts from hazardous chemical exposures. Concepts include burden of proof, reframing the theme to focus on reducing the hazard rather than exposure, being transparent about gaps in information, and the linkage to the other key themes identified, including vulnerable populations and prevention.

Eliminating Inequities

When reducing harmful chemical exposures and negative health impacts, it is critical to ensure that susceptible individuals and vulnerable populations are identified and protected from hazardous exposures.

Prevention

Prevention plays an important role in public health protection from harmful chemical exposures. Ideas about how policy should promote prevention differ (e.g. whether or not to adopt the precautionary principle as a default, and if so, what acting on this principle looks like in practice).

Advice about the Process for the National Conversation and Key Actors to Include

Many parties have a stake in these issues and should be part of this discussion. Several groups should be represented as this project moves forward. The *National Conversation* requires transparency, community engagement, and a “goals-based” framework..

Specific Items for Consideration

Specific Points by Theme

Reducing Harmful Exposures and Health Risks/Effects; Eliminating Inequities

- Focus more on reducing hazards than exposures.
- Agencies should be proactive not reactive.
- Toxic Substances Control Act (TSCA) reform is critical
- Ways need to be found for scientists and communities to work more effectively together so the right questions are asked
- Need a federal system to deal with environmental exposures in school settings and ways for federal agencies to intervene in the schools
- Agencies need to do a better job of avoiding silos
 - CDC should work with more than the state/local public health systems (e.g. with managers of state/local parks/playgrounds)
- Consider mandated environmental health coordination programs in each state modeled after a 2008 DC ordinance, to ensure better reporting systems, inter-agency coordination, and consumer access to information (e.g. about pest management).
- Consider recommending a multi-disciplinary and multi-agency federal office that focuses on child health and protection, including food safety, chemical exposures, and the built environment
- Identify and prioritize chemicals of concern based on inherent hazardous properties, overlaid with indicators of exposure. Consider a data base
- Need for transparency about what is and isn't known, less toxic alternatives, and how well enforcement is working (include, among other dimensions, the impact of genetic predispositions and deficiencies in existing policies)
- Translate scientific language/findings to ensure policy-makers have understandable, decision-relevant information; data do not constitute useful information – or information that is used well.
- Restructure the approach to ATSDR health assessments and mandate that they not be used until the approach is improved (issues include shifting the burden of proof from the community)
- Need to overcome issues regarding the proprietary nature of business information – public interest should outweigh business/proprietary interests
- Reach out to business and industry. Many recognize the value of producing products right the first time. Changing requirements may not always produce public health benefits.
- Review the definitions of green chemistry and what is and isn't known about the safety of these products; same obligation to assess hazards
- Need to support state environmental health legislation
- Review the differences among statutes in defining the standards for what is “safe” and consider harmonizing them (note the differences between CERCLA and the Safe Drinking Water Act)
- Tax policies should reflect real costs of oversight, cleanup, monitoring, and risk assessment; funding should include a multi-agency approach

- Consider recommendations in the Canadian Chemical Management Plan
- Use existing efforts as models (e.g. Maine and Washington’s movement toward alternative assessments to prioritize chemicals of concern)
- Concerns about industry compliance with the 2007 European Community Regulation REACH (the Registration, Evaluation, Authorization and Restriction of Chemical substances) – access to information and findings on REACH that will be available in 2010
- Concerns that environmental monies go to regulatory agencies rather than public health departments, but there still is a lack of regulation
- Consider policies and practices for testing blood components for heavy metals
- Consider a “Communities Right to Know” act similar to workers’ right to know (Information should be part of the public record and disclosed during real estate transactions)

Prevention

- People need information to take precautions individually
- Broaden our idea of who serves as community health promoters (e.g. barbers)
- Varying views on the precautionary principle
 - Institutionalized precaution should be the default policy – if we don’t know, we act cautiously
 - Reject the precautionary principle because science, government, and policy-makers need to provide people with information, and policy-makers are responsible for making the difficult decisions based on available information. The precautionary principle takes away that obligation.
- Identify and prioritize chemicals
- Need a database of all potential uses of a chemical, with distinctions for those that have use restrictions, those banned for specific uses and those where less hazardous alternatives exist for the given use

