Developing a Roadmap for the Future of National Hazardous Substances Incident Surveillance

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Abbreviations

AESHP	Association of Educational Safety and Health Professionals
AHEMR	All-Hazards Emergency Management Region
AHLS	Advanced Hazmat Life Support course
APHA	American Public Health Association
ATSDR	Agency for Toxic Substances and Disease Registry
BEOH	Bureau of Environmental and Occupational Health
BSC	Board of Scientific Counselors
CAER	Community Awareness Emergency Response
CAMEO	Computer-Aided Management of Emergency Operations
CCPS	Center for Chemical Process Safety
CDC	Centers for Disease Control
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CEHA	Colorado Environmental Health Association
CEPI	Center for Educational Performance and Information
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFS	Commodity Flow Survey
CLHO	Council of Local Health Officers
CO	Carbon Monoxide
COPS	Concerns of Police Survivors
COTPER	Coordinating Office for Terrorism Planning and Emergency Response
CPSC	Consumer Product Safety Commission
CSB	United States Chemical Safety and Hazard Investigation Board
CSTE	Council of State and Territorial Epidemiologists
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	US Department of Homeland Security
DOD	US Department of Defense
DOH	Department of Health
DOT	Department of Transportation
DSHS	Department of State Health Services
EMT	Emergency Medical Technician
EMS	Emergency Medical Services
EPA	Environmental Protection Agency
FBI	Federal Bureau of Investigation
GDEM	Governor’s Division of Emergency Management
GIS	Geographic Information Systems
GPS	Global Positioning System
HAN	Health Alert Network
HANYS	Healthcare Association of New York State
HMIS	Hazardous Materials Information System
HSEES	Hazardous Substances Emergency Events Surveillance
IDLH	Immediately Dangerous to Life and Health
ISEE	International Society for Environmental Epidemiology
LaHSEES	Louisiana HSEES

LDHH	Louisiana Department of Health and Hospitals
LEPC	Local Emergency Planning Committee
MDCH	Michigan Department of Community Health
MDE	Michigan Department of Education
Meth	Methamphetamine
MI	Michigan
MKOPSC	Mary Kay O'Connor Process Safety Center
MLP	Minnesota Meth Lab Program
MMS	Minerals Management Service
MMWR	*Morbidity and Mortality Weekly Report*
MN	Minnesota
NADEC	National Alliance for Drug Endangered Children
NCEH	National Center for Environmental Health
NEAJ	*New England Antiques Journal*
NEHA	National Environmental Health Association
NEISS	National Electronic Injury Surveillance System
NEWMOA	Northeast Waste Management Official's Association
NFIRS	National Fire Information Reporting System
NFPA	National Fire Protection Association
NIEHS	National Institute of Environmental Health Sciences
NIOSH	National Institute for Occupational Safety and Health
NOX	Nitrogen Oxides
NRC	National Response Center
NTSB	National Transportation Safety Board
NYS	New York State
"*O*"	The Oprah Magazine
OADEC	Oregon Alliance for Drug Endangered Children
OHS	Office of Homeland Security
OPH	Office of Public Health
OR	Oregon
OSHA	Occupational Safety and Health Administration
PCC	Poison Control Centers
PEST	Pesticide Exposure Surveillance in Texas
PHMSA	US DOT Pipeline and Hazardous Materials Safety Administration
PMR	Preventive Medicine Residents
RMP	Risk Management Plan
RQs	Reporting Quantities
SERC	State Emergency Planning and Right-to-know Commission
SI	Schenectady International
STANYS	Science Teacher's Association of New York State
TCEQ	Texas Commission on Environmental Quality
TDA	Texas Department of Agriculture
TPCN	Texas Poison Control Network
TQ	Threshold Quantities
TSCC	Toxic Substances Coordinating Committee
TWCC	Texas Workers' Compensation Commission
TX	Texas
UNIS	Utah Notification and Information System
UPCC	Utah Poison Control Center

US	Unites States
USDA	United States Department of Agriculture
WA	Washington
WEHA	Wisconsin Environmental Health Association
WHA	Wisconsin Hospital Association
WI	Wisconsin
WRWA	Wisconsin Rural Water Association

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Foreword

This report is authored by the Mary Kay O'Connor Process Safety Center (MKOPSC). While the content of the report is based on input from stakeholder meetings, the Board of Scientific Counselors (BSC), various contributions from the Agency for Toxic Substances and Disease Registry (ATSDR), and the Hazardous Substances Emergency Events Surveillance Program (HSEES) state partners, the final content is the responsibility of the MKOPSC.

Executive Summary

Currently, the United States (US) is not yet utilizing all of the tools at its disposal to prevent, as well as mitigate, the consequences of hazardous substance incidents. In order to properly manage something, it must be measured. Currently, the US does not even have an estimate of the magnitude of the consequences of hazardous substance releases. Some argue that the day-to-day responses to hazardous substance releases can be considered drills for more serious incidents. As a nation, we can learn from these events to be better prepared for catastrophic events, whether accidental or intentional.

Specifically, a pressing need exists to evolve the fourteen Hazardous Substances Emergency Events Surveillance (HSEES) state programs into a national system of state-based surveillance in order to ensure progress in reducing the health effects of hazardous substance releases. The current HSEES system, maintained by the Agency for Toxic Substances and Disease Registry (ATSDR), is a key component in monitoring the acute health effects, causes and circumstances of chemical, biological, radiological and nuclear releases in the United States. This agency is a vital resource for stakeholders when incidents occur at fixed facilities. Large-scale collection, analysis, and distribution of "lessons learned" are critical to this nation's efforts to reduce injuries and other consequences of hazardous substance releases. For all incidents, other than petroleum-only releases, the HSEES system does detail the substances involved, causes of the incident, associated equipment items, the type of location, victim demographics, the type of emergency response, injury details, personnel protective equipment in use, nearby vulnerable populations and other pertinent information. Without the information gained from an analysis of good data, it is impossible to properly allocate resources, or develop public policy to minimize the health and environmental effects of hazardous substance releases. Despite the thoroughness of the HSEES system, the reality exists that unlike the Department of Transportation's (DOT) comprehensive program for monitoring transportation incidents, no equivalent system for fixed chemical facilities exists in this nation.

Although it is true that the US Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration (OSHA) are primarily responsible for safety at fixed facilities, neither entity has a comprehensive incident reporting system. The EPA's Risk Management Program Accident History reports less than 400 incidents per year. The United States Chemical Safety and Hazard Investigation Board (CSB) and National Transportation Safety Board (NTSB) perform detailed investigations of selected incidents, while HSEES and the DOT provide broad statistical overviews of incidents.

Decidedly, a combination of the HSEES system with the existing data collection systems noted in the above paragraph into a national system of state-based surveillance would represent a significant step in the right direction. The current HSEES system already has demonstrated success on a fourteen-state scale, evidencing particular benefits. One such benefit is the awareness of the HSEES staff in each state of the array of agencies that are concerned with hazardous substances, and the development of relationships that foster the flow of information between groups. Not only do the state HSEES staff collect data; staff also analyze the data and identify leading problem areas in the state. Based on these analyses, these state agencies then perform

outreach activities focused on those problem areas and the people likely to be able to prevent, mitigate, or respond.

Despite the usefulness and benefits of the current HSEES system, disappointingly thirty-six states have no comprehensive system of collecting fixed facility incident data, and none of these have a system that includes petroleum incidents. This problem within process safety cannot be ignored. Unquestionably, a coordinated national system of state-based hazardous substances event surveillance is needed to ensure progress in reducing the health effects of hazardous substance releases. After an analysis of several years of data by the Mary Kay O'Connor Process Safety Center (MKOPSC), it is estimated that of all 50 states, 35 states contain 93 percent of the population, and 93 percent of the hazardous substance releases. The other 15 states likely have too few incidents to justify a separate data collection effort, and these might be covered by adjacent states with similar types of industry and agriculture.

In addition to expanding surveillance, there are many steps that might be taken to improve the data collection, analysis, and distribution of findings. Presently, a large group of stakeholders including state and federal agencies, industry, academia, and others are working to identify the desirable characteristics of a national system. Items that are under consideration include:

- Cost effective collection of the most significant events and associated data
- Harmonizing the numerous existing data collection systems of the federal agencies
- Improving the transfer of data amongst agencies
- A plan for expanding the HSEES program to additional states, including priorities
- The statistical relationship between the fourteen HSEES states and all fifty states
- The importance of collecting incidents involving only petroleum
- Issues of personal privacy, versus completeness of data and sharing of data
- Regulatory restrictions
- Improving the analysis and dissemination of lessons learned
- Measuring the effectiveness of the surveillance system
- Measuring the overall success of programs to reduce the effects of releases
- The possibility of providing near real-time surveillance for some events –e.g., Katrina
- The possibility of collecting chronic as well as acute health effects

Upon completion of the studies and discussions to characterize the desired national system, a *Roadmap for the Future of National Hazardous Substances Incident Surveillance* will be published detailing the future path forward. This *Roadmap* will include an assessment of the required resources.

A coordinated effort of the current collection systems into a national hazardous substances surveillance system can be accomplished for less than the cost of one major release per year. Furthermore, such a system meets the ATSDR mission of public health surveillance and development and implementation of strategies for the improvement of public health. The public health consequences of acute hazardous substance releases can be devastating, leading to substantial morbidity and mortality, as seen in incidents in Bhopal, India; Seveso, Italy; and Chernobyl, Ukraine. The current fourteen-state ATSDR HSEES system has documented many successes, but it is limited in scope. The proposed expansion of the current systems to a national surveillance system will lead to the use of actionable data for the implementation of proactive national prevention programs, with the active participation of various partners. The lack of a

comprehensive, accurate nationwide system results in knowledge gaps (e.g., the effects of exposures to acute hazardous substance releases), inability to describe trends or changes in trends, inefficient use of resources to collect data, misguided prevention priorities, incomplete data for evidence-based planning and prevention activities, incomplete data to evaluate the effectiveness of prevention efforts, and a lack of accurate and timely information for training responders and informing industry practices beyond those immediately affected.

1. Rationale for Incident Surveillance

Several factors contribute to the vision and rationale for expanding an incident surveillance system to encompass a nation-wide perspective. Presently, the United States (US) is not yet utilizing all of the tools at its disposal to prevent, as well as mitigate, the consequences of hazardous substance incidents. The Hazardous Substances Emergency Events Surveillance (HSEES) system, maintained by the Agency for Toxic Substances and Disease Registry (ATSDR), is a key component in monitoring the acute health effects, causes, and circumstances of chemical, biological, radiological, and nuclear releases in the United States. This is especially crucial for incidents at fixed facilities. In order to ensure progress in reducing the health effects of hazardous substance releases, a pressing need exists for evolving the fourteen state HSEES into a national system of state-based surveillance. By looking at what information of what would be lost without HSEES or a national system, we better understand the necessity of such a system.

In addition, large-scale collection, analysis, and distribution of "lessons learned" are vital to this nation's efforts to reduce injuries and other consequences of hazardous substance releases. In order to properly manage something, it must be measured. Once metrics are developed and gathered into comprehensible format, the data must be used as a learning tool. A specific example would be to use day-to-day responses to hazardous substances as a learning drill for more serious incidents.

1.1 Measuring and Learning

As a nation, we can learn from studying events, whether accidental or intentional, to be better prepared for catastrophic events. For instance, being able to understand how emergency responders are injured could be critical to a major response. If the responders themselves are injured, they are unable to perform their function and may require assistance. Without the information gained from analysis of good data, it is impossible to properly allocate resources or develop public policy to minimize the health and environmental effects of hazardous substance releases.

In order to manage the consequences of hazardous substance releases, one must be able to measure the magnitude of the problem to identify problem areas. These problem areas might highlight, for example, specific industries, chemicals, modes of transportation, types of processes, illegal activities, injuries to emergency responders, or threats to vulnerable populations. Once problem areas are identified, resources can be focused on effectively addressing those specific problems, with the goal of reducing releases of hazardous substances and subsequent morbidity and mortality. These specific focus areas would include prevention, mitigation, and response.

The ideal system would be geographically complete, chemically complete, generate data of high quality, and serve the needs of a wide variety of stakeholders. In addition, a potential valuable outcome to the nation would be the ability to obtain data promptly, so that the future surveillance system could be part of a vital emergency response system. Currently, however, the fact remains that only fourteen states currently participate in the HSEES system.

1.2 Vision Statement

To develop a comprehensive system of hazardous substances release data collection, analysis, and dissemination for the proactive prevention of incidents, mitigation of public health impact, and improved emergency response.

Furthermore, the system needs to convert data to information through timely and useful analysis. This analysis should provide information to those who need to know, including: researchers, government officials and agencies, industry, employees, academia, and the general public. The effectiveness of the system should be evaluated by determining whether the information provided makes a difference in preventing future accidents.

1.3 What is Lost without HSEES or a National System?

In the absence of a national system to collect and manage the data from a hazardous substance release, the following benefits are lost:

- Timely, complete data on the human health impact of emergency events
- Coordinated and timely alerting of various responsible personnel at state and local levels, who may receive no other alert
- Difficulty for many federal agencies in complying with the Government Performance Results Act of 1993
- State and local chemical emergency response
- Evidence-based planning data to prevent, mitigate and respond to terrorist activities
- Accurate and timely information for: training responders, revising industry practices, and informing industry personnel beyond those immediately affected
- Information and educational materials for the community
- Support for legislation on chemical-related prevention and preparedness
- Partnerships with federal, private, and international organizations to further their research
- Ability to describe data trends and changes in trends
- Targeted prevention activities that are measurable
- Ability to identify causes of hazardous substance releases
- Data for evidence-based planning and prevention activities
- Data to evaluate the effectiveness of prevention efforts

2. Methodology

The concept for developing a national hazardous substances incident surveillance system was initiated as a result of collaborative meetings between ATSDR and the Mary Kay O'Connor Process Safety Center (MKOPSC). As a result of this initial dialogue, ATSDR and MKOPSC partnered to convene a series of meetings and follow-up activities to discuss the need for, and the desired characteristics, of a national hazardous substances incident surveillance system.

To date, three major meetings have occurred. The attendance and composition of the attendees has grown and changed based on interested parties and identified stakeholders in such a system. The first meeting was held in College Station, Texas (TX) on the Texas A&M University campus in late September 2007. Approximately 15 people attended this meeting with representation from federal agencies, state organizations, and educational institutions. Meeting participants reviewed the current state of data collection, previous attempts to unify and improve the data systems, and identified the need to develop a plan for a path forward. This path forward included planning of the second meeting to be held in November 2007, in Washington, DC.

The second meeting was attended by approximately 60 participants. The initial goals of this two-day HSEES meeting entitled, "Roadmap for the Future of National Hazardous Substances Incident Surveillance," was to brainstorm and create a shared vision for Hazardous Substances Incidents Surveillance in the US. Attendees represented a variety of partners: federal agencies, the private sector, state and local health departments, and academic institutions. Despite diverse backgrounds and areas of specialization, participants agreed that another goal of the meeting was to form agreement on the components of the desired surveillance system and procedures and roles of the participants within the system. A final goal identified was the necessity to form a unified understanding on resources needed to begin and complete the project. To facilitate discussions, three workgroups were formed. The first step was for each group to address the issues identified during the first meeting. Each group met for an afternoon reporting their discussions to the entire group the next morning. Several hours of discussion by the entire group ensuing the morning's presentations created new ideas.

Although a wide variety of opinions were offered and some areas of disagreement arose, an overwhelming desire was voiced by the group to move forward. Because a number of the issues raised were beyond the scope of this two-day meeting, and many of them required additional data gathering and analysis, volunteers were identified to assist ATSDR and MKOPSC. Participants agreed that the MKOPSC would create the document that would lead to the Roadmap with the intent of reflecting the discussion at the meetings, as well as the subsequent analysis.

The third meeting was held in Atlanta, GA, consisting of participants primarily from the federal agencies with an interest in providing and/or utilizing hazardous substances incident data. Additional opportunities were identified for collaborating in the collection, sharing, and use of incident data. Additionally, a number of departments within agencies were identified as potential collaborators on this project. There remains an ongoing effort to involve groups that have been under-represented in the first three meetings, including industry, labor, and several key federal agencies. Feedback on this report will be sought from all types of stakeholders.

The attendees at each of these meetings are listed in Appendix B.

3. HSEES Program Background

Chapter 1 briefly mentions the relationship of HSEES to ATSDR and the Centers for Disease Control (CDC). However, the goal of this chapter is to give an understanding of this system's significance, background without inundating the reader with organizational detail of the agencies. HSEES is funded in part by Centers for Disease Control (CDC) and Prevention's Coordinating Office for Terrorism Planning and Emergency Response (COTPER). The HSEES system was established in 1990 by ATSDR to collect and analyze information about acute releases of hazardous substances and threatened releases that result in a public health action such as an evacuation. The primary goal of HSEES is to reduce the morbidity (injury) and mortality (death) that result from hazardous substances events, which are experienced by first responders, employees, and the general public.

Since its inception, HSEES has been committed to developing ideas toward a national chemical incident surveillance program. The HSEES system serves as the only known hazardous substances surveillance system in the US designed to capture the public health consequences of hazardous substance releases.

Currently, fourteen state health departments have cooperative agreements with ATSDR to participate in HSEES: Colorado, Florida, Iowa, Louisiana, Michigan, Minnesota, New Jersey, New York, North Carolina, Oregon, Texas, Utah, Washington, and Wisconsin. Through the cooperative agreements, these states are required to perform a number of outreach programs each year. Because of their participation in the HSEES program, the states also help alert other agencies of ongoing safety events. Their extensive knowledge of local events affords these participants the ability, for instance, to warn a water treatment plant of an upstream release. The states play another important role by assisting with the planning of emergency response drills based on their knowledge of the types of releases that have occurred. In order to understand the breadth of the work done by the HSEES states, Chapter 6 of this document, highlights one recent program activities of the individual states while Appendix A summarizes the prevention efforts for each state over the period of 2004 to 2007.