Advice about the Process for the National Conversation and Key Actors to Include

- The *National Conversation* should take a “goals-based” approach to help frame the conversation (e.g., see “A Common Agenda for Health and the Environment: Goals for the Next Generation and Steps to Get There”).
- Strong support for an “action oriented” agenda
- Distinguish short- and long-term action items in the recommendations.
- Transparency is crucial.
- Ways need to be found to engage communities (e.g., through news releases, meetings in communities)
 - Consider global implications – if something is banned in the U.S., it is likely transferred overseas, and the burden shifts to the receiving country. USAID should be involved; our international policy presence in the realm of environmental public health needs to be improved
 - Consider other groups, including:
 - Occupational health representatives – worker exposures must be included
 - U.S. Department of Defense
 - Agencies representing prisons
 - The Securities and Exchange Commission: They can enforce the legal obligation of businesses to disclose potential hazards.
 - The European Union: They have implemented a policy encouraging the use of the Precautionary Principle.
 - U.S. trade representatives and the World Trade Organization
 - U.S. Forest Service

- Landowners
- Manufacturers/Industry

Chemical Emergencies

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Framework for Discussion

Preparedness is a complete process in which both prevention and response are critical components. Emergency responders and receivers must have adequate training and education. This training also must extend far beyond the responders to communities, workers, schools, and others who need to be a part of this coordinated effort. The group worked to identify and assess gaps in chemical emergency preparedness and to share ideas on opportunities for improvements.

Key Themes

System and Coordination Issues

The need for coordination is paramount. Chemical emergencies involve components of various organizations at various levels (e.g. local, state, federal) and in various sectors thus, the need to find better ways for these entities to work together is immense. Duplication of efforts should be avoided to streamline preparedness and response. Prevention is a major system-wide issue.

Responder Training/Capacity Building

Persons charged with responding to chemical emergencies must be well prepared to deal with a range of hazardous situations. Gaps exist in responder information and training – both before and during emergencies. These gaps must be filled to effectively and safely address emergencies.

Community Involvement

With the ultimate goal of protecting the public from harmful chemical exposures, it is crucial that community members and workers be informed about potential risks and trained in how to prevent and respond to emergencies.

Specific Items for Consideration

Successes

- Shelter-in-place within last 25 years

- Incorporating chemical concerns into other response activities
- Planning to help systematically involve local, state, and federal authorities in emergencies
- Sensors on first response vehicles
- Making people aware that chemicals are a hazard and providing training programs
- Information about chemical production globally

Unmet Needs by Theme

System and Coordination Issues

- Catastrophic risk hazard prevention (e.g. systems preventing impacts from natural disasters)
- Should the hazard exist in the first place?
- Alternatives assessments and solutions – better systems for collecting and sharing data and lessons learned
- Recognize that all emergency response is local
- Uneven capacity to respond
- Clarification of “security” versus “safety”
- System to disseminate accurate information
- Better tools to determine hazard/chemical during response
- Coordination between local, state and federal agencies – avoid duplication
- There are differences between urban and rural responses
- Resource equity, including tools (e.g., technology, GIS, sensors) and capacity building
- Gaps in safeguarding animal and plant health and food
- Mobile sources (e.g. trains and automobiles)
- Federal government has different funding streams (e.g. transportation, FEMA) – coordination is missing
- Need better organization at state level
- Three categories: chemical production, use and disposal; natural disasters; and terrorism – different organizing principles/schemes
- Differences in technology access and dependence on putting information on the internet
- Timeliness of releasing information
- Recovery from event (environmental level, time period)
- Better emergency response preparedness (includes drills, training, communication, better coordination between agencies, and resource equities and capacity building)
- Corporate responsibility and buy-in at all levels for better emergency response and prevention
- Emergency management is a cycle: prevention, mitigation, response, recovery (loop)
- Clear plan for any sampling activities – acute and chronic
- Counting emergency events
- Universities need to share information
- Define terms