The HSEES system received a thorough review in 2005 by the National Center for Environmental Health (NCEH)/ATSDR Board of Scientific Counselors (BSC). In the BSC report published in 2005, deliberations included program goals, objectives, strategies, and priorities, and provided external peer review of NCEH/ATSDR programs. The BSC's advice and guidance assists NCEH/ATSDR in ensuring scientific quality, timeliness, utility, and dissemination of results. The BSC found the HSEES system useful, and agreed provided good scientific information. Additionally, the BSC also made a number of recommendations to improve the utility of the system. From chapter forward in this, the BSC report and recommendations are quoted extensively. In order to distinguish the BSC comments, these citations will be noted and appear in italics.

3.1 Data Elements

A significant component HSEES is the data collected. Unique features of the HSEES system are its emphasis on health effects, emergency response, details of decontamination efforts, identification of potentially affected populations, and focus on victim demographics. Data elements collected include:

- Time, date, and day of the week
- Geographic location and place within the facility where the event occurred
- Event type (fixed-facility or transportation-related event)
- Factors contributing to the release
- Environmental sampling and follow-up health activities
- Specific information on injured persons: age, sex, type and extent of injuries, distance from spill, population group (employee, general public, responders, student), and type of protective equipment used
- Information about decontaminations, orders to evacuate, or orders to shelter-in-place
- Land use and nearby population information to estimate the number of persons potentially exposed

To view a complete listing of data elements, please refer to Appendix F.

3.2 Data Collection Methodology

A unique element of HSEES is the methodology of data collection. The collection of information is pro-active in the sense that state coordinators actively seek out detailed information concerning an incident. Data are entered into a secure web-based collection system, typically within 48 hours after an incident has occurred. Systems of quality control have been implemented by ATSDR and state health departments to ensure high-quality data.

4. Federal Hazardous Substances Surveillance Systems

The HSEES system is not the only resource available. A wide variety of federal agencies collect some type of data related to hazardous substances releases. However, numerous difficulties are associated with obtaining and utilizing these data. For example:

- Collection systems are fragmented
- Gaps and overlaps are present due to an array of laws and regulations
- Little effort exists to coordinate the taxonomy of various systems, and each system changes with time
- Most agencies require users to download data and install it in a database, or to use an online query system that may have limited utility
- Many agencies fail to analyze and disseminate the information in a useful manner

Figure 1 is an illustration of a number of the federal data systems where the overlaps and gaps, in some cases, may occur. Establishing a national system involves better coordination between agencies to reduce redundant data collection. One example demonstrating this overlap is between the Department of Transportation (DOT) and HSEES, in that both agencies gather information about the health effects of transportation incidents. Because reporting of transportation incidents to DOT is mandated by law, it appears that DOT should be primarily responsible for collecting these data and sharing them electronically with ATSDR.

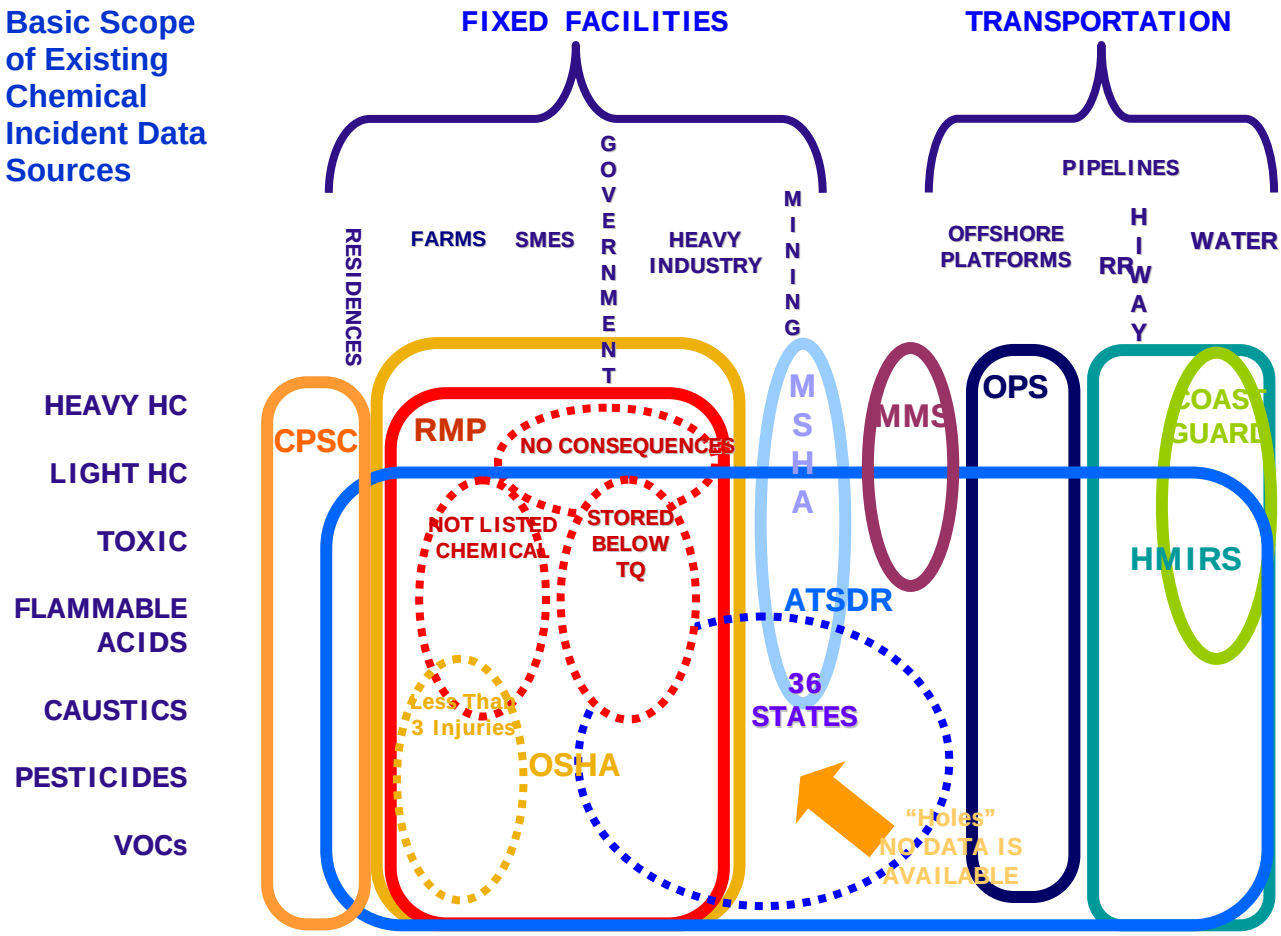


Figure 1: Basic Scope of Existing Chemical Incident Data Sources

Federal data systems can be categorized into three areas: Specialized Hazardous Substances Chemical Incident Sources; General Incidents Sources that Include Hazardous Substances Events; and Incident Investigation Sources. **Figure 1** also illustrates the different types of data and how the information would flow from source to user. This White Paper is concerned primarily with the data collection which flows into the HSEES system as outlined on the top line in **Figure 2**. Other sources of data are valuable, but are produced in a time frame that is not compatible with HSEES.

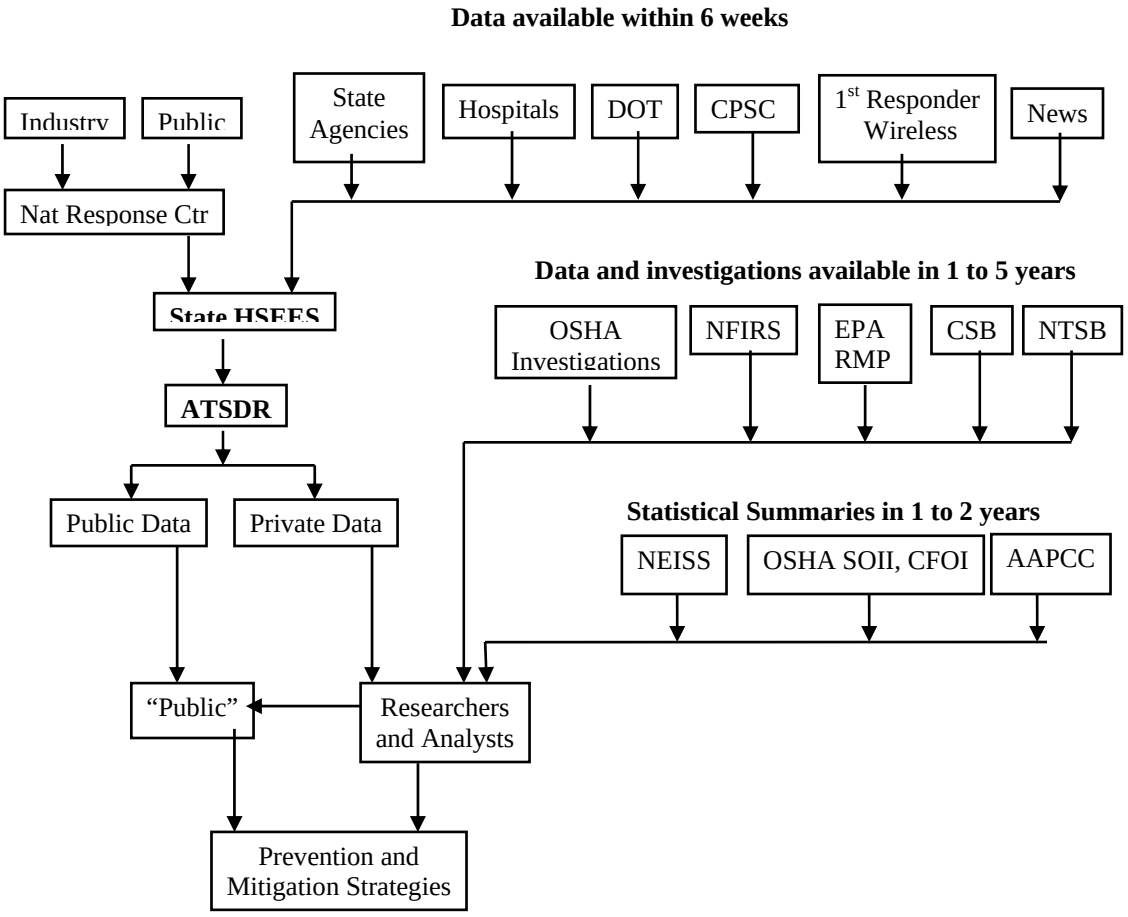


Figure 2: Chemical Incident Surveillance and Analysis Flow of Information

4.1 Specialized Hazardous Substances Chemical Incident Sources

Agencies specifically designed for the collection of hazardous substances chemical incidents are the National Response Center (NRC), the DOT [Hazardous Materials Information System (HMIS) and Pipelines], ATSDR-HSEES, Environmental Protection Agency (EPA) Risk Management Plan (RMP) Accident History, and the Center for Chemical Process Safety (CCPS)-Process Safety Incident Database. These systems collect data primarily on a statistical basis, but as there is no thorough investigation of the incident they do not and probably cannot provide root causes. However, they may indicate "causes" that are the events immediately prior to the release that might have contributed. This section discusses specific elements of each of these systems.

The NRC handles over 32,000 reports annually receiving the initial notification of incidents due to requirements by numerous federal regulations. When an accident occurs, many other federal, state, and local agencies are notified of the incident as based on pre-determined criteria. Any details from the database are preliminary and unreliable, and the extent of reporting is considered questionable.

The DOT Office of Hazardous Materials Safety maintains the HMIS. This office is responsible for the safety of the highways, railroads, airlines, and waterways. When an accident occurs, reports are due to this office from carriers within 30 days of the incident. The DOT Office of Pipeline Safety reports incidents involving natural gas transmission and distribution and hazardous liquid pipelines. More than 98% of incidents involve petroleum products which are **not** captured by the HSEES system.

The ATSDR-HSEES program has fourteen participating states and reports all chemicals except for petroleum, unless coupled with other hazardous. Even with this limited participation, HSEES collects data only on approximately 8,000 incidents per year. It is important to note that this number does not include incidents that were petroleum-only releases. These petroleum-only incidents are not included due restrictions from the Comprehensive Environmental Response Compensation and Liability Act.

The EPA RMP Accident History reporting is required for approximately 15,000 facilities storing certain chemicals above threshold quantities and only when other conditions are satisfied. As a result of these criteria, an average of 400 incidents is reported per year in the EPA RMP Accident History Database.

4.2 General Incident Sources that Include Hazardous Substances Events

Section 4.1 discussed sources of data for hazardous substances; however, there are many types of incidents, but only some of them involve hazardous materials. Sources for general incidents include, but are not limited to: the National Fire Information Reporting System (NFIRS); the Coast Guard – Marine Casualty and Pollution Database; Minerals Management Service (MMS); and the Consumer Product Safety Commission (CPSC).

The NFIRS consists of fire reports which include various states and municipalities who voluntarily report to the system. NFIRS contains an optional Hazmat Module, and the Fire Service Casualty division has details about personnel protective equipment.

The Coast Guard Marine Casualty and Pollution Database provides details about marine casualty and pollution incidents investigated by the U.S. Coast Guard Marine Safety Officer. In 2004, there were 3,667 oils spills of less than 100 gallons, and 220 spills of greater than 100 gallons. Roughly 99% of these spills were petroleum.

The MMS tracks spill incidents that are one barrel or greater in size, and are comprised of either petroleum, or other toxic substances resulting from Federal Outer Continental Shelf oil and gas activities.

The CPSC utilizes the National Electronic Injury Surveillance System (NEISS), composed of a national probability sample of hospitals in the US and its territories.

The National Injury Information Clearinghouse, also by the CPSC, includes the incident summary database, the death certificate database, the investigation summary database, and other information that is available upon request. In order to receive information, the request must specify product codes of interest.

4.3 Incident Investigation Sources

Finally, this section notes those sources of information from entities that perform and report detailed incident investigation. These entities include the United States Chemical Safety and Hazard Investigation Board (CSB), the National Transportation Safety Board (NTSB), and the Occupational Safety and Health Administration (OSHA) Accident Investigations. Findings from the CSB (fixed facilities) and NTSB (transportation) are made available through detailed reports, not databases.

OSHA Accident Investigation Reports records incidents that have greater than two injuries or one fatality. In the searchable online database, the reports usually have a one-paragraph description of the event.

5. Partners and Collaborators

Chapter 3 briefly touched on the BSC review noting that the report would be quoted from extensively. This chapter uses sections from this review to highlight discussions of current and potential partners and collaborators. The first selection below discusses the recommendation to increase the coordination with other agencies.

> *The workgroup recommends that the HSEES program increases coordination with other federal agencies and CDC programs in preventing and reducing the severity of hazardous substances emergency events and their public health consequences by developing consistent, complementary and collaborative messages and activities that could be more efficient and effective than individual programs. In particular, the HSEES program should coordinate with CDC's NCEH and National Institute for Occupational Safety and Health (NIOSH) programs, as well as with EPA, OSHA and CSB and other stakeholders.*
>
> *The final challenge is in creating a national presence for the HSEES program. This should involve collaboration with NCEH's Environmental Public Health Tracking Program, NIOSH, OSHA, EPA, CSB, and other relevant federal agencies, private sector bodies and other stakeholders, as appropriate. By collaborating, HSEES program staff could draw on the expertise and experiences of other agencies to improve both the conduct and evaluation of their own program. In addition, they might be able utilize data from these sources to broaden the scope of the database…. These collaborations would also help inform others of the availability of the HSEES database for analysis and use, and it could provide opportunities for broader dissemination of products and lessons learned from the HSEES program.*

During the three meetings previously discussed in the methodology chapter, the meeting participants identified a number of ways agencies can work together to improve the data, gather, and share it more efficiently, and to better utilize information derived from the data. A number of agencies and/or groups within agencies expressed an interest in partnering and collaborating in the future. It has been determined that identifying and recruiting additional partners and collaborators will be an ongoing component of this effort.

In the various collaborations and partnerships, cost-effectiveness needs be ensured and duplication of effort needs to be avoided. Furthermore, improvement of the coordination of activities to strengthen the impact of prevention activities should be addressed. By applying everything that is learned and streamlining information, the hope is to elicit nationally-applicable lessons. Additionally, we hope to gain knowledge from the diverse groups in the chemical industry, different industry associations, environmental and citizen advocacy groups, and local and state advocacy groups.

5.1 Past and Current HSEES Partners and Customers

Although there are many more partnerships and collaborators to be sought out, below are some examples of how HSEES staff has already partnered with other agencies or provided data to customers.

- Collaboration with **EPA** concerning children exposed to hazardous substances at school as part of EPA efforts to reduce hazardous substances in schools.
- A HSEES journal article about secondary contamination of emergency department personnel when treating arriving patients, one of few evidence-based journal articles, was used by **OSHA** to help formulate Personal Protective Equipment guidelines for hospital workers.
- The **CSB** requests HSEES background data for its investigations, including an investigation of asphyxiation of workers and responders by inert gases.
- **NIOSH** uses HSEES data to identify cases of pesticide poisoning that are not reported to their tracking system.
- **Industry and industrial organizations**, such as the Chlorine Institute and Association of American Railroads, request HSEES data to identify companies that are underreporting events.
- **Research institutes**, such as the MKOPSC and RAND Corporation, use HSEES data for research, such as determining the role that performing maintenance has on HSEES events.
- A **private company**, Advanced Chemical Safety, Inc., used HSEES data to prove the effectiveness of water as a decontaminant that can prevent injuries to skin and eyes
- **University of Arizona** utilized HSEES data to develop an Advanced Hazmat Life Support course (AHLS) course, which is now used to teach health professionals nationally and internationally
- **First Responder Safety Trainers** request HSEES data to include in their training courses. The states and federal agencies have specifically requested HSEES data to include in training courses for first responders, public health staff and informational materials.

5.2 Potential Partners and Customers

Also identified by the various participants in the development of this Roadmap was a list of potential partners and customers of. The following entities can benefit from, and use the data with resulting products from a National Surveillance and Prevention Program for Acute Hazardous Substances Releases:

- State health and environmental departments
- CSB
- NTSB
- US DOT Pipeline and Hazardous Materials Safety Administration (PHMSA)
- US EPA
- US Department of Homeland Security (DHS), Coordinating Councils – Chemical Sector
- NIOSH
- OSHA
- ATSDR/ HSEES System
- CDC, NCEH
- US Department of Defense (DOD) , Army Veterinary Corps
- United States Department of Agriculture (USDA)

- National Institute of Environmental Health Sciences(NIEHS)
- Council of State and Territorial Epidemiologists (CSTE)
- National and State National and State Poison Control Centers (PCC)
- CPSC
- Research Institutes
- Urban Policy planners
- Environmental and Citizen Advocacy groups
- Preparedness and response agencies
- Industry advocacy groups
- Labor advocacy groups
- International partners (e.g., India and Poland)
- Graduate Students

5.3 Customers Served by ATSDR

In addition to the partnerships that have been forged, the customers of HSEES have found a wide variety of uses for data gathered for issues such as public health, counterterrorism, developing legislation.

A few examples where the HSEES system has aided in public health issues include:

- Support for legislation to protect the public
- Preparedness training and planning
- Training for chemical industry workers, and chemical handlers in other industries
- Collaborative support for other federal government agencies activities
- Research in Process Safety
- Guidance for private industry and their organizations

HSEES is being used in states for chemical terrorism preparedness, including:

- Identifying high risk chemicals, industries, and locations for local and state emergency planners (EPA regional response teams, regional hazmat teams, state emergency management offices, local emergency planning committees (LEPCs), DHS, law enforcement, Federal Bureau of Investigation (FBI), and Chemical Incident Response teams.)
- As a link between state environmental departments, state health departments, and other state and local agencies in state emergency notification systems
- As a source of data and case scenarios for counterterrorism planning and drills

In developing legislation in several states, HSEES data was used in its development. A few examples of the States and with a brief description of the legislation are listed below.

- **Minnesota:** Passed legislation banning the sale of mercury thermometers in 2001; passed Methamphetamine (meth) lab ordinances in 17 counties, with 20 more counties in progress. As of October 2005, the law, reportedly, was substantially reducing the number of illegal labs.
- **New York:** Data on methamphetamine labs led to a Governor's program bill signed into law on August 2, 2005. In July 2004, the Governor signed a law banning use of elemental mercury in all primary and secondary schools in New York. The law requires the development and dissemination of informational materials. These materials were developed by a Partnership which included HSEES staff in New York.
- **Iowa:** Meth data was utilized by the Governor to promote a new law restricting the sale of pseudoephedrine in May 2005. Reports show a reduction of meth labs incidences by as much as 90 percent since the law was enacted.
- **Oregon:** HSEES participation in statewide advisory groups has led to state legislation to curb the availability of precursor chemicals used in methamphetamine labs. It is believed that by restricting access to these chemicals through this legislation for the period from 2003 to 2007 there was a 95% reduction in the number of meth labs in Oregon.
- **Georgia:** An HSEES article is published about children exposed to meth chemicals and is used to support the passing of "Governor Perdue's Child Protection Package Briefing"
- **Wisconsin:** HSEES data were analyzed to demonstrate that a large percentage of events below the State's reporting quantities (RQs) involve victims. This information was recently presented to the state legislature to persuade reevaluation of a proposal to raise the state RQs to the Federal level.

In addition to the uses demonstrated in the above sections, ATSDR and the state health departments have collaborated on numerous journal articles and presentations. A complete listing of these articles can be found in Appendix E.

6. HSEES State-Based Activities

In order to understand the breadth of the work done by the HSEES states, this chapter highlights recent program activities of the individual states. This information was briefly touched on in Chapter 3 in the background of HSEES discussion. For more detailed information on the variety of prevention efforts of the HSEES states for the 2004-2007 period, refer to Appendix A.

State response capability

> *"In regards to state based activities "the HSEES program also has been effective in building important state capacity in hazardous substances emergency event assessment and response. This is an extremely valuable by-product accrued by member states."[BSC Review, 2005]*

Collaboration

> *"Another major public health impact of the HSEES program is that it has aided in the integration of activities between state's environmental and public health agencies, an important aspect of state capacity building. This has created valuable data sharing and collaborative work that have had positive impacts in several different arenas within states." [BSC Review, 2005]*

State outreach

> *"At the state level, performance and outputs have been interesting and useful. States have developed effective educational materials and have run a number of workshops and training sessions. However, as noted above, these materials and activities need to be exported to states beyond those funded by the HSEES program, particularly if they are facing similar problems, such as mercury or ammonia in food. One mechanism for dissemination is through existing programs such as the Superfund Site Assessment Program that is active in addressing methamphetamine laboratory issues. Similar venues should be considered for other materials." [BSC Review, 2005]*

Because each state has a different structure of state and local agencies concerned with hazardous substances, one advantage of a state based collection of data benefit is the ability of each HSEES state staff to capitalize on the familiarity it has with its specific environs and related entities. The numerous agencies involved with emergency response efforts include: law enforcement, health, fish and wildlife, environment, poison control. The HSEES staff in each state is aware of the array of agencies concerned with hazardous substances, and has developed working relationships that foster a reciprocal flow of information.

The HSEES program consists of fourteen participating states marked by agricultural, commercial, and industrial diversity. Not only do the states perform the data collection activities, they analyze the data and perform outreach and other activities focusing on the problem areas and the people likely to be able to prevent, mitigate or respond to these problems. In some cases, states are able to assist in emergency alerting. They also participate in activities such as planning of emergency preparedness drills. As discussed in the previous chapter, several states have used the data to support legislative decisions. It is unlikely that a centralized federal system could achieve this type of state and local benefit.

Over the years and under the auspices of the ATSDR, staff at each of the individual state health departments has conducted a variety of prevention outreach activities. These activities have been guided by the common goal of reducing the frequency of hazardous materials releases and the associated injuries. Efforts have been directed at raising awareness and providing education for the staff. Some of the prevention activities have been dictated by the incident data collected intrastate and other activities have been in response to the needs of interested groups.

These outstanding prevention outreach activities characterize the depth and breadth of the HSEES program. However, those highlighted below are only a fraction of the prevention efforts within each HSEES state. For additional information, contact state participants listed on the ATSDR web site: www.atsdr.cdc.gov/HS/HSEES/State_Websites.html.

COLORADO

Supporting Preparedness of Colorado All-Hazards Emergency Management Region (AHEMR) with Quarterly Reports

In July 2003, in response to the terrorist attacks on the World Trade Center and Pentagon on September 11, 2001, the Governor of Colorado issued an Executive Order that created nine AHEMRs within the state. Each region was tasked with determining critical infrastructure in its area, and planning and preparing for terrorist attacks. To assist these new AHEMRs with counter-terrorism prevention and preparedness planning in relation to the potential for a hazardous materials incident, HSEES staff developed quarterly reports from HSEES data. The reports, which were distributed to each region, were developed for each quarter in 2006 and 2007.

Feedback shows that these reports were, and continue to be of great use to Emergency Managers, planners, first responders, and local governmental entities that use the information for training, table top exercises, terrorism exercises, and full scale county-wide exercises.

FLORIDA

Reducing Exposures to Chemicals through Florida Healthy Home

Via HSEES data analyses and FPCIN data reaffirmation, Florida HSEES identified chlorine, ammonia, and carbon monoxide as high risk chemicals that impact the well-being of Floridians. These chemical releases comprised nearly 20% of all HSEES-eligible incidents reported in 2007. The exposures caused approximately 2,000 calls annually to the Florida Poison Information Network and many led to an emergency response by Fire Rescue, HAZMAT, Emergency Medical Technician (EMT) or Hospital Staff.

As a response to these preventable exposures, Florida HSEES partnered with the Florida Healthy Homes Program to increase chemical safety awareness in Florida's most vulnerable population. Florida's Healthy Homes Program is a new program using a holistic approach to protect children and families from housing-related health and safety hazards. The program seeks to create and maintain healthy and safe homes by raising awareness of potential health risks in the home; referring families to local health/housing programs to help reduce or eliminate risks. The home visiting organizations will receive training on identifying environmental health hazards in the home, educating families about the hazards identified, and making referrals to the local county health department (CHD) for follow-up. The Florida HSEES program has supplied the exposure data with chemical safety recommendations, and Florida Healthy Home will supply the vehicle to distribute the message to the Floridians most at risk.

IOWA

Awareness and Education Efforts to Reduce Agricultural Ammonia Releases in Iowa

The culture and economy of Iowa is deeply rooted in the farming and the agriculture industry. There are 99 counties in Iowa, 88 of which are considered rural. Approximately 650,000-700,000 tons of agricultural ammonia is used per year. There are only two ammonia producers in Iowa, and more than 800 retail facilities. Approximately 25,000-26,000 nurse tanks and more than 1,200 permanent ammonia storage tanks are scattered across the state. Two underground pipelines covering 668 miles in Iowa deliver ammonia.

Data has shown that ammonia is consistently the most commonly released chemical in Iowa. From 2001-2005, there were 532 ammonia releases and 351 (66%) were related to the agricultural industry. Of all the agricultural-related ammonia releases, 270 (77%) occurred at a fixed facility and 81 (23%) occurred during transportation. Given the amount of ammonia handled every year in Iowa, the number of victims and evacuations is relatively small. Nevertheless, most accidents resulted from equipment failure or human error, both of which are preventable. Most ammonia releases and injuries occur during the spring (planting season) and late fall (fall fertilizing). Employees are the most likely to be injured, and the most commonly reported injuries are chemical burns and respiratory irritation.

In 2003, a comprehensive report containing 2001-2002 data on acute anhydrous ammonia releases was prepared by the Iowa HSEES program. As a result of this study, it became evident that the agricultural community was responsible for the majority of ammonia releases occurring in Iowa. To raise the awareness of the agricultural community to this problem, a reusable safety sticker was developed for use by agricultural ammonia users. The sticker contained general safety reminders in addition to specific precautions to employ before and after loading ammonia tanks. The HSEES program identified Story County as being the county with the highest number of farm-related ammonia releases. The sticker program was piloted in Story County during 2004. That spring, the stickers were distributed by 16 retail facilities to 1,800 area farmers when they purchased ammonia for use during planting season.

Five-year data for Story County showed an average of six ammonia releases per year. Data for 2004 showed Story County with only one release. In 2005, the project was expanded to include an additional 15 counties (135 retail facilities). Five or more ammonia releases were reported in each of these counties from 2000 to 2004. In reviewing data for 2005, Story County showed only one release and seven of the 15 new counties showed a reduction.

A letter soliciting feedback about the usefulness of the safety sticker was sent to all retail facilities in 2005. The response rate was low (7%). However, almost all who responded felt the safety sticker did have an effect on preventing accidental ammonia releases. While the Iowa HSEES program does not take full credit for the reduction of releases, it is believed that the repetition of safety-related messages cannot be underestimated.

LOUISIANA

Louisiana Department of Health and Hospitals (LDHH) / Office of Public Health OPH E-mail Notification System

Hazardous material events that occur in the state of Louisiana are generally captured by two sources: the Hazardous Material Incident Hotline run by the Louisiana State Police and the NRC.

The Louisiana State Police relays most incidents to the LDHH / OPH as a result of an Interagency Agreement set up for the Louisiana HSEES (LaHSEES) project. Incidents that are not relayed to LDHH are generally drills or crimes; however, the details of these events are available on a secure website. Incidents captured by the NRC are also relayed to LaHSEES. Currently, the Interagency Agreement with the Louisiana State Police and the NRC relay system are the only mechanisms in place for LDHH / OPH to be made aware of hazardous material emergency events within the State.

During normal business hours, incidents received by LaHSEES are reviewed, and through an internal set of criteria, forwarded to appropriate LDHH / OPH personnel throughout the state. After being notified of an event by LaHSEES staff, those LDHH / OPH personnel decide on the type of public health action that is required in their region.

Appropriate LDHH / OPH personnel are notified based on the following criteria:

- Event location
  LDHH / OPH divide Louisiana into nine regions. When a hazardous substance event occurs in one of the nine regions, a regional contact person and a back-up regional contact person are notified of the event.
- Event type
  Certain event types trigger additional notifications through an internal set of procedures. Triggers include the following:
  - Events that result in injuries or fatalities
  - Events on the Mississippi River
  - Events involving raw sewage
  - Events that result in evacuations
  - Events that result in road closures
  - Events of public health significance

For years 2004 – 2007, an average of nearly 13,000 hazardous material events per year were reviewed by LaHSEES staff and, since 2005, forwarded to the LDHH / OPH regions.

MICHIGAN

Are Michigan K-12 Schools Now Mercury Free? Evaluation of School Compliance with MCL380.1274b

Michigan passed an amendment to the Revised School Code (Act 451 as amended) mandating that K-12 schools remove all elemental mercury or mercury-containing instruments by December 31, 2004. Mercury is a potent neurotoxin that is especially hazardous to children. This law was

passed to protect children from accidental exposure resulting from spills of mercury in the laboratory and breakage of mercury-containing instruments. In 2003, a letter from the Michigan Department of Environmental Quality (DEQ) and the Michigan Department of Education (MDE), schools were informed of the requirements of the law and were offered technical assistance in identifying and disposing of mercury sources. The Michigan Department of Community Health (MDCH) became concerned about compliance with the law when its HSEES project received reports of mercury spills in schools after the December 2004 compliance deadline.

MDCH HSEES developed a two-part strategy to assess the magnitude of non-compliance and to provide assistance to non-compliant schools, in collaboration with DEQ, the MDE, and the Center for Educational Performance and Information (CEPI) in the Office of the State Budget. The first phase included the development and mailing of a four-page booklet to provide guidance to schools on how to identify and dispose of mercury, accompanied by a survey asking about the status of their mercury removal process. These materials, which were mailed out under a cover letter signed by the MDCH Director, took a public health, rather than a regulatory approach. The second phase was to have schools respond to a compliance question on a survey administered by CEPI, which all public schools are required to complete every year. CEPI collects and reports data, including data on school safety, to facilitate school districts' compliance with the federal *No Child Left Behind Act of 2001* and the MDE's accreditation requirements.

The MDCH booklet, survey, and cover letter were mailed in July 2006 to 4,712 school principals, and the 685 district school superintendents that oversee these schools. Thirty-eight percent of the schools returned completed surveys to MDCH. Most reported that the mercury removal process was complete. About 25 schools indicated on the survey that they had not completed the process and/or called MDCH to request assistance with the mercury removal process. The DEQ Environmental Assistance hotline also received calls requesting assistance.

The mercury compliance question was then placed in the Spring 2007 CEPI survey. Results of the survey were given to MDCH in September 2007. The names of schools in the CEPI survey were matched to the list in the MDCH survey. Schools were contacted where discrepancies in information existed (fourteen schools), they had not responded to either survey (111 schools), or indicated that they were not in compliance (16 schools). As of January 2007, Michigan Department of Community Health (MDCH) HSEES had contacted all these schools and is provided further assistance to only two schools that indicated they were not mercury free.

The results of this project strongly suggest that the goal of this legislation--protecting children from possible exposure to mercury in school--was accomplished. Results also indicate that a multi-phased assessment and technical assistance process was useful in achieving and documenting success, a process that was made possible by funding and resources provided by the ATSDR's HSEES program.

MINNESOTA

Efforts to Reduce Meth Labs in Minnesota and Evaluate Results

A surge in illegal manufacture of methamphetamine in clandestine labs (meth labs) began in Minnesota (MN) in the late 1990s, and was detected through the MN HSEES program. The trend in increasing meth lab activity continued into the early 2000s. Using HSEES data that showed health risks to the public and responders from meth labs, MN HSEES supported creation of the

Minnesota Meth Lab Program (MLP) at the Minnesota Department of Health in 2001. Activities of the MLP, including a 2003 HSEES-sponsored conference for community public health agencies and others, were important in promoting procedures for safer response to meth-related hazards in communities. However, despite efforts, meth lab activity continued.

In January 2005, an opportunity arose to present information about meth labs to Minnesota senators and representatives through an event called "Meth Day at the Capitol." Organized by a state senator, the Meth Day event was held at the Minnesota Capitol near the start of the 2005 legislative session. The event involved participation of several government agencies and private organizations, such as the Minnesota Pollution Control Agency, Minnesota Bureau of Criminal Apprehension, Minnesota Department of Health, law enforcement representatives, and community action groups.

Minnesota HSEES data were used in part to present information about meth lab trends in the state. Maps illustrating the growing number of meth labs from 1999-2004 were presented on posters and in presentations. Other exhibits, such as displays of chemicals used in meth labs, depicted how limiting access to precursors could reduce meth labs. Hazards and injuries associated with meth labs were described. This activity drew about 300 people, including state legislators and legislative aides. The event also attracted media coverage, with footage aired on local TV stations.

In May 2005, legislation was passed that limited access to meth precursors, including restricting the sale of pseudoephedrine and making illegal the act of putting anhydrous ammonia in a container not designed, constructed, maintained, and authorized to contain or transport anhydrous ammonia, such as a propane tank. The new law also increased penalties for meth use, prohibited other meth lab-related activities, and outlined cleanup and record-keeping requirements. The Governor signed the bill and it became law on July 1, 2005.