Responder and Receiver Training/Capacity Building

- Responders don't understand Hazmat events
- Firefighters are the primary group injured
- Training for volunteer firefighters
- Firefighters and other emergency responders don't know what chemicals and/or processes are in a facility
- Drills
- Chemical first receivers training

- Shouldn't only rely on sensors
- Standardize training requirements

Community Involvement

- Schools and hospitals
- Factoring of community needs (e.g. there are no evacuation options, shelter-in-place with contamination)
- Community access to information – keep data in one location, and keep it available (i.e., don't purge data after 2 years)
- Explain to communities why decisions were made, why chemicals are being produced
- Drills
- Communities are unaware of facilities and their contents and/or locations
- Corporate responsibility to communicate with communities – periodic communication between facility and community

Possible Solutions by Theme

System and Coordination Issues

- Remove duplication
- Better coordination
- Use alternative chemicals that don't harm human health
- Use/develop alternatives assessment methodology, rather than risk assessment
- Unify/coordinate funding streams
- Show best practices model and get everyone to use it
- Spotlight and study events to understand problems
- Identify barriers and what has prevented dissemination of available information/knowledge
- Federal oversight where communities are ignored
- Hazard vulnerability analysis
- Target and tailor solutions – how they apply at the local, state and federal levels
- Identify who would be stakeholders and come together to identify solutions
- State/regional training with federal and local
- Clarify the audience for this effort
- Ombudsman at each agency
- Use precautionary principle in all solutions
- Unified approach
- Green engineering

Responder Training/Capacity Building

- HazMat training standards for first responders
- Roles and responsibilities of various emergency responders
- Practice emergency drills

Community Involvement

- Publicize Bhopal to raise public awareness of chemical emergency issues
- Corporate responsibility to communicate information to communities
- Enforcement of community right to know
- Involve and empower community representation in *National Conversation* process

Additional Thoughts

- There is no one solution to better coordinate efforts; solutions need to be targeted to local, state, and national level
- Consider who the stakeholders are and who really cares about this.
- Ensure focus on key audiences to ensure fruitful process over the next 18 months.
- Why do we spend so much money on cleaning up sites when we can focus resources on corporate management prevention strategies and create an economically viable chemical production process that is sustainable?

Serving Communities

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Framework for Discussion

The discussion of community needs related to public health and chemical exposures has been in progress for years. Many of the challenges that communities face in this area today are not new; numerous reports and recommendations have been put forth to address these issues. It is time for a shift to action. Now is the time to identify and resolve the problems of the past and to collaborate to create a system that truly meets community needs.

Key Themes

Addressing Community Concerns

An atmosphere of mistrust, suspicion and frustration characterizes several communities that have been affected by hazardous chemicals over the years. These sentiments – and the reasons for them – must be acknowledged, understood, and addressed. Communities need to know that agencies are aware of the difficulties they have encountered (e.g. inaccuracy of and insufficient access to information, inadequate attention to local concerns, and at times the feeling that communities were better off before federal government involvement) and are truly committed to resolving past problems.

Moving Forward with Government Agencies

A variety of opportunities exist for government progress in serving communities. Communities have a desire for government to provide resources to build capacity for public involvement. Ongoing relationships between agencies and communities need to be established early on at sites to truly serve communities throughout the entire process.

Moving Forward with Industry

Communities have a right to know about chemical uses and releases. Access to information poses continuing challenges. The perspectives of community members and industry representatives both need to be represented.

Items for Consideration

Past Successes

- Getting lead paint out of homes (Title X in 1992 Housing and Community Development Act)
- Toxic Substances Control Act (TSCA): Recognition that we need more information, that it needs to be updated
- Recognition that there is a need for transparency and collaboration
- CERCLA tax (now expired)

Unmet Needs by Theme

Addressing Community Concerns

- Build trust
- Acknowledgment of mistakes/failures; apology
- Re-do health assessments that have errors
- Make certain all information shared with communities is written in plain English.