After the law was implemented, MN HSEES, along with MLP, conducted an evaluation of the effectiveness of the law. All state counties were contacted and surveyed to collect data on the number of newly discovered labs during specified time periods. Contacts included public health offices, law enforcement and other county officials. The three time periods that were surveyed included: January 2005 - June 2005 (before the law was implemented), July 2005 - December 2005 (after the law was implemented) and January 2006 - June 2006. The survey results showed meth labs decreased by about 66% (95 to 33 labs) from January 2005 - June 2005 to July 2005 - December 2005 after passage of the meth precursor law. This decline was maintained into January 2006 - June 2006, when 35 new labs were discovered. The summaries from this evaluation were made available on the Minnesota Department of Health web site at http://www.health.state.mn.us/divs/eh/meth/index.html.

NEW YORK

Removing Mercury and Mercury-Containing Items from Schools, Businesses and Homes

Mercury is a neurotoxin. Every mercury spill must be cleaned up to prevent exposure to mercury vapor. Mercury has no warning properties such as odor, taste or irritation. The lack of any warning during exposure to mercury vapor makes cleanup of a mercury spill even more critical. In addition, some people have a familiarity with mercury from having played with it as children

and are not aware of its toxicity. These facts combined make the removal of mercury and the prevention of mercury spills an important targeted outreach.

New York State (NYS) HSEES data revealed that mercury spills at schools could be very disruptive to the school population. These spills required evacuation and decontamination; led to the loss of personal belongings and school resources when contaminated items were discarded as hazardous waste; and could be very costly to clean up. In 2002, New York HSEES staff and the NYS Health Department Center for Environmental Health's Outreach and Education Unit established the "Partnership to Remove Mercury from Schools" to build consensus and develop educational materials to remove mercury and prevent spills in NYS schools. The Partnership consisted of eighteen organizations that cooperated to identify the best strategies for mercury removal and then developed nine targeted brochures (www.health.state.ny.us/environmental/chemicals/hsees/mercury/index.htm). Brochure distribution was officially launched in April 2005 by the NYS Deputy Commissioner of Education with an announcement in the electronic newsletter to all school leaders in NYS. That year, more than 110,000 brochures were distributed to and through the following: NYS Association of Buildings and Grounds; NYS School District Superintendents; 1,400 schools of the NY City Department of Education, NYS Department of Environmental Conservation for their training workshops with Northeast Waste Management Official's Association; NYS School Nurses Association; NYS Parent Teachers Association; NYS Chapter of the Association of Educational Safety and Health Professionals; public school principals and science teachers; public health educators; and the Commissioner of Education's Advisory Council for Nonpublic Schools. In January 2006, a mailing to more than 2,000 non-public schools completed this massive outreach/education process. Customized cover letters and postage-paid feedback cards accompanied every distribution. New York HSEES staff presented the products and design of this outreach at the 2005 National Environmental Health Association Annual Educational Conference and at regional and statewide conferences of the Science Teachers Association of New York State. Numerous agencies and organizations established links to the New York HSEES web page. This educational outreach was a very labor-intensive effort because of the many Partners involved in the brochures' development and review (38 independent organizations) and because of the diversity and complexity of the NYS school system. However, it is because of the breadth and depth of the initial invested involvement and the use of the brochures at mercury removal workshops held by the NYS Department of Conservation that this outreach activity has had far-reaching benefits through on-going removal of mercury.

New York HSEES has continued its efforts to educate the public about mercury. In 2007, staff collaborated with ATSDR to publish an article about mercury spills from antiques: "Elemental Mercury Releases Attributed to Antiques - New York, 2000-2006," *Morbidity and Mortality Weekly Report (MMWR*), 56(23): 576-9 (June 15, 2007). The *MMWR* article generated significant press and interviews with the Associated Press, the Canadian Press, CNN, CBS Radio News, Canadian Broadcasting Company Radio and FOX Radio News in NYC. The press interviews spawned more than 172 articles worldwide on the topic of mercury in antique and household items, including *"O,"* and an inquiry from *Reader's Digest Australia*.

In the Fall of 2007, New York HSEES staff sent letters with a copy of the *MMWR* article to the editors or publishers of six antiques' magazines: *Antiques and Collecting Magazine, Antique Trader, Art & Antiques, New England Antiques Journal, Southeastern Antiquing and Collecting Magazine, The Magazine Antiques.* Subsequently, the Editor-in-Chief of the *New England*

Antiques Journal published a condensed version of the original MMWR article in the December 2007 issue: *New England Antiques Journal***,** 26(6): 48-9.

NORTH CAROLINA

North Carolina Outreach Activity to the Meat and Poultry Industry

From 2002-2005, HSEES data showed 18 anhydrous ammonia events in meat/poultry processing plants with 10 of those events occurring in 2004-2005. The data indicated the events were caused by human error, most likely by not properly adding ammonia to the refrigeration system, or by equipment failure due to poor maintenance of the system. Although 18 events were not extremely high numbers of events, the large number of people evacuated showed that a significant number of people were put at risk due to the releases.

To learn more about ammonia refrigeration, a web search was conducted to find resources on the subject. One of the biggest problems in the industry is that workers do not think that ammonia releases are dangerous because the releases do not happen frequently. Thus, the employees do not believe they are at risk. The US Environmental Protection Agency's Chemical Safety Alert on the "Hazards of Ammonia Releases at Ammonia Refrigeration Facilities" was identified and used as a resource to understand the causes of releases and also the ways in which they can be prevented.

An Industrial Hygienist for the North Carolina Department of Environment and Natural Resources was contacted for collaboration. The Industrial Hygienist coordinates the Clean Air Act 112(r) program which is both a statutory and regulatory program designed to prevent chemical accidents and releases through a program of preparedness, response and prevention. The 112(r) requires inspection of any fixed facility that holds more than 10,000 pounds of anhydrous ammonia. The Industrial Hygienist and other staff inspect facilities every five years to review mandated training curricula/requirements, and prevention and safety plans and practices.

The data and research collected identified a public health problem that was addressed by a prevention outreach activity that targeted safety officers and employees at 135 meat and poultry processing plants. The goal was to decrease the number of ammonia releases and related injuries. Stakeholders were responsive to the proposed activity and returned surveys designed to capture the knowledge, ideas and suggestions of industry personnel about the best tool(s) for intervention. It was determined the best method for raising awareness and providing education to employees at the meat and poultry processing plants would be to design a poster for employee break rooms. The long-term goal is to measure a decrease in the number of ammonia releases and a decrease in the number of injuries.

Initial information from the collaborators, the 112 program coordinator and inspectors, is favorable. The 2006 ammonia poster outreach to meat industry personnel was well received. The collaborators have seen the posters displayed in break rooms during inspections and have received positive comments. Industry personnel have expressed their appreciation and think the poster was well done. Data analysis will be conducted when 2007 data collection is finalized to determine if the number of ammonia releases and/or related injuries has declined since the poster has been distributed. Special thanks to Colleen Dillido (Public Health Prevention Service fellow) for her assistance with this outreach activity.

OREGON

Collaborating to Reduce the Devastating Effects of Meth on Communities

During the period from 2000 to 2004, an increasing number of clandestine methamphetamine laboratories were seized by law enforcement in Oregon and other parts of the western United States. As the reports of active clandestine labs were becoming a more frequent part of hazardous materials incidents reported to Oregon HSEES, investigation of the incidents revealed that children were present at labs where relatives or family friends were engaged in illegal manufacture of drugs. Children in these situations were at high risk of exposure to and adverse effects from hazardous processes and toxic materials released. There was concern about the best way to evaluate and care for these children. Many people in the medical care and child welfare communities were trying to develop information on the toxicity of methamphetamine precursor chemicals and protocols for the care, treatment (including appropriate and effective decontamination) and follow-up of exposed children. Oregon HSEES built partnerships by participating in state and local interagency committees to develop protocols and checklists for emergency responders going to meth labs where children were found, as well as for health practitioners, case workers, and emergency department staff who might be involved in the children's care.

In 2003, Oregon HSEES collaborated with a community partner to develop a CD Summary[1] on guidelines for the care of children exposed to methamphetamine labs. This Oregon Public Health newsletter was distributed to 14,000 health care providers in the state, and was picked up by numerous websites across the nation. Oregon HSEES continued outreach through presentations on the hazards of meth labs to children and adults. The presentations were made to responder and community groups, to employees of businesses and public agencies, and at scientific conferences.

In 2004, the HSEES epidemiologist became aware of other National and statewide groups focused on the rapidly growing methamphetamine epidemic, such as the National Alliance for Drug Endangered Children (NADEC) and the Oregon Alliance for Drug Endangered Children (OADEC). In 2005, the HSEES epidemiologist became part of an OADEC multidisciplinary group providing training on the hazards of methamphetamine labs to children. The OADEC trainings were held in various parts of the state over the next three years for audiences such as child welfare, law enforcement, fire, hazmat, and other responders and medical care providers. As a member of the medical and scientific research working group of the NADEC, the HSEES epidemiologist participated in the development of guidelines for "Chemical Residual Removal for Children Associated with Clandestine Methamphetamine Laboratories," completed and disseminated in April 2006[2]. In addition, the HSEES epidemiologist was appointed to the Oregon Governor's Meth Task Force, Subcommittee on Drug Endangered Children. The Governor's Meth Task Force proposed legislation to address the methamphetamine epidemic in the state. As a result of these collaborative efforts, legislation was passed in Oregon restricting access to precursor chemicals, including pseudoephedrine products. It is believed that restricting access to precursor chemicals led to the reduction in the number of meth labs in Oregon by 95% from 2003 to 2007. This reduced the danger to children by reducing their home exposure to the explosive and toxic hazards associated with illegal manufacture of methamphetamine, as well as the danger of exposure to contaminants for unsuspecting residents of locations where meth was manufactured

[1] Children in methamphetamine "labs" in Oregon, CD Summary 52:16, Oregon Department of Human Services, 2003. http://egov.oregon.gov/DHS/ph/cdsummary/2003/ohd5216.pdf

[2] http://www.nationaldec.org/WorkingGroups/MedicalResrchWkgGrp.htm

such as homes, hotels, motels, automobiles and motor homes. This action provided evidence to other states dealing with the same epidemic that legislative methods can successfully reduce the harm to the public. The drug epidemic still exists with the devastating ramifications of exposure of children to the hazardous lifestyles of drug using parents, but exposure to hazardous ingredients, manufacturing processes, by-products and wastes has been significantly reduced.

TEXAS

Assisting County and Local Emergency Managers with County-Level Data

In 2007, Texas HSEES began a new initiative designed to assist county and local emergency managers by providing them county-level data on hazardous materials incidents. These data were intended for use in emergency planning, staffing, training, grant applications, funding and other information needs. Of Texas' 254 counties, HSEES staff developed data for the ten counties having the largest number of events from 1993 to 2006. These tables were linked to the Texas HSEES website and e-mailed to the emergency managers of the ten counties. Ector County's LEPC requested a PowerPoint presentation with additional data for that county. The presentation was made in August 2007. An additional data item, the frequency of HSEES events by zip code, was created by Ector County's Geographic Information Systems (GIS) data person who also works in the fire department. The GIS data person is merging HSEES data with other data to analyze the current emergency response and evacuation routes to determine if there are alternate routes which would lower response times. This activity is still in progress and has not been completed.

In 2008, Texas HSEES is taking this activity a step further by developing data tables for all 254 counties using data from 1993 through preliminary 2007. Upon approval, these tables will also be linked to the Texas HSEES website. In collaboration with the Governor's Division of Emergency Management (GDEM), Texas HSEES is participating in three-day training seminars held quarterly for county emergency managers. Texas HSEES staff delivers a 20-minute presentation describing the Texas HSEES program, the type of chemical release situations that are investigated, and the types of data that each county manager may request. A "structured interview" (discussion questions) is included at the end of the presentation to encourage each manager to think about how these data could be useful in meeting various information needs. Some example questions include: "Who do you go to for funding?"; "What types of information do they require you to provide to justify your funding request?"; "Who is your data person and what details are collected day-to-day?" Emergency managers are encouraged to contact Texas HSEES so that staff can provide data to assist them in justifying training, equipment and other needs. Texas HSEES staffs document the prevention efforts and outcomes that have resulted from using these data. Following the presentation in January 2008, 11 emergency managers expressed an interest in receiving data tables for 12 counties. After the data to fulfill these requests are provided, the emergency managers will be contacted to encourage future communication and feedback regarding their projects' outcomes.

UTAH

Improving Reporting from Health Care Facilities

Utah's HSEES outreach showcase is a data-driven activity. Previously, Utah HSEES had not been receiving many reports of hazardous materials incidents from health care facilities. Data from the Utah Poison Control Center (UPCC) indicated that events were occurring and that health care facilities had called the UPCC for consultation on hazardous material exposure. However, these events were not being reported by the health care facility directly to Utah HSEES and the UPCC data did not contain all the information needed for the HSEES report. Furthermore, the UPCC reports were difficult to use due to confidentiality issues.

The activity involved mailing the Utah HSEES 2002-2003 Cumulative Report to Hospital Emergency Planning Committees. A fact sheet was included with information on the importance of patient decontamination before admittance to the hospital and also before transport to the hospital. The fact sheet included data from cases in which individuals had been brought into health care facilities without being decontaminated and, subsequently, people at the facility becoming ill. One example was a release of hydrochloric acid at a spa that resulted in two people self-presenting at a health care facility where the staff then became symptomatic. This prevention activity began in April 2006 and continued through June 2007. After the initial mailing, a follow-up survey was conducted.

The Utah HSEES coordinator also made a presentation at the Utah Hospital Summit which increased awareness of the HSEES program among health care facilities. A week after the presentation, a care facility reported to Utah HSEES about an event with a victim who was brought in after exposure to anhydrous ammonia. The activity also promoted data sharing. There has been increased collaboration between care facilities emergency planning committees and access to the Pre-Hospital Online Admission Records prepared by Utah's EMS. This network has aided in gaining additional information on events that Utah HSEES receives either from UPCC or the media. The more complete the HSEES reports are, the stronger the data can be in determining risk factors. These risk factors can then be instrumental in reaching the ultimate goal of reducing the injury and death from exposure to hazardous substances.

WASHINGTON

Washington Supports Emergency Response and Promotes Event Notification with Unique HSEES Calendars

Washington HSEES staff created a HSEES calendar for each of three years: 2006, 2007 and 2008. This activity was an effort to highlight the HSEES program and invite collaboration with others interested in emergency events management and surveillance. The calendars provided information on the HSEES program and hazardous substances releases in Washington State in an effort to protect human health and the environment by preventing future releases. The calendars encourage target audiences to report immediately all hazardous materials releases and provide contact numbers for ready use. Target audiences for calendar distributions have included personnel interested in emergency management (e.g., law enforcement and fire department officials, LEPCs, select industries and at-risk populations). The HSEES calendars have gotten favorable responses from emergency management personnel, public health partners, ATSDR and HSEES programs in other states. As a result, the calendars have been requested for distribution at emergency response

planning meetings, the number of hits to the HSEES website has increased, and the HSEES listserv has grown.

WISCONSIN

Ammonia Awareness Day

Over time, the uncontrolled releases of ammonia in Wisconsin (WI) have been both frequent and persistent. For the 13-year period of 1993 to 2005, 667 ammonia events (12% of total events) have been reported to the WI HSEES Program. Of the 667 ammonia events, 96 events resulted in 268 victims (19% of all victims), with each person suffering at least one verifiable injury resulting from exposure to ammonia. Ammonia events have accounted for 17% of all evacuees in the WI HSEES data set. A minimum of 7,827 persons were ordered to evacuate or self-evacuated following a release or threatened release of ammonia during 156 events.

Generally, ammonia "spills" in Wisconsin have taken place in three broad categories: the production/agriculture community; in connection with the illicit manufacture of methamphetamine; and among those companies using ammonia as a refrigerant, e.g., meat processors, specialty foods manufacturers, juice processors, cold storage/warehouse facilities and in the dairy-related industries such as milk, ice cream, butter and cheese manufacturing. The majority of events, victims and evacuees have occurred in the ammonia refrigeration sector. According to WI HSEES data, of the 667 ammonia events that occurred from 1993 to 2005, 393 (59%) occurred in the ammonia refrigeration sector. Of the 268 ammonia victims for that period, 121 (45%) were injured during ammonia releases while this hazardous substance was providing refrigeration. Ammonia evacuees for the period totaled 7,827, of which 6,392 (82%) were associated with releases of ammonia being used to provide refrigeration.

Ammonia Awareness Day interactions provided ammonia information in the form of attached documents, including a new ammonia brochure; a link to a new Ammonia Awareness Day informational web page on the WI HSEES web site (http://dhfs.wisconsin.gov/eh/hsees/AmmoniaDay.htm); and an evaluative questionnaire. Of the 38 ammonia refrigeration companies/facilities agreeing to participate in the interaction, 19 of them completed and returned questionnaires. A sampling of the results from the questionnaires includes the following responses: 94% of respondents said that the interaction resulted in either discussion among staff or educational initiatives; 42% of respondents identified problem areas in their ongoing ammonia management activities; 74% of respondents were in favor of expanding Ammonia Awareness Day into a more formal educational or training experience; and 95% of respondents thought that the interaction was a useful reminder about the importance of good ammonia safety practices.

7. Limitations of the Existing HSEES System

Up to this point, this paper has discussed the current and future potential of the HSEES system. However, there are limitations to the HSEES system based on legislation and available resources. This chapter will discuss issues that were raised in the series of meetings held prior to this paper's publication and present future feasible directions to deal with these limitations.

7.1 Regulatory Issues

7.1.1 Petroleum Exclusion

> *"A second limitation is the scope of events defined as reportable. All petroleum only incidents are excluded from the HSEES program. The workgroup recommends that ATSDR consider including in HSEES all petroleum events above some threshold, for example at least 100 gallons."[BSC Review, 2005]*

There are some involved with this endeavor that believe a means to overcome the petroleum restriction should be found. Others believe that petroleum incidents seldom have health effects and there is not sufficient benefit for the cost of processing additional incidents. Identifying a reasonable threshold quantity may be one possible solution to the disagreement over this issue.

From the series of meetings used to steer the course of this roadmap, one of the workgroups suggested that existing data collection systems could provide the petroleum only incidents. This is true for transportation incidents, those in Coast Guard waters and on the Outer Continental Shelf. There does not appear to be an adequate means for gathering these incidents at fixed facilities. The EPA's RMP Accident History does collect some incidents; however, it only includes releases of light hydrocarbons (those with five or fewer carbon atoms) and those that meet the other restrictions of that system. To be consistent with EPA and DHS lists, HSEES should be revised to include at least the light hydrocarbons.
Legal counsel has informally concluded that the legislation does not prohibit the collection of petroleum only data.

The following summarizes the MKOPSC analysis of petroleum only incidents:

Significance of Petroleum Only Incidents

- OSHA Accident Investigation reports were used to identify petroleum related incidents at OSHA facilities which are generally fixed facilities. Center staff read each report and estimated the quantities from the text description if the quantity was not stated.
- For the 11 year period of 1993 to 2003 there were 194 (~19/yr) petroleum related fatalities and 376 petroleum related injuries requiring hospitalization.
- By comparison the HSEES system reported an average of 34 fatalities from 1993 to 2003, for all chemicals except petroleum, in 11 to 15 states. We estimate this would be about 100 per year for the entire US.

- In addition to statistical evidence that petroleum product incidents result in numerous fatalities and injuries, there are also major incidents involving these products:
- Jet fuel was primarily responsible for the destruction of the World Trade Center and damage to the Pentagon
- Gasoline components were involved in the 2005 BP explosion claiming 15 lives.
- The Buncefield explosion involved liquid hydrocarbons at ambient conditions
- The 1989 Phillips explosion involved primarily isobutane and resulted in 23 fatalities.
- The 1974 Flixborough explosion involved cyclohexane and caused 18 fatalities

Threshold Quantities for Petroleum Only Incidents

- Quantity released and the number of injuries and fatalities were analyzed based on EPA's RMP accident history data (for light hydrocarbons), OSHA Accident Investigation data (heavy and light hydrocarbons).

- The OSHA data show significant numbers of fatalities and injuries at quantities below 10 gallons.
- The EPA RMP data for light hydrocarbons show significant injuries, but no fatalities, below 100 lbs (about 16 gallons)

  Conclusion

- There is no clear threshold quantity below which fatalities and injuries are unlikely.

Inclusion of Light versus Heavy Hydrocarbons

- EPA and DHS only monitor light hydrocarbons. This is apparently based on the belief that hydrocarbon vapors are more likely to explode and cause widespread damage.
- Is this assumption justified based on experience with light and heavy hydrocarbons?

- OSHA accident investigation data was utilized to study the relative consequences of light and heavy hydrocarbons.
- EPA data could not be used since it excludes heavy hydrocarbons.

- The OSHA data shows that there were 108 fatalities due to light hydrocarbons and 86 due to heavy hydrocarbons from 1993 to 2003.
- The charts also show that there is no clear threshold quantity for light or heavy hydrocarbons.

- Conclusions

- There is no justification for excluding heavy hydrocarbons from a national surveillance system.
- There is no clear threshold quantity for injuries due to heavy or light hydrocarbons.

Workload to Include Petroleum Only Incidents

- Would the number of petroleum events result in a major increase in the workload and required funding of programs like HSEES?

The New York state HSEES program has data on the number of petroleum incidents that occur annually.

- New York HSEES program typically collects about 1,000 non-petroleum incidents per year. The attached table indicates that there are about 10,000 petroleum incidents per year in NY state.
- Processing all these incidents would obviously greatly increase the workload of the HSEES staff.
- Since the fatalities due to petroleum incidents are about 20% of the total while the number of incidents is 10 times the number of non-petroleum incidents it appears that some selective reporting of petroleum incidents is indicated.

Summary of Conclusions Regarding Petroleum Only Incidents

- The number of fatalities and injuries justify collection of petroleum incidents.
- There is no clear threshold quantity for fatalities and injuries due to petroleum incidents.
- There is no justification for only reporting light hydrocarbons.
- The number of petroleum incidents is so great that selective reporting is probably necessary. This might involve only reporting incidents that result in injuries, fatalities or other significant consequences.

7.1.2 Confidentiality issues in collecting complete data and sharing of data

Confidentiality is one of the most difficult issues in developing a coordinated national system. In order to share data effectively, there must be a way to identify particular events. This usually means that the location and time of an incident must be known or an incident number must be assigned that is common between the systems. However, data sharing introduces the possibility that the health information contained in HSEES can be linked to a particular event. Presently, such inadvertent revelation of health information is not possible at the federal level as the data is encrypted. Only the individual states can access health information. It should be noted that data for location and company name data can be limited to the private database available, with an agreement, only to HSEES. The public database probably would not contain this information.

At the November 2007 meeting, one of the workgroups concluded that information regarding the location, the name of the facility, and the name of the corporation should be included in the database. Some participants disagreed with this statement, but the general feeling was in support of including that information. The reasons given for the inclusion of this information as necessary were: it is vital for geo-coding the data that's already in the system; to help unify other databases that are very difficult to search; and to cross reference with other databases. All agreed that identifying information for individuals should not be incorporated in the national system, but should be retained by the states.

> *"Lack of data about the specific geographic location of the events is also limiting. Locations are often reported as the county in which an event occurred. It would be useful to have exact locations provided as some counties are extremely large, for example, by using a Global Positioning System (GPS) or at least street addresses*

and nearest intersection. This geographic data might enable researchers to provide insights into alternative transportation routes, siting issues and proximity to at risk populations, and would facilitate integration of these data in GIS databases for geographically-based analyses." [BSC Review, 2005]

Some of those who collect the data believe it will be more difficult to collect data if a company knows that its name can be linked to the event. Data collection by HSEES is voluntary and based to some extent on established relationships, trust and rapport. On the other hand, the company name is already available in most other data sources. The issue that some states may have legal barriers to sharing some information also has been raised. A workgroup needs to be formed to develop a recommended policy for dealing with these issues. Because of the sensitivity of this information, legal counsel should probably be included in this effort as well as consideration of both federal and state laws.

7.2 Resources (Funding) Issues

A number of stakeholders have expressed a desire to have the reporting expanded to include types of data not currently collected that would likely have a significant impact on the required resources. These items include near real-time reporting, collecting data on exposure and longer term health effects, and collecting data on incidents occurring in homes. As the breadth and depth of the information increases, the resources needed to collect this data will also need to increase to accommodate this need.

7.3 Near Real-Time Reporting

Several stakeholders have suggested that the HSEES state coordinators play a role in near real-time surveillance of some incidents. At this point, there is no clear indication of exactly what that role is or how it can be accomplished. Most states have only one person involved in the HSEES program working normal business hours. The percentage of HSEES events occurring during those hours is approximately 55%. However, there may be some benefit in a "next business day" surveillance of important events. One can easily imagine ongoing surveillance in an event such as a major hurricane which leads to many hazardous substance events. Implementing such a program would seem to be of limited value until the system is expanded to cover most of the population.

This topic appears to be one for longer term consideration that could be implemented as the system is expanded.

7.4 Exposure and Longer Term Health Effects

"First, there remain some questions of data completeness and consistency. For example, the HSEES program collects health data for acute effects only. Further, there is no follow back to determine whether evaluation of emergency department visits, hospital admissions, or calls to the poison control centers, might lead to detection of additional health effects directly related to a hazardous substances emergency event, but were not reported as part of the event record, or even to additional events. The workgroup recommends that ATSDR investigate the

feasibility of expanding the health effects data collection in scope and follow-up period."[BSC Review]

Data on the number of people exposed to a release are currently not collected. Only those with acute injuries are counted. However, in determining if follow-up long term effects should be investigated, such data could be of use. Long term health effects are currently excluded from the system. Some of the workgroup members discussed the value of longer term follow-up. With the formation a workgroup of interested stakeholders, it might be possible to develop guidelines for identifying incidents which deserve long term study.

This topic is outside the area of expertise of the MKOPSC and should be facilitated by a different organization.

7.5 In-Home Reporting

"The workgroup also noted that in-home events are not required by law to be reported, and small spills within the fence line of commercial facilities may not be reported. The workgroup recommends that ATSDR consider including those events in the HSEES program to improve the scope of public health protection." [BSC Review]

Currently in-home incidents are excluded from the system unless there is a response activity. Generally, if there is no response, there are limited means for identifying incidents or following up on the incident details. Further consideration of this topic should be pursued in cooperation with the CPSC and PCCs.

7.6 Ability to Identify Trends

The ability to develop long-term trends using HSEES data is hampered by several factors. First, states that participate in HSEES changes from time to time. Second, the reporting requirements required by ATSDR or the states change either in response to regulation or to utilize resources more effectively. Third, when new states are added to the system, it typically takes two years for them to develop all the relationships necessary to effectively collect the data.

These factors make it difficult to determine trends in the number of incidents. However, if one is aware of reporting requirements and the likely low rate of reporting in the first few years, it is believed it can be done on a state-by-state basis. Determination of trends would be very helpful in assessing the effectiveness of prevention, mitigation and response programs.

It is recommended that further analysis be performed to determine if guidelines can be written to facilitate trend analysis.

8. Statistical Relationship of HSEES States to the 50 States

In looking to expand the current HSEES program to a national system, the question arises as to whether all 50 states are needed in order to have accurate representation of incidents in the US. After an analysis of several years of data by the MKOPSC, it is estimated that of all 50 states, 35 states contain 93 percent of the population, and 93 percent of the hazard substance releases. The other 15 states likely have too few incidents to justify a separate data collection effort, and these might be covered by adjacent states with similar types of industry and agriculture.

Below, the excerpt from the BSC review brings up the issue of representativeness of the current states participating in the HSEES program. The sections that follow will look at the correlating factors of the state, national estimates, representativeness, similarities of states, prioritization of addition of states, optimum number of states to be included.

> *Another limitation to our vision is the limited capacity to identify national patterns and recommend national data-based strategies. The HSEES program is limited to 14 states, and it appears that there has been no assessment of the representativeness of those states. The workgroup recommends that ATSDR consider representativeness for a national assessment as one of the criteria for funding states. In addition, coordination among participating states should be enhanced.*
>
> *Additional analyses of the distribution of industries and employment across the US might help quantify this possible bias. In addition, the program might wish to consider representativeness also in terms of socio-economic status, population density, ethnic/racial mix and other population level parameters. We must look to see if HSEES states are representative of the US, and what states are the highest priority in our studies. Furthermore, we need to see if some similar states could work together more effectively than they are currently doing alone. After looking at these issues, we agreed that adding states to the whole process was necessary, not only to have more data, but also to include a fair representation of statistical information. Through research, we recognize that a lot of states have similar needs and that collaboration would be useful.*
>
> *In terms of improvement, "the workgroup had a long discussion on the utility of national coverage for the HSEES program, and recommends that, in the evaluation and possible expansion of the program, ATSDR place value in having a set of member states representative of the entire US, and consider whether a sample of states rather than all 50 states is sufficient as an indicator of national trends. [BSC Review, 2005]*

8.1 Correlating Factors

As stated in the BSC review, there are a number of uses for correlating factors that can relate the present fourteen states to the entire US or to other states or groups of states. There may be different factors for transportation and fixed facilities or certain industry segments, school children, the general population, and others.

The MKOPSC has undertaken a study to identify factors that can be used to compare the HSEES states with other states and provide a basis for extrapolation and comparison of any two or more states. The procedure used has been to find factors that are known for all 50 states and attempt to correlate them with the HSEES data or portions of the data. The factors, so far tested, include the following with correlation coefficients shown in parenthesis:

All Events

- State population – Total HSEES events (0.63)
- NRC Notifications – Total HSEES events (0.92)
- Number of employees in key industries – Total HSEES events (0.84)

Fixed Facility Events

- EPA RMP Incidents – HSEES fixed facility events (0.76
- NRC Fixed Facility – HSEES Fixed Facility (0.92)

Transportation Events

- DOT HMIS – HSEES Transport (0.86)
- DOT Roadway – HSEES Roadway (0.80)
- NRC Roadway – HSEES Roadway (0.79)
- DOT Rail – HSEES Rail (0.97)
- NRC Rail – HSEES Rail (0.75)
- Ton-miles of Hazardous Substances Shipped by Truck – HSEES Ground Transportation Events (0.30)

As shown in the list above, there are a number of factors that provide reasonable correlation with the number of HSEES events. The simplest and most easily obtained factor is state population. Some correlating factors, such as that between ton-miles of hazardous substances shipped by truck and HSEES truck related incidents, show very little correlation.

8.2 National Estimates

To be successful in making a reliable estimate of the number of incidents of various types in the entire country, the first factor necessary is an appropriate method. While none of the correlating factors are perfect, it may be that the use of several different factors can be used with confidence if they give similar results.

The National Fire Protection Association (NFPA) is the agency primarily responsible for monitoring fires in the US. They rely on two sources of information to make national estimates of the number of fires. One is the NFIRS system which is a reporting system used by many fire departments to record the details of fires into a national database. Fire department participation is generally voluntary. Therefore, while this system contains millions of fires, it is not a complete or representative sample of the US. Large metropolitan fire departments are much more likely to report than are small fire departments, especially volunteer fire departments. To overcome this limitation, NFPA conducts a national stratified survey that provides information about the number of fires occurring in the jurisdiction of different sized departments. These two types of information are combined to provide the national estimates.

The HSEES system is analogous to the NFIRS system in that it has detailed reporting but is not necessarily a representative sample. However, rather than conducting a survey like NFPA we believe that other incident systems or characteristics of the HSEES states can provide the tools to extrapolate the incidents in HSEES to cover the entire US.

8.3 Representativeness

We also need factors to determine whether a state can be considered representative of other states in the country aside from the fourteen participating states. To date, the only factor identified as likely to provide true representation is the number of employees in key industries. Twenty industries with the largest number of HSEES incidents were chosen. Analysis indicates that the correlation is sufficient to identify states likely to have similar patterns of hazardous substances releases. Analysis also shows that the fourteen states currently participating in HSEES are representative of all 50 states. Several industries were identified that are over-represented. For example, in Texas, the oil and gas industry is over represented due to the large number of facilities there. Having this knowledge, however, one can adjust extrapolations to account for this fact.

Adding California to the program would increase the population coverage from 40% to 50%. However, based on the number of employees in key industries, the HSEES sample would be slightly less representative than with the current fourteen states.

Demographic Representation

A demographic comparison of HSEES States and the US by income, ethnicity, level of education, age and employment by industry was made.

The five demographic factors studied show that the populations of the 14 HSEES states are very representative of the entire United States. Where the 14 states under or over represent a population adjustments can be made based on these statistics. Hispanics are over represented by about 12%. Native Americans are under represented by about 30%.

8.4 Similar States

Next, guidelines need to be developed that might identify groups of states that have similar characteristics, and those that have too few incidents to be efficiently collected on a state basis. Based on the distribution of employees in the key industries and the proximity of states to one another, a map has been developed (Figure 3) of states that appear to have similar characteristics and would be likely to benefit from collaboration. Collaborating on analysis and outreach could make the programs of these states more productive.

Figure 3: Possible Scenario for Grouping of States

8.5 Prioritizing the Addition of Additional States

Several criteria may play a role in identifying states that should be added to the HSEES system. First is the expected number of incidents in a state. This can be estimated most easily based on the state population. Second is to maintain or enhance the representativeness of the states in the program. A third factor might be to maintain geographic diversity. One desirable alternative could be to add states to each of the groups shown schematically in Figure 3.

8.6 Optimum Number of States

After analysis by MKOPSC, it is estimated that 35 states contain 93% of the population and 93% of the hazard substance releases. The other fifteen states are likely to have too few incidents to justify a separate data collection effort. The omitted states might be covered by adjacent states with similar types of industry and agriculture. The cost of collecting data per incident varies from about $100 per incident in large states to about $500 per incident in smaller states. It would appear economical to have smaller states served by an adjacent and similar state to reduce the cost per incident. Some of the smaller states now participating in HSEES could probably serve additional states at little extra cost. None of the participating HSEES states are included in the fifteen judged to be too small to have their own collection system. There is no particular number of states that should be included in the HSEES program, but it is clear that there is an optimum participation to obtain the best cost-to-benefit return.

9. Potential Enhancements of HSEES and the Flow of Data

This paper has discussed thus far, the current HSEES program benefits and shortcomings. This chapter addresses the numerous possible enhancements that have been identified in the BSC Review and the stakeholder meetings. These enhancements include improvement and expansion of the HSEES system, better harmonization of the many federal data systems and improved electronic data sharing between agencies. In each case, it is important to consider both the cost and the benefit of any changes. This review may lead to, in some cases, eliminating data elements from the system.

For most of the proposed changes, the MKOPSC has undertaken some type of analysis. As these results become available, workgroups are being formed to assess these results and guide any further analysis and develop recommendations.