Moving Forward with Government Agencies

- ATSDR needs access to accurate data; can't be forced to rely on others (e.g. Department of Defense) for data at sites
- Coordination among all government agencies, consistency and agreement with process
- ATSDR's health assessments need to be accurate and peer-reviewed
- Need data on ritualistic use of mercury
- U.S. Department of Defense needs to be subject to environmental laws
- Accurate, honest documentation
- Enforcement of regulations in place
- Unbiased scientists (neutral experts)
- Assessment tools – hazard analysis versus risk assessment versus medical model
- Waiting on science to show impacts will take a long time – alternative response for dealing with communities, perhaps a written protocol that allows things to move forward at the director's discretion

Moving Forward with Industry

- Litigation is not always the best solution
- Communities need to work with corporations
- Industry needs to take more responsibility; show chemicals are safe before such are released to the public
- If burden of proof is shifted, what criteria would be set so that industry could function?
- Are there ways to make information more available without industry being forced to give it away to everyone?

Possible Solutions

Addressing Community Concerns

- Case studies following and assessing the entire process of ATSDR's involvement with communities, reflecting points of process breakdowns and assessing community impact of ATSDR involvement

- Appropriately retract/withdraw studies when flaws are found and re-do such studies
- Re-visit all major sites – a necessary starting point to continue the conversation and share schedule with communities at outset so they know when the visits will occur.
- Devise a strategy for managing anger/stress and effective communication (training in all communities for government and communities together?)

Moving Forward with Government Agencies

- Community involvement initiatives, including community-based participatory research
- Community advisory committees in all agencies; need a feedback loop
- Clear and effective communication to bridge agency and community
- Clear translation of scientific findings and risk (i.e. plain language) so community can use information
- Re-institute CERCLA tax (utilize tax for cleanup)
- Toxins are available at the consumer level (e.g. mercury) – Change this by law?
- Offer honesty, integrity, continuity, transparency and consistent messages
- Create an investigative arm of ATSDR
- External peer-review process for ATSDR health assessments, all ATSDR documents
- EPA: Identify chemicals being used throughout community
- EPA: Chemicals in products – disclosure
- DOT: Identify and publish all transportation routes of hazardous chemicals through communities (on web sites?)
- Do not exempt DOD or others from environmental laws
- Accurate data
- A website with all relevant information for the public
- Provide environmental justice groups with:
 - Health resources
 - Technical assistance
 - Legal assistance
 - Organizing resources
- Proactive inter-agency and university initiative; share information about best practices
- Shift burden of proof – move toward precautionary principle
- Ensure unbiased science
- Funding – enforcement capability and action
- Start with EPA's data, definitions and mapping of Environmental Justice and impacted communities
- Harmonize data on all types of toxic chemicals
- Address residual effects of chemicals
- Understand the complete picture of how chemicals are used in communities (e.g. how chemicals are being transported, and through which communities; incinerator emissions; chemicals in trash)
- If an FDA-like model (where drugs need to be tested as safe before being brought to the market) were used for chemicals, the public would be better protected from harmful chemical exposures
- Ratify Stockholm Convention on persistent organic pollutants

Moving Forward with Industry

- Transparency
- Honesty/integrity
- Agency, community and corporations need to work together for action. Define the place of corporations in solutions – need to remain profitable
- Possible health tax on chemical companies

- Instead of blame, start joint projects with communities and corporations
- Mandate to substitute safer chemicals
- Community involvement at the ground level – people should know what kinds of chemicals are used in industry

Additional Thoughts

Missing from the Discussion:

- Youth
- White House Office of Scientific Integrity / Office of Science and Technology
- Labor
- Lawyers
- Healthcare providers
- Health communication specialists
- Translators
- Immigrant and migrant community representatives

Education and Communication

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Framework for Discussion

Education and communication are vital portions of the public health and chemical exposures discussion. Constituencies have significant trust issues, and education and communication are important tools for rebuilding that trust. The public is often faced with a wide array of inconsistent information, with messages coming from multiple sources, including government agencies, industry and the media. Professional education on environmental health topics is necessary to ensure that the network of health care providers can effectively address human health issues related to chemical exposures.