9.1 Incident Definition

The current definition of an HSEES event and certain exceptions are as follows:

An event is a release of any hazardous substance except petroleum in the amount of 10 lbs/1 gallon, or in any amount if on the HSEES mandatory reporting list. Threatened releases of such substances are also included if this threat led to an action (e.g., evacuation) to protect public health. (Note: Releases of petroleum only are excluded due to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) authorizing legislation.)

Additional rules:

- Releases of only Nitrogen Oxides (NOX) or Carbon Monoxide (CO) from stacks or flares are excluded.
- Releases in residences with no emergency response are excluded.
- Overdoses or reactions to medicines, drugs and alcoholic beverages are excluded.

A number of suggestions have been made to modify the definition of an incident. Included are the following:

Modifying the Threshold Quantities (TQ): Some argue that the TQ should be consistent with other legislation or regulations. Generally, this would have the effect of reducing the number of incidents. Others have suggested that there is no safe quantity; that injuries occur with quantities of less than 10 pounds or 1 gallon. TQs are discussed in more detail below.

Use of Chemical Lists: Some have suggested that the list of chemicals could be reduced to those in various regulations. Others believe that it is of benefit to have a comprehensive list of chemicals. Identifying chemicals not on particular lists that are causing injuries could help improve other regulations.

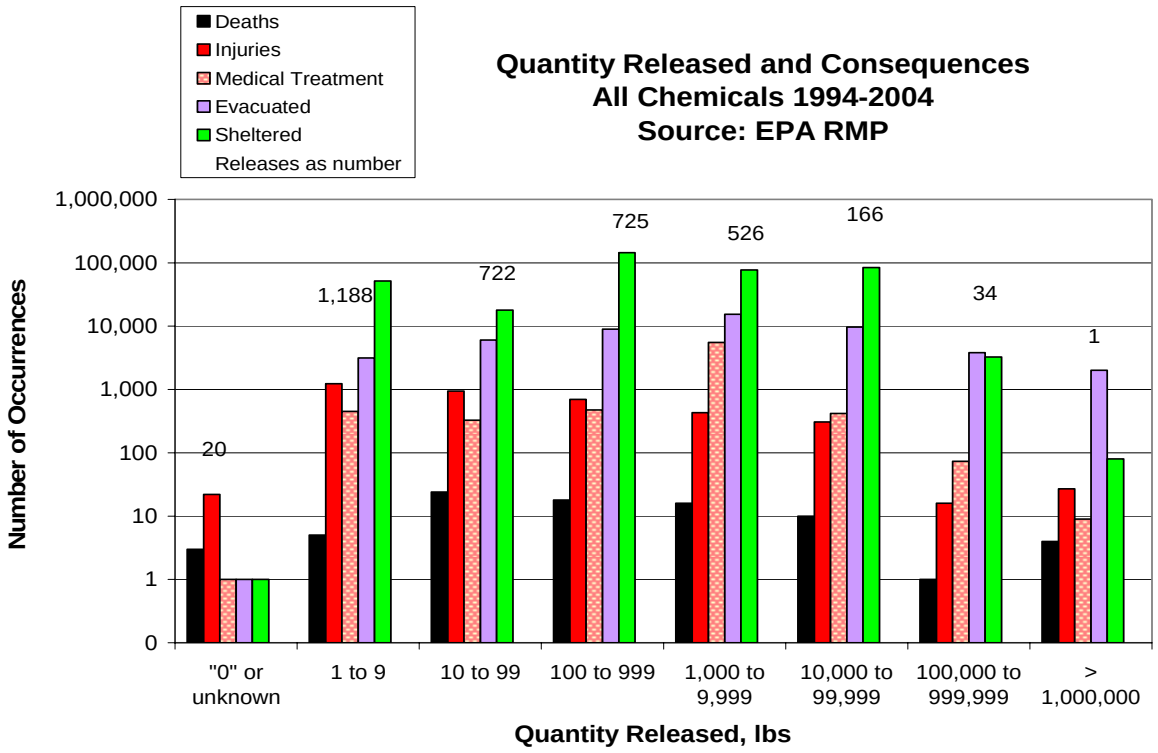
Petroleum Exclusion: Many believe a means to overcome this restriction should be found. Others believe that petroleum incidents seldom have health effects and there is not sufficient benefit for the cost of processing additional incidents. Identifying a reasonable threshold quantity may be the solution to this question. This topic is discussed in detail in the chapter 7, "Limitations of the Existing HSEES System."

9.2 Threshold Quantities

Table 1 shows the relationship between the number of occurrences of injuries, fatalities, evacuations and sheltering in place and the quantity of chemicals released. These data apply to the 15,000 facilities that are included the EPA's RMP program. There are roughly similar numbers of injuries in each quantity range shown. Even with quantities of less than 10 pounds, there were 682 injuries. There does not appear to be any minimum threshold below which injuries do not occur. However, from a cost-benefit viewpoint it may be reasonable to set a threshold quantity of 10 pounds. Including events below this threshold increases the number of incidents by 70% while capturing only 17% more injuries. The MKOPSC has developed additional information similar to this table to address specific chemicals and groups of chemicals. The data analyzed includes all 10 years of RMP data and additional sources such as HSEES and DOT. A working group is being formed to assess these results and make recommendations for setting threshold quantities for reporting.

The RMP data was analyzed for alkanes, chlorine, ammonia, acids and for all releases. The HSEES data was analyzed for all releases, chlorine and ammonia. In all cases there is no clear threshold quantity below which injuries are unlikely. The following table is typical of the others.

Table 1 Quantity Released and Consequences



9.3 Review of HSEES Input Form

The first step to assess the HSEES data fields will be to survey both those who collect the data and any stakeholder that has or may use the data in the future. The first survey addressed the usefulness of each data element. The second survey also determined determine how difficult or time consuming it is to capture each data element. An additional step will be to solicit and evaluate suggestions for additional data elements to help serve the needs of all stakeholders. A working group is being formed to assess these results and make recommendations for adjustments to the data elements collected. The group may also undertake additional means of assessing the value of certain data elements. This work will also serve as a basis for determining what tier data should be in.

9.4 Harmonization of HSEES with Other Data Systems

The terminology of all the federal data systems varies widely. Naturally, systems focused on a particular type of event, such as pipelines, have some very specialized fields. However, almost all the systems have certain core data elements that are similar in nature, but vary in the nomenclature and details. The MKOPSC is currently constructing a spreadsheet which will show the details of a number of systems. This will facilitate consideration of how the systems could be modified to be more consistent. A workgroup is being formed to complete this analysis.

Achieving agreement on changes in terminology is difficult within an agency. Thus, achieving agreement between different agencies is expected to be even more challenging. Implementing these changes also will require, in many cases, approval from the OMB.

Achieving consistency amongst the data systems would promote the exchange of data, especially electronically. It would also enable comparisons of risks from different types of events. Often a risk analysis must consider the difference in transportation risks versus those at fixed facilities. If data are consistent, the task becomes much easier.

9.5 Electronic Transfer of Data amongst Agencies

Currently, data in some systems are being transcribed by hand from other systems. Fortunately, during the stakeholder meetings, there has been agreement, in principle, to implement electronic transfer from the NRC and DOT to the HSEES system.

9.6 Tiered Systems of Data Collection

There are other methods of employing the concept of tiered data collection. One is to develop criteria to identify incidents that have significant consequences or the potential for severe consequences to receive more detailed data collection and analysis compared to less hazardous incidents. Another tiered method is to have significant incidents require completion more quickly for key fields of information. The selection criteria also could consist of incidents of particular types such as dust explosions or reactive chemicals' incidents or particular chemicals, industries and other factors. The DOT uses a 'threshold quantity released' to determine when to seek more detailed incident causation data.

It is proposed that 3 Tiers be utilized.

Tier 1 data is the basic data required to understand the significance of an incident and that can be quickly collected and disseminated. It is anticipated that data for this Tier would be about one page in length.

Tier 2 data would contain most of the present HSEES data and would be collected and disseminated in a matter of days to several months.

Tier 3 data would be additional detailed data collected for selected significant incidents. It is likely that 100 to as many as 1000 incidents per year would receive this more thorough data collection and investigation.

Below is an excerpt from the BSC Review related to this topic.

> *"one intermediate option discussed was having a two-tier surveillance program, with 15 core states with full implementation and funding as is currently done, and the rest of the states having less rigorous programs with more limited funding that rely on states reporting data from their own, existing hazardous substances emergency events programs without the same level of data assurance and completeness. This second tier would provide useful but less reliable and comprehensive information." [BSC Review, 2005]*

9.7 Specifics of Processes and Activities

> *"greater specificity about processes and/or activities involved in hazardous substances emergency events would be helpful in identifying risk factors for events." [BSC Review, 2005]*

Prevention of hazardous substance incidents often relies on an understanding of the particular process or activity being performed. While it is probably impractical to capture all the needed information in a database, it may be possible to achieve a better system through a combination of database fields and the text scenario which is now included in HSEES. In previous research, the MKOPSC has found that a subject matter expert can elicit useful details of an incident from the text description. The MKOPSC has also investigated and developed detailed terminology applicable to chemical process plants.

It may be useful to have additional specific fields or choices in drop down lists that are specific to particular situations such as chemical plants.

9.8 Timeliness of Data Collection and Reporting

As discussed in the Chapter 7, some believe that near real-time reporting is desirable in some situations. Conversely, it may be more efficient to wait for data being developed by another agency in order to avoid duplication of effort. This is true in the use of data from the DOT. Carriers are required to report an incident to DOT within 30 days. In addition, DOT requires time to process the data. In this case, HSEES would not receive the data for perhaps 60 days. HSEES procedures could be modified to allow for this type of data flow..

9.9 Value of Adding OSHA Variables

The OSHA Occupational Injury and Illness Survey is the primary means of measuring the number and impact of such health effects in the US. That system collects several items not included in HSEES that appear to have some benefit. Further consideration of the cost and benefit of additional data is warranted. Potential data items which may be added include:

- Occupation
- Part of Body Injured
- Days away from work
- Ethnicity
- Tenure with employer

9.10 Provide Data to Support CCPS Metrics System

CCPS, in conjunction API and ACC, have developed a lagging indicator of chemical process safety. This system will be implemented by the members of those organizations. Many other organizations that are not members may also adopt this system. As a means of benchmarking, it would be very helpful if the HSEES system collected two pieces of information required to make these measurements. One is the total number of people employed at the facility and the second is the UN chemical number. The UN chemical number is needed to establish the chemical classification and its related threshold quantity. Incidents meeting these criteria should be flagged automatically by the computer system.

Including this capability should enhance the use of the data by industry and researchers in that field.

9.11 Provide Environmental Effects

Providing an indication of environmental effects could enhance the value of HSEES to specialist in that field. The EPA RMP Accident History includes a brief checklist with just five choices describing the type of environmental damage. Including this information in HSEES could be done with little additional cost.

10. Awareness and Use of Incident Data

Focused messages aimed at particular audiences are needed to ensure effective communication. A prime example of this kind of effective communication was noted in Chapter 6 for New York State. The New York State mercury awareness program identified nine different target audiences and wrote a special brochure for each one.

> *The HSEES program should include national dissemination of important findings, with the intent of preventing and/or reducing the severity of future hazardous substances emergency events wherever they occur. To effectively enhance awareness and get organizations and companies to participate in the process there must be effective publicity, well-written journal articles, more trade magazines, and technical conferences. These activities should address the needs of government agencies, industry, labor, public interest groups, medical professionals, emergency responders [BSC Review 2005].*

10.1 HSEES Data Dissemination

The HSEES program regularly receives requests for information. The HSEES internet site is a repository for the HSEES Public Use dataset that is available for analysis, either as a download or mailed on a CD. The HSEES internet site lists journal articles and outreach campaigns, and provides links to the fourteen state HSEES sites. HSEES staff tracks the number of people who are targeted by the data requests. The number of people targeted by these requests is approximately 200,000 yearly.

The parties who collect, analyze, or use incident data and information should enhance their efforts to publicize their work. Additional means of determining the use and impact of the data and information distributed should be developed. An analysis of journal article citations could be one measure of success.

The HSEES program regularly presents findings, including results, case studies and the outcomes of prevention outreach activities at a wide variety of conferences including:

- American Public Health Association
- Mary Kay O'Connor Process Safety Center
- National Environmental Health Association
- National Fire Protection Association
- American Institute of Chemical Engineers Conference
- Pediatric Environmental Specialty Unit Annual Meeting
- Public Health Preparedness Summit
- Council of State and Territorial Epidemiologists International Society for Environmental Epidemiology
- American Chemical Society
- National Association of Emergency Medical Technicians

- EPA Regional Chemical Emergency Preparedness and Prevention and EPA International Hazmat Spills Prevention

HSEES has published findings in a variety of journals including the:

- Journal of Hazardous Materials
- American Journal of Industrial Medicine
- Environmental Health: A Global Access Science Source
- Journal of Environmental Health
- Morbidity and Mortality Weekly Report
- Chemical Health and Safety
- Prehospital Disaster Medicine
- International Journal of Hygiene and Environmental Health
- Journal of Occupational and Environmental Medicine
- Annals of Emergency Medicine

HSEES articles have encompassed a wide variety of topics, including:

- HSEES cumulative data on hazmat incidents and injuries
- HSEES prevention outreach programs
- Pesticide releases
- System interruption
- Adverse weather conditions
- Public health consequences
- Illicit methamphetamine laboratories
- Anhydrous ammonia releases due to thefts
- Improper chemical mixing
- Rail transit
- Fire and explosions in the manufacturing industry
- Carbon monoxide poisonings from underground utility cable fires
- Hazardous materials releases in rural/agricultural areas
- Firefighter injuries
- Chemicals as potential weapons of terrorism
- Secondary contamination of emergency department personnel
- The personal services industry
- Mercury spills from antiques
- Improper disposal of hazardous substances
- Homemade fireworks

11. Recommendations

The need for an expanded and improved national system of state based hazardous incident surveillance is apparent. The system is necessary for the safety and security of those in the US. Many tasks have been identified that will help move this process forward. Many of these tasks can be completed and implemented without a major commitment of resources. Major expansions will, of course, require additional funding. Funding sources could be federal agencies, direct congressional allocations, states and, perhaps, industry.

Upon completion of the various studies and assessments documented in this report, it will be possible to produce a roadmap that will contain the specific recommended changes, a justification for those changes, a statement of the value of the overall system and an estimate of the resources required to accomplish those goals.

In parallel with that effort, it is necessary to bring additional stakeholders into this decision-making process.

With the commitment of a wide variety of stakeholders to a well-defined plan, a compelling case will be made for the provision of adequate resources.

APPENDICES

Appendix A. Summary Listing of HSEES States' Prevention Outreach Activities 2004-2007

COLORADO

2004

An annual report on 2002-2003 data was developed and distributed throughout Colorado to first responders involved in hazardous materials response.

In July 2003, in response to the terrorist attacks on the World Trade Center and Pentagon on September 11, 2001, a Governor's Executive Order created nine AHEMR in Colorado. These regions were tasked with determining critical infrastructures in their areas and planning and preparing for terrorist attacks. In order to assist these new regions with counter-terrorism prevention and preparedness planning, in relation to hazardous materials incident potentiality, an annual report on 2003 data was developed and distributed to each region.

As Colorado identified an increasing number of injuries in rest areas in the state due to dumping of methamphetamine lab wastes, we conducted a public awareness project in coordination with the Colorado Department of Transportation (CDOT). Posters informing the general public on the recognition, hazards and proper notification of methamphetamine wastes was created by the Colorado Department of Public Health and Environment (CDPHE) and posted by CDOT at all rest areas in the State of Colorado.

As Colorado identified a number of chlorine-related incidents due to the improper mixing of cleaning chemicals by janitorial and cleaning staffs, educational material (magnets and brochures) on the hazards of mixing chlorine-based cleaning products with other cleaning products were created in English and Spanish and distributed to all janitorial and hotel associations in Colorado.

2005

In an effort to provide information to the emergency management community in

Colorado for emergency planning purposes, a state-wide report on 2004 Hazardous Substances Emergency Events Surveillance (HSEES) data was presented to the Colorado Emergency Planning Commission and a written article was published in its quarterly newsletter.

Updated the website to improve outreach to the general public, first responders, emergency managers, health care providers and private industry. This included adding new publications which had been completed over the last four years, designing and adding three dimensional maps showing the rate of hazardous substance releases by county, releases involving injuries by county, a list of the most commonly spilled chemicals in Colorado and other applicable graphically-displayed information.

Based on data analysis of the notification contact information contained within the HSEES system for 2003 and analysis to determine how the CDPHE might begin receiving new reports on releases in Colorado which HSEES staff were not being notified of, the CDPHE completed a report on 2004 data for submission to local health departments throughout the state. This report included an accompanying letter requesting that local health departments provide information on spills in their area directly to the Department's spill reporting line. A spill reporting brochure was also included.

An analysis of data from 1993-2003 indicated that Denver County had the third largest number of releases in Colorado. An analysis was conducted on the Denver County data in order to assure that local governments in Denver County were prepared for the types of incidents that occur in their county, and may potentially occur on a much larger scale. A presentation of the data analysis, the findings and the resulting

recommendations was made to the Denver County LEPC and the Denver County Hazardous Materials Team.

2006

In July 2003, in response to the terrorist attacks on the World Trade Center and Pentagon that had occurred on September 11, 2001, a Governor's Executive Order created nine AHEMRs in Colorado. These regions were tasked with determining critical infrastructures in their areas and planning and preparing for terrorist attacks. To assist these new regions with counter-terrorism prevention and preparedness planning, a quarterly report on 2006 data was developed and distributed to each region.

Based on feedback from a report on 2004 data submitted to local health departments, and a request from the Colorado Environmental Health Association (CEHA), an article was written for the CEHA's Point Source quarterly newsletter. This article included an analysis of the 2005 data and an accompanying letter requesting that environmental professionals provide information on spills in their area directly to the Department's spill reporting line.

A report on 2005 data was prepared for the trucking industries in Colorado. Included with this report was a letter requesting that the trucking industries report their incidents directly to the CDPHE 24-hour spill reporting line in addition to the Department of Transportation (DOT).

Based on analysis of data from 1993-2004, staff noted that a large number of fixed facility incidents were occurring at facilities regulated under the Superfund Amendments and Reauthorization Act Tier II program. An industry-specific analysis on 2002-2005 data was conducted and distributed to all Tier II facilities in Colorado. The data were to be used for emergency planning; training and response activities to assure that these facilities are better prepared for actual incidents.

2007

In July 2003, in response to the terrorist attacks on the World Trade Center and Pentagon that had occurred on September 11, 2001, a Governor's Executive Order created nine AHEMRs in Colorado. These regions were tasked with determining critical infrastructures in their areas and planning and preparing for terrorist attacks. To assist these new regions with counter-terrorism prevention and preparedness planning, in relation to hazardous materials incident potentiality, a quarterly report on 2007 data was developed and distributed to each region.

A report on 2006 data was prepared for previous spillers in Colorado. Included with this report was a letter requesting that they report future incidents directly to the CDPHE 24-hour spill reporting line.

FLORIDA

2006

Increased Stakeholder Awareness and Connectivity via EPICOM

2007

Carbon Monoxide Fact Sheet Development and Dissemination to Stakeholders

IOWA

The "HazMat Quarterly Newsletter" is published four times annually and contains information on chemical releases that occurred during the past quarter and trend analysis. The Newsletter is sent to hazmat teams, local emergency planning committees, fire departments, county sanitarians and other interested parties. This activity is ongoing.

Various oral presentations, poster presentations, and displays for educational purposes. This activity is ongoing.

2004

Methamphetamine (Meth) Lab Fact Sheet to educate the public on the dangers of meth labs
Iowa HSEES Cumulative Report 2002-2003. This report was used as an educational tool for emergency responders and planners.
Anhydrous Ammonia Safety Sticker. This sticker was developed in conjunction with the 2001-2002 report on anhydrous ammonia. The sticker has been distributed to farmers in 16 Iowa counties.

Methamphetamine Lab Clean Up Guidelines were developed for the public, landlords, real estate agents and property owners.

2005

Iowa HSEES Annual Report, 2004. This report was used as an educational tool for emergency responders and planners.
Clandestine Drug Lab Alert Poster was developed for the public to warn of the dangers of meth labs. The poster was displayed at all area rest stops in Iowa.

2006

County Specific Report on Emergency Chemical Releases, 1996-2005. This report was used an educational tool for all local emergency planning committees.

Iowa HSEES Data Report, 1996-2005. This report was used as an educational tool for emergency planners and responders.

Top Ten Chemicals Released from 2000-2005 Fact Sheet was developed as an educational tool for emergency planners and responders.

2007

HSEES Calendar was developed for 2008. The calendar was distributed to all local emergency planning committees, county environmental health departments and hazmat teams as an education tool for the HSEES program.

Improper Mixing of Household Chemicals Brochure was developed for the education of the public. Iowa Dept. of Public Health partnered with a local grocery store chain to distribute the brochures as a sack stuffer.

LOUISIANA

2004

Analyzed nearly 13,000 HSEES referrals from Louisiana State Police, Louisiana DEQ, and the National Response Center (NRC) in 2004. Many were forwarded to appropriate Louisiana Department of Health and Hospitals (LDHH) staff for response.

Created the LaHSEES website

Presented 2001 & 2002 program results to LaHSEES stakeholders in Baton Rouge, LA.

Presented program details to Tulane University School of Public Health and Tropical Medicine graduate school students.

Presented 2001 & 2002 program results by LDHH, Office of Public Health (OPH) regions to LDHH Regional Administrators.

Published "Lessons learned from hazardous chemical incidents-Louisiana HSEES system" in the *Journal of Hazardous Materials*; 115(1-3): 33-8, 2004.

Published "Hazardous Substances Emergency Events Surveillance related injuries, fatalities and evacuations in the state of Louisiana, 2002" in the *Louisiana Morbidity Report*, December 2004.

2005
Analyzed nearly 14,000 HSEES referrals from Louisiana State Police, Louisiana DEQ, and the NRC in 2005. Many were forwarded to appropriate LDHH staff for response.

Published Brochure "Hazardous Substances Emergency Events Surveillance (HSEES) System 2001- 2002 Transportation Events: What You Can Do to Decrease and Prevent the Release of Hazardous Substances During Transit."

Published "Hazardous Substances Emergency Events Surveillance System: 2004: A Summary Report.

2006
Analyzed nearly 13,000 HSEES referrals from Louisiana State Police, Louisiana DEQ, and the NRC in 2006. The majority were forwarded to appropriate LDHH staff for response.

Published fact sheet "Mississippi River Industrial Corridor: What safety precautions can residents and industries take to prevent and prepare for chemical emergencies"

Published fact sheet "Calcasieu Industrial Corridor: What safety precautions can residents and industries take to prevent and prepare for chemical emergencies"

Published "Acute Releases of Hazardous Substances Related to Hurricanes Katrina and Rita"
Published "Hazardous Substances Emergency Events Surveillance System: 2005: A Summary Report"

2007
Analyzed nearly 13,000 HSEES referrals from Louisiana State Police, Louisiana DEQ, and the NRC in 2007. The majority were forwarded to appropriate LDHH staff for response.

Parish Health Profiles - published an interactive web map of the state providing parish-specific HSEES data.

Published the "Louisiana Methamphetamine Report 2004-2006."

Published "Hazardous Substances Emergency Events Surveillance System: 2006: A Summary Report."

MICHIGAN (MI)

2005 - first year of data collection

To increase awareness of the new surveillance program in Michigan, the first year was devoted to developing and distributing an informative brochure to stakeholders at professional meetings and conferences throughout the State. Announcements went out in local trade journals and newsletters. Presentations on MI-HSEES were made to local health departments and the State Emergency Planning and Right-to-know Commission (SERC). A MI-HSEES web page was developed on the Michigan Department of Community Health's web site.

2006

Published the first annual report of MI-HSEES data entitled "Hazardous Substances Emergency Events Surveillance, 2005" and distributed to stakeholders.

Mercury in Schools Project (Phase I)- In response to reports of mercury spills in schools, conducted educational outreach and a survey of all of the K-12 public schools in Michigan (approximately 5,500) to ensure that they are in compliance with a State law requiring that all mercury should be removed from schools by December 31, 2004. Project included providing technical assistance to schools that requested assistance in disposing of mercury in response to our letter and survey.

Presentation of MI-HSEES data at the annual Michigan Information Integration Conference, National Environmental Health Conference, a LEPC group, the Michigan Department of Environmental Quality (DEQ), at meetings of local public health agencies, and various public health preparedness trainings.

Outreach by distribution of MI-HSEES materials: Michigan Safety Conference, Michigan State Police Homeland Security Conference, Michigan Occupational and Environmental Medicine Association annual meeting.

2007

Presentation of MI-HSEES data at the annual Michigan Epidemiology Conference and at the Michigan Department of Community Health's Poster Expo, at a meeting with the Michigan Occupational Safety and Health Administration, and at meetings with Michigan's eight regional emergency public health/medical planning groups.

Then second annual Report, entitled "Michigan Hazardous Substances Emergency Events Surveillance, 2006," was published and distributed to stakeholders. A summary of the report was published in a number of public health and emergency management newsletters.

Mercury in Schools Project (Phase II) - Arranged to have a questionnaire added to a mandatory survey administered by the Department of Education about compliance with the mercury-free school, as a way to improve data collection from the MI-HSEES survey conducted in 2006 as noted above. Offered technical assistance to respondents that indicated they were not in compliance. Data were obtained from almost all schools and only a few are still working on completing the mercury removal process.

Carbon Monoxide (CO) Project- Developed a web site of CO materials, www.michigan.gov/carbonmonoxide, and implemented a plan to issue a press release when Michigan has power outages, warning of the dangers of CO exposure when using generators.

MINNESOTA

2004

Presentation of a poster titled "Acute Hazardous Substances Releases and Injuries Associated with Aerial Agricultural Chemical Application" at the 16th Annual Meeting of the International Society for Environmental Epidemiology (ISEE) in New York, NY.

Submission of an article on aerial application incidents for publication: Rice, N., Messing, R., Souther, L., Berkowitz, Z. (2005) Unplanned Releases and Injuries Associated with Aerial Application of Chemicals, 1995-2002. Journal of Environmental Health, 68(4), 14-18.

Revision and update of the Minnesota (MN) HSEES web page to include event maps, excerpts from the Minnesota County Health Tables, and added, with editor's permission, an article published in Minnesota Fire Chief: Souther, L. (2000) April Showers Bring May Ammonia Releases. Minnesota Fire Chief, 36(4), 14-16.

Presentation of information about clandestine drug labs in the Emergency Response portion of the Minnesota Pollution Control Agency's Air, Water and Waste Conference, February 2004.

Presentation of HSEES overview and data trends at the Minnesota Safety Council's 8-hour Hazardous Materials Refresher class.

Distribution of HSEES information at an exhibit booth at the 38th Annual Minnesota Governor's Conference.

2005

Update and expansion of Minnesota HSEES web pages to include maps depicting distribution of selected chemical events and an updated chlorine fact sheet.

Presentation of a Minnesota HSEES program overview and data trends to Hazardous Materials Responder classes at the Minnesota Safety Council.

Presentation of HSEES data on clandestine methamphetamine laboratory trends in Minnesota as part of "Meth Day at the Capitol."

Distribution of HSEES information at an exhibit booth at the 39th Annual Minnesota Governor's Conference.

2006

Coordination of and participation in a workshop session on ammonia releases at the 2006 National Environmental Public Health Conference, Atlanta, GA.

Evaluation of a Minnesota methamphetamine precursor law by surveying counties for new clandestine meth lab discoveries after the law's implementation on July 1, 2005.

Compilation of Minnesota HSEES data for Twin Cities Advanced Practice Center for emergency preparedness activities.

Presentation of HSEES information at a resource table at the 2006 Minnesota Community Health Conference.

Update of Minnesota HSEES data on web pages including addition of the 2005 MN HSEES Report and map updates.

2007

Completion of an information sheet on anhydrous ammonia and addition to the MN HSEES web pages.

Alerting state and local public health officials of chemical releases or reported concerns.

Assessment of the interest and feasibility of creating an agricultural anhydrous ammonia safety sticker.

Compiled a report on MN HSEES 2006 data trends and outreach activities and added the report to the MN HSEES web page.

Completion of an article describing HSEES for Minnesota Fire Chief magazine: Rice, N. (2007) Hazardous Substances Release Information for Fire Departments. Minnesota Fire Chief, 43(5), 17-18.

NEW JERSEY

2007

HSEES Fact Sheet: Information for Local Health Officers - focused on increasing awareness of the HSEES project for local health officers

HSEES Fact Sheet: Information for Offices of Emergency Management in New Jersey - focused on the top five counties with the highest number of releases, specifically on high numbers of transportation-related events.

HSEES Fact Sheet: Information for Hospitals in New Jersey - focused on the top five counties with the most victims associated with hazardous substance releases.

NEW YORK

2004

Collaborated with Agency for Toxic Substances and Disease Registry (ATSDR) to prepare a manuscript for *Morbidity and Mortality Weekly Report* (MMWR) on a type of hazmat even that had not previously been reported in the literature, namely, the release of carbon monoxide from underground utility cable fires in New York State. The article, "Carbon Monoxide Releases and Poisoning Attributed to Underground Utility Cable Fires - New York, January 2000-June 2004," described 234 carbon monoxide incidents and was published on October 8, 2004.

Continued collaboration through the Partnership to Reduce Mercury in Schools. Focused on securing the participation of New York City schools in this education and outreach effort and on obtaining necessary approvals to design and print the nine written deliverables. In July 2004, the Governor signed a new law that banned the use of elemental mercury in all primary and secondary schools in New York State (NYS) and required the NYS Department of Environmental Conservation, in consultation with the Department of Health, to develop and disseminate informational materials on the dangers of mercury-added consumer products and on their disposal. The auspicious timing of this new mercury Law ensured a strong interest in the mercury materials and their extensive use.

Continued Collaboration to Address Issues Related to Clandestine Drug Laboratories with NYS Police, the NYS Department of Environmental Conservation, other agencies and responder groups to address the problem through education and by providing information through telephone calls and e-mail. HSEES staff prepared posters for two conferences ISEE and the American Public Health Association (APHA)) that focused on methamphetamine labs and NYHSEES outreach activities. Staff also gave a presentation at the Council of State and Territorial Epidemiologists (CSTE) conference in Boise, Idaho. HSEES staff assisted in preparing the Department of Health's testimony presented in November, 2004, at a hearing, organized by the State Commission of Investigation, into the problem of clandestine drug labs in NYS.

Outreach to Professional Organizations and Others Involved in Emergency Response or Health and Safety to raise awareness and increase knowledge about hazardous substances, their releases in New York State and the public health consequences. Staff made twelve presentations to professionals including firefighters, LEPCs and construction engineers.

Published an article on homemade fireworks:

Cooper, D., Wilburn, R. E., Ehrlich, J., Welles, W. L., Stemmons, S., Gunnells, L., Horton D. K. and W. E. Kaye. 2004. Brief Report: Injuries Associated with Homemade Fireworks – Selected State, 1993-2004. *Morbidity and Mortality Weekly Report* 53 (25): 562-3.

Published an article summarizing New York HSEES data:

Welles, W.L., Wilburn, R.E., Ehrlich, J.K. and C.M. Floridia. 2004. New York Hazardous Substances Emergency Events: Learning from Hazardous Substances Releases to Improve Safety. *J. Hazardous Materials* 115 (1-3): 39-49.

2005

Distribution and evaluation of the nine brochures in the Reducing Mercury in Schools series. Distributed more than 110,000 mercury brochures to the following: NYS Association of Buildings and Grounds; NYS School District Superintendents; 1,400 schools of the NY City Department of Education, NYS Department of Environmental Conservation (DEC) for their training workshops with Northeast Waste Management Official's Association (NEWMOA); NYS School Nurses Association; NYS Parent Teachers Association; NYS Chapter of the Association of Educational Safety and Health Professionals (AESHP); public school principals and science teachers; public health educators; and the Commissioner of Education's Advisory Council for Nonpublic Schools. Customized cover letters and postage-paid feedback cards accompanied every distribution. The brochures were posted on the Department of Health (DOH) web site at: www.health.state.ny.us/environmental/chemicals/hsees/mercury/index.htm

Continued collaboration with other NYS Agencies to address issues related to clandestine drug laboratories, particularly an increase in thefts of agricultural anhydrous ammonia for use in the illicit manufacture of methamphetamine. Studied the efficacy and toxicity of three chemical additives to act as deterrents in anhydrous ammonia thefts and assisted in the preparation of a report for the Governor and Legislature on Additives to Anhydrous Ammonia.

Continued collaboration with other NYS agencies to address through legislation issues related to clandestine drug laboratories. HSEES staff took an active role in preparing and providing comments on a Governor's program bill that was passed into Law. Passage of this Law strengthened future prosecutions and established educational requirements. The Law made possession of precursor chemicals illegal, made possession of anhydrous ammonia for the production of methamphetamine a felony, increased penalties under child endangerment laws for the manufacture of methamphetamine in the presence of a child, provided for development of a mandatory reporting system for all law enforcement agencies, and required increased education of mandatory reporters on recognition of a methamphetamine lab.

Conducted outreach to professional organizations and others involved in emergency response or health and safety through 12 presentations of HSEES data to various audiences including: Hazmat Training Weekend at the New York State Fire Academy, NYS Department of Environmental Conservation Division of Environmental Remediation spring meeting, "Fire 2005, Fire Industry, Rescue and Emergency Medical Services (EMS) Expo," the 99th Annual Conference of Fire Chiefs, US Environmental Protection Agency (EPA) Region 2, National Environmental Health Association (NEHA) Annual Education Conference and Exhibition, the 110th Annual Conference of the Science Teacher's Association of New York State (STANYS) and two LEPCs.

2006

Continued distribution and evaluation of the nine brochures in the Reducing Mercury in Schools series. A mailing to more than 2,000 non-public schools in January was the last major step in this massive outreach/education process. Customized cover letters and postage-paid feedback cards accompanied the mailing.

Continued collaboration with other NYS agencies to address issues related to clandestine drug laboratories. Provided NYHSEES data and slides on clandestine drug laboratories to the Methamphetamine Steering Committee for a multi-agency work group involved in decision-making and reviewed their report entitled "New York State (NYS) Interagency Methamphetamine Steering Committee, 2005 to Present." Staff made two videocasts entitled "Clandestine Drug Laboratories and the Role of Local Health Departments" that reached staff at more than 16 county health departments and two DOH Regional Offices. Also, provided NYHSEES

data on clandestine drug laboratories and activities in support of eliminating clandestine drug laboratories at the NYS Department of Health's First Poster Day on November 1, 2006.

Continued outreach to professional organizations and others involved in emergency response or health and safety to raise awareness and increase knowledge about hazardous substances, their releases in NYS and the public health consequences. Staff made six presentations at venues including the Hazmat Training Weekend held at the NYS Fire Academy; "Fire 2006, Fire Industry, Rescue and EMS Expo," the 100th Annual Conference of Fire Chiefs; the Columbia County LEPC annual meeting; and the State University of New York, School of Public Health.

Provided alerts or timely notifications of on-going hazmat incidents to professionals in public health, emergency management and environmental conservation. From April through December of 2006, staff provided 18 alerts to appropriate response agencies statewide.