Key Themes

The breakout groups sub-divided into a group focusing on public communication and another focusing on professional education. The themes for each sub-group are outlined below:

Public Communication

Usable Information

The public has a right to access information related to their health. Just as important as access to information is the capacity to act on the information one has received. Therefore, communication efforts need to use language that is appropriate for the intended audiences (e.g., lay public). Audiences need sufficient context to be able to make decisions based on the information they are given.

Communicating Uncertainty

Uncertainty is common in environmental health issues. When communicating about human health and chemical exposures to the public, agencies should be frank about what is unknown. Uncertainties and information gaps should be identified and acknowledged, not minimized or denied. A consistent approach to risk communication across agencies is needed.

Public Participation Processes

People need resources and tools to be empowered to participate in decisions that affect their health. Communities should be engaged as early as possible; public involvement should not be an afterthought.

Professional Education

Integration of Environmental Health into Educational Curricula

Environmental health topics should be included in formal education. Environmental health should be included in curricula at all levels, including high school, undergraduate programs, nursing and medical schools, graduate programs, and in continuing education and non-degree programs.

Pragmatic Approach

Many government agencies and professional organizations work on environmental health issues and already maintain a wealth of information on environmental health/environmental health education. One body needs to be established as the primary source of this information. Collaboration is needed to eliminate redundancies.

Specific Items for Consideration from the Entire Group

Initial Reflections on the Nation's Approach

- Scientific culture disjointed from community
- Lack of scientific education (some efforts do exist, e.g. Science Education for Public Understanding Program [SEPUP] in California)
- Issue of resources (funding) → resources need to be linked to needs

Major Successes

- Public has access to more exposure data (e.g., Toxics Release Inventory)
- Accuracy of detection of chemical exposures
- Better focus on children
- Potential of the web as a tool, although there is still a problem of access

Major Unmet Needs

- Integration – interdisciplinary and interagency
- Science supporting community
- Community understanding of science
- Translation of data – need for understanding
- Access to communication channels (e.g., Web, Ipad)
- Address many audiences
- Increased capacity of pediatric environmental health specialty units (PEHSUs), nonprofits

Items for Consideration from each Sub-Group, by Theme

Public Communication: Unmet Needs

Communication Research

- Managing the media
- Learning social marketing
- What mechanisms are effective for different audiences?
- Better messaging

- Understanding of how to communicate effectively to different audiences
- How to deliver results to communities
- How to deal with message overload

Communicating Uncertainty

- More education on what we (e.g., the government) don't know
- How to interpret conflicting science?
 - Help to think differently (critically) of science as process, what we don't know
- Problem of counter-messages (e.g., one message from companies but another message from federal agencies)
- Issue of uncertainty → need to be frank about it
- Consistent approach to communicating uncertainty
- Acknowledge that the system allows companies to sell things we don't know about

Public Participation Processes

- Ask for public input
- People have a limited awareness of their ability to take part
- Capacity and continuing support for communities → accessible tools, guides
- Learn how to engage the public and other partners
- Raise awareness of problems
- Engage the public early and build trust; take advantage of community knowledge

Access to Usable Information

- What are you asking consumers to do?
- Interpretation of information
- Capacity to act on the information/consider risk in perspective
- Create sustainable message delivery systems
- Plain language
- Coordination among entities on scientific information/implications (government, NGOs, companies) for consistent translation and interpretation of messages
- The clarity of labeling is inadequate

Public Communication: Short-Term Solutions

Communication Research

- Training on standard skills in risk communication

Communicating Uncertainty

- ATSDR: Before assessing, be frank about limits of information; manage expectations from the beginning; be honest; listen/hear people, pay attention to the human aspect of the issues
- Compile a list of best practices and recommendations for risk communication

Public Participation Processes

- Public Service Announcement campaign on public health and chemical exposures to let people know work is being done
- Hold stakeholder meetings
- Government and industry: Consider and involve difference audiences

Access to Usable Information

- Agencies: Go to communities to find out needs
- Before communication, think about audiences and their needs
- Test messages
- Explain risk assessment to the public
- Better education for school systems and communities to protect children; educate public and government officials
- Use new technologies for communication (e.g. Google news, Government 2.0), and door-to-door for elderly and isolated populations
- Government and industry: Pay attention to culture, age, gender, race, ethnicity, occupation in messaging and message delivery

Public Communication: Long-Term Solutions

- Coordinate efforts of research institutes, government (have one federal voice)
- National initiative for public understanding of science

Professional Education: Unmet Needs

Integration of Environmental Health into Educational Curricula

- Insufficient professional education on environmental issues
 - Nursing
 - Medical education
- Teacher education – general education requirements to include environmental public health
- Time to teach it - environmental health doesn't fit into existing curricula
- Funding/resources
- People – committed leaders and role models
- Collective effort
 - Educational institutions
 - Environmental health interdisciplinary process
- Train next cadre of experts
- Environmental health as a core component of professional development for multiple disciplines
- Environmental health is often taken on as a specialty on top of a specialty

Pragmatic Approach

- Lead agency - no one is in charge regarding chemical exposures and public health
- Integration into existing systems
 - Models
 - Strategic plans
 - There are resource limitations to implementation
- Branding environmental health
- More emphasis on training existing public health educators
- Pollination between environmental health and public health
- “Put the federal money where the passion is.”
- Public audiences are a link between federal and state agencies
- Interrelationships between established programs

Professional Education: Short-Term Solutions

Integration of Environmental Health into Educational Curricula

- Create environmental health track in medical schools as a pathway to further specialization
- Infuse environmental health into curricula (e.g. through assigned readings)
- Increase opportunities for interdisciplinary dialogue (e.g. Presidential Task Force); convene the agencies
- Train educators/incorporate in educational curriculum (e.g. health educators)
- Cross-listing of available Continuing Education offerings among agencies
- Environmental health literacy as a topic for public and professional education campaign
- Undergraduate education → Graduate medical education/nursing education → Continuing education: Offerings all along for multiple disciplines
 - Introduction to environmental health
- Engage credentialing bodies
- Focus on emerging/applied environmental health
- Overview of environmental health offerings so people know what exists

Pragmatic Approach

- Convene and obtain buy-in from professional organizations
- Compliance with current federal law – awareness of agencies/organizations about applicable laws
- Sustainable, repeated message/information
- Gather models of effective practice
 - Identify opportunities to replicate
 - Assessment conducted by clearinghouse
 - Published and peer-reviewed
- Define “how much” training is needed (start small)
 - What is the minimum competency level for free, online, peer-reviewed training?
- Show how environmental health integrates into professionals’ jobs:
 - Nursing
 - Medicine
 - Health education
 - Pharmacy
 - Social work
 - Law
- Professional association dialogue
 - National Environmental Health Association (NEHA)
 - American Public Health Association (APHA)
 - American Medical Association (AMA)
 - American Nurses Association (ANA)
 - Society for Public Health Education (SOPHE) – could serve as a facilitator
- Clearinghouse → repository
 - Federal? Non-governmental?
- Be sure professionals have strong understanding of existing laws to protect public health, children’s health
- Branding through popular culture means; explain what environmental health/medicine is

Professional Education: Priority Solutions

- Inventory effective models of practice

- Establish a clearinghouse/repository of resources
 - Actions: Find neutral/non-polarizing group
- Create venues for dialogue
 - Action-oriented
 - Results-producing
- Coalesce partners around increasing resources
- Increase awareness of environmental health laws → compliance

Professional Education Long Term Solutions

- Funding: Source? Does funding come from other current programs?
 - Incorporate funding for chemical education into Toxic Substances Control Act (TSCA) reform