Assisted a graduate student from the State University of New York at Buffalo working on a master degree in Urban and Regional Planning with NYHSEES data for risk factor analysis. The data were used in two academic presentations (December 6 in Buffalo, and December 11 in Albany) on "Multi-hazard threats, with probability, vulnerability and past frequency for the State of New York" that were be attended by professionals in public office, emergency management and public health. The data were also used by the graduate student in a chapter on HazMat events.

Made two presentations at the 2006 National Environmental Public Health Conference, held December 4-6 in Atlanta, Georgia. The presentations were "National Acute Chemicals Events Surveillance: A Partnership for Success" and "Using Surveillance Data on Acute Chemical Releases to Build Capacity for Prevention, Planning and Response."

Participated in the Centers for Disease Control (CDC) National Research Agenda on CO meeting in Portland, Maine. After plenary sessions, meeting participants separated into communication and surveillance tracks to address how best to deliver the 2010 CDC goal of having surveillance capabilities for CO poisonings in all 50 states.

2007

Alerting of professionals in public health, emergency management and environmental conservation. Staff provided 20 alerts or timely notifications to appropriate response agencies statewide from January 1 to September 30, 2007. Recipients of alerts included county health departments, New York City Department of Health and Mental Hygiene, NYS DEC Spill Prevention and Response, the NYS DEC Emergency Response Coordinator and staff, Regional and District Offices of the NYS DOH, NYS DOH Bureau of Environmental Radiation Protection, and NYS DOH Bureau of Community Environmental Health and Food Protection

Outreach to professional organizations, emergency responders, local planners and others involved in safety and health through two presentations, two informational meetings and responsiveness with NYHSEES data or slides to six requests. The two presentations were: a training session held for the Blooming Grove Volunteer Ambulance Corps and Fire Departments in Orange County and a presentation to new Preventive Medicine residents (PMR) who are beginning the DOH PMR program which trains physicians to work in public health. The two informational meetings included one with staff at the NYS Office of Homeland Security (OHS) and another with the Deputy Director for Public Health Preparedness at NYS DOH. NYHSEES data that were provided in response to requests were: 134 school events (67% with victims) from 1993 to 2004 to the DEC Pollution Prevention Unit; spill and evacuation data for a comprehensive emergency response plan; data on chemical incidents in 2006 that involved fire or explosions for use by DEC Executive Staff and the Governor's Deputy Secretary to plan for air monitoring equipment that may be needed to protect the public and responders following a large-scale incident; and slides with NYHSEES data for a trainer from EnMagine, Inc. in California, who conducted two training sessions entitled "Hospital Hazardous Materials Incident Command" for about 60 members of the Healthcare Association of New York State (HANYS).

Collaboration with the Chemical Alliance and American Chemistry Council to introduce them to the NYHSEES program and uses of NYHSEES data, and to develop partnerships with chemical manufacturing industries in New York State. The presentation was well-received and NYHSEES staff was invited to join the Schenectady County LEPC in an emergency preparedness tour of the Schenectady International (SI) Group facility in Rotterdam Junction on April 19, 2007. The facility which is largely automated produces phenolic resins.

An article entitled, "Elemental Mercury Releases Attributed to Antiques – New York, 2000-2006," was published in *Morbidity and Mortality Weekly Report* on June 15, 2007. The *Morbidity and Mortality Weekly Report* article generated significant press: radio interviews with the Associated Press, the Canadian Press, CNN, CBS Radio News, Canadian Broadcasting Company Radio and FOX Radio News in New York City. The press interviews then spawned more than 172 articles worldwide on the topic of mercury in antique and vintage items and led to inquiries from *Reader's Digest Australia* and an article in the February 2008 issue of **"***O, The Oprah Magazine"*, which has a circulation of 2.5 million readers, with an estimated pass-on readership of 16 million.

Education of people involved in buying, selling and collecting antiques and vintage items about the possibilities of mercury spills and targeted outreach through six trade journals on antiques: *Antiques and Collecting Magazine, Antique Trader, Art & Antiques, New England Antiques Journal, Southeastern Antiquing and Collecting Magazine, The Magazine Antiques.* The Editor-in-Chief of the *New England Antiques Journal* subsequently published a condensed version of the original *Morbidity and Mortality Weekly Report* article in the December issue of *New England Antiques Journal* (26(6): 48-9).

Presentation and manuscript for the MKOPSC 2007 International Symposium at Texas A&M University in October. The presentation which was entitled "New York Hazardous Substance Emergency Events Surveillance (HSEES) Data Support Emergency Response, Promote Safety and Protect Public Health" was also published in the *Symposium Proceedings* and will be published in the *Journal of Hazardous Materials*.

New York HSEES supported ATSDR efforts at the National Vision meeting with a presentation on New York's prevention and outreach activities in recent years. Staff gave a presentation on data-driven prevention activities and also facilitated the workgroup on data quality and improving data elements, collection and analysis.

NORTH CAROLINA

2004

Presented "North Carolina HSEES-related Fires and Explosions 1993-2003" with ATSDR and other HSEES states at the National Fire Protection Association Conference and Exposition.

Submitted articles to *EpiNotes* (journal distributed by the Epidemiology Section) and *The Fire Rescue Journal* distributed by the North Carolina Office of State Fire Marshal.

Poster presentations at various responder conferences throughout the state (2004 Piedmont Fire Seminar, 2004 North Carolina State Firemen's Association Conference, 2004 All Hazards Emergency Manager's Conference).

Presentations to LEPCs in the counties (Wake, Guilford, Mecklenburg, and Lee) with the highest number of releases.

2005

Distributed a *2002-2003 Data Report* to LEPCs and local emergency managers.

Poster presentations at various responder conferences throughout the state (2005 Piedmont Fire Seminar, 2005 North Carolina State Firemen's Association Conference).

Poster presentation at All Hazards local emergency manager conference (2005 All Hazards Emergency Manager's Conference).

Presentations to LEPCs in the counties with the highest number of releases (Wake, Guilford, Harnett and Mecklenburg).

2006

Created a poster for the Meat and Poultry Industries that outlines the dangers of ammonia refrigeration system releases. *Ammonia Refrigeration Injury Prevention in North Carolina* was distributed to more than 60 plants throughout the state.

Distributed a *2004-2005 Data Report* to LEPCs and local emergency managers.

Submitted an article outlining pesticide-related North Carolina HSEES events to the *North Carolina Pesticide Section* newsletter that reaches 42,000 licensed pesticide applicators.

Poster presentations at various responder conferences throughout the state (2006 Piedmont Fire Seminar and 2006 North Carolina State Firemen's Association Conference).

Poster presentation, "North Carolina Hazardous Substances Emergency Events Surveillance 2002-2005" at North Carolina Public Works Association Conference.

Poster presentations at local emergency manager conferences Spring 2006 All Hazards Emergency Manager's Conference and Fall 2006 Emergency Manager's Conference.

Presentations to LEPCs in the counties (Wake and Guilford) with the highest number of releases.

Presented, "Ammonia Dangers in North Carolina Industry" with ATSDR and other HSEES state at the National Environmental Public Health Conference.

2007

Collaborated with the North Carolina Office of State Fire Marshal to distribute a flyer, *Firefighter Injuries 2002-2006,* focused on preventing respiratory injuries to firefighters in all fire departments in the State.

Poster presentations at various responder conferences throughout the State (2007 Piedmont Fire Seminar and 2007 North Carolina State Firemen's Association Conference).

Poster presentations at local emergency manager conferences (Spring 2007 All Hazards Emergency Manager's Conference and Fall 2007 Emergency Manager's Conference).

Poster presentation at 2007 North Carolina Safety Conference.

Presentations to LEPCs in the counties with the highest number of release (Wake, Guilford and Brunswick).

OREGON

2005

Additional activities related to the methamphetamine epidemic in Oregon:

- Presentations to public health practitioners on meth labs' contribution to HSEES incidents in Oregon.
- Education on exposures, health effects, care, and decontamination procedures for children exposed to the products of methamphetamine manufacture. Two training sessions were given to medical

providers, child welfare workers, child abuse treatment providers, first responders, Emergency Medical Technician (EMT), U.S. Department of Education staff, legal and judicial staff. Partner: Oregon Alliance for Drug Endangered Children.

2002-2003 Cumulative Report based on OR-HSEES data was posted on Oregon HSEES web site: http://egov.oregon.gov/DHS/ph/hsees/. Paper copies were provided to partners: Community Awareness Emergency Response (CAER) groups, LEPCs, industry representatives and emergency responders.

Article describing Oregon HSEES submitted to *The Gated Wye*, a monthly newsletter for the Oregon fire service, published by Office of State Fire Marshal.

Participated in monthly LEPC meetings.

Participated in monthly and quarterly meetings of CAER groups.

2006

2004 Cumulative Report on hazardous materials releases in Oregon. Posted on Oregon HSEES web site and partners were provided with the web link.

Participated in monthly LEPC meetings through May 2006.

Participated in monthly and quarterly meetings of CAER groups; provided email hazard alerts to six CAER groups on hazards of new methamphetamine precursors and home biodiesel manufacturing.

Report on *Clandestine Meth Labs Identified by OR HSEES by County and Year, 1998-2005* was provided to Dr. Daniel Sudakin, Oregon State University and was posted on Oregon HSEES website.

Education on exposures, health effects, care and decontamination procedures for children exposed to the products of methamphetamine manufacture. One training session was given to medical providers, child welfare workers, child abuse treatment providers, first responders, EMT personnel, U.S. Department of Education staff, legal and judicial staff. Partner: Oregon Alliance for Drug Endangered Children.

2007

Article describing Oregon HSEES was printed in *The Gated Wye*, a monthly newsletter for the Oregon fire service that is published by Office of State Fire Marshal.

Participated in strategic planning sessions for reorganization from a single statewide LEPC to several locally focused LEPCs similar to those in other states.

Participated in monthly and quarterly meetings of CAER groups; provided e-mail hazard alerts to six CAER groups on hazards of mercury releases from antique mirrors and on hydrofluoric acid-etched graffiti.

Participated in HazMat Computer-Aided Management of Emergency Operations (CAMEO) training provided by the Office of State Fire Marshal.

Education on exposures, health effects, care and decontamination procedures for children exposed to the products of methamphetamine manufacture: Training session given to medical providers, child welfare workers, child abuse treatment providers, first responders, EMT, U.S. Department of Education staff, legal and judicial staff. Partners: Oregon Alliance for Drug Endangered children.

Report: *Risks to Responders - Oregon HSEES incidents - 1993-2005*. Posted on the Oregon HSEES website and presented to the ECHO CAER group. Notified partners of report on website.

Publication: Collaborated with ATSDR HSEES staff on: *Secondary Contamination of Medical Personnel, Equipment, and Facilities Resulting from Hazardous Materials Events, 2003-2006*, in Disaster Medicine and Public Health Preparedness, in press.

2007-2008

Chlorine fact sheet based on chlorine releases in Oregon is being revised to target drinking water systems and public swimming pools more specifically.

Ammonia fact sheet based on ammonia releases in Oregon is being prepared. Planned distribution includes CAER groups, LEPCs, responders and web site posting.

Developing plan for dissemination of alerts to local health departments about hazardous materials incidents occurring in their jurisdictions. Partners: Oregon Health Alert Network (HAN), Council of Local Health Officers (CLHO) and local health departments.

Report on the top ten chemicals released in Oregon 2000 – 2006 is in preparation and is intended for responders, policy makers and general public.

TEXAS

2005

Analyzed and presented data to the Texas Poison Control Network (TPCN) to make them aware of the HSEES program and developed a data sharing agreement.

Analyzed and presented data to Toxic Substances Coordinating Committee (TSCC) to make them aware of the HSEES program and encouraged the sharing of data. The TSCC is an interagency group with representation from the Texas Department of State Health Services (DSHS), Texas Commission on Environmental Quality (TCEQ), and the Texas Department of Agriculture (TDA).

Analyzed and presented data to the Texas Workers' Compensation Commission (TWCC) Health Safety Summit to make them aware of the HSEES program and encouraged the sharing of data.

In collaboration with the DSHS Toxicologist, wrote an article on chemical release events in schools for the School Health Bulletin. This was distributed to every school nurse in Texas (estimated distribution was 3,000). It resulted in one additional report of a chemical release event that injured two students.

In collaboration with the DSHS Toxicologist, developed the Sodium Hydroxide Fact Sheet. Distributed this fact sheet to more than 330 contacts at 207 industrial facilities in Texas who regularly contribute data to HSEES.

2006

TxHSEES 2004 Annual Report distributed to more than 330 contacts at 207 industrial facilities in Texas who regularly contribute data to HSEES.

Presentation to the CSTE national meeting regarding the results from collaborative efforts to share data with TPCN and the Pesticide Exposure Surveillance in Texas (PEST) program.

TxHSEES analyses of the Trucking Services Industry. The Texas HSEES investigators contacted by phone and/or e-mail six of the following entities: Texas trucking industry contacts, industry health and safety managers or trainers at those companies identified as having the most frequent number of events, and other trucking industry stakeholders. TxHSEES surveyed the entities to identify possible corrective measures they could take to reduce acute hazardous substances release events attributable to human error, improper filling/loading/packing, and forklift puncture.

Based on information obtained in the 2006 activity described above, TxHSEES developed a Trucking Communication Intervention Activity (including baseline survey and post-survey evaluation).

2007
Data were analyzed for the ten Texas counties with the most frequent number of events. County data tables were linked to TxHSEES website and emailed to county emergency managers.

Ector County-specific analyses completed and presentation delivered to the Ector County LEPC. An additional analysis was requested showing the number of events by zip code. These data are being merged with other data to analyze the current emergency response and evacuation routes to determine if there are alternate routes which would lower response times.

TxHSEES Report on 2006 events distributed to more than 326 contacts at more than 233 facilities in Texas who regularly contribute data to HSEES.

Coordinating Office for Terrorism Planning and Emergency Response (COTPER) Alerts. There were 13 COTPER Alerts in 2007. Six were not HSEES cases, seven were HSEES cases. Of the seven HSEES cases, three referrals were made to the Texas Commission on Environmental Quality (TCEQ), the State regulatory agency. Other alerts were provided to the Texas Poison Center Network (1), Radiation Control (1), Harris County Pollution Control (1) and local health department (1). The other entities were notified out of concern that the situation might fall under their jurisdiction and that they might not have received notification about the situation from another source. These alerting activities are an indication of the cooperative relationships that TxHSEES is building with other entities.

2008
County data for all 254 Texas counties to be linked to TxHSEES website.

Presentations will be delivered to the Governor's Division of Emergency Management training seminars for emergency managers. One county will be identified for a prevention/intervention activity.

Texas HSEES 2007 annual report distributed to more than 300 contacts at more than 200 facilities in Texas who regularly contribute data to HSEES.

UTAH

2004
A pamphlet about the danger of carbon monoxide poisoning and the signs and symptoms of carbon monoxide poisoning was created. The pamphlet included a description of the HSEES program, case histories from the HSEES database and links to relevant web sites. The pamphlet was then distributed to maintenance and management individuals at college dormitories and college apartment complexes.

A fact sheet on the hazards of mixing bleach with other products was created with case histories from the HSEES database, links to relevant web pages, and a description of the HSEES project. In addition, the fact sheet was distributed with educational materials to 20 childcare or adult care facilities.

Phone-outreach was performed by directly contacting swimming pool managers, owner/operators, public works directors, parks and recreation directors and others to inform them that, according to HSEES data, for every 3 chlorine releases (1993-1999), one or more of them generated victims, evacuees, or both. Those contacted received information regarding the scope of the Utah HSEES program. The telephone survey included questions on the maintenance of their facilities and if an emergency plan had been prepared.

2005
Developed relationships with large industries in the state that would enhance our ability to obtain detailed information regarding releases of hazardous substances. A tri-fold brochure was developed to outline HSEES activities and describe how information collected by HSEES could be used by industry.

Developed a quarterly newsletter to send to first responders, LEPCs and other groups that work with hazardous releases. This newsletter included information about the HSEES program, the number of events occurring during that time period, as well as an analysis of the data into fixed facilities and transportation events. The newsletter included contact information for the HSEES program.

Develop a collaborative relationship with each of the local health departments to improve reporting of methamphetamine-related hazardous substance emergency events. The Utah legislature passed a bill this year entitled, "Illegal Drug Operations Site Reporting and Decontamination Act." This bill requires law enforcement agencies in Utah to report clandestine drug labs to the local health department.

2006
Collaboration with transportation companies in Utah that report to DOT, to increase awareness by tools such as a brochure describing the HSEES program, the resources that are available and how to report directly to our program. Efforts were made to have the companies that reported to DOT also report directly to the HSEES program to increase the percentage of events entered into the system within the 48-hour rule.

Education of superintendents concerning the importance of having an evacuation plan in place and provided data involving students and hazardous releases. Superintendents were provided with a pamphlet describing incidents involving students and other similar incidents in Utah, a brief program description and information about evacuation plans.

2007
The Utah HSEES program registered as an organization in the Utah Notification and Information System (UNIS) and collaborated with Local Emergency Planning Committees (LEPC) and the Public Information Offices Association in the state of Utah to register on UNIS so that Utah HSEES could utilize the system to send alerts of events.

A fact sheet was developed to describe Utah HSEES events by county. The fact sheet was sent to fire chiefs in Utah along with the 2005 cumulative report and a questionnaire. The questionnaire requested that the recipients review the accuracy and completeness of the report and fact sheet, and submit any discrepancies.

A pamphlet describing ammonia spills was created. The pamphlet focused on the importance of having a safety plan in place and provided data involving employees and hazardous releases. This pamphlet was distributed to dairies in Utah along with a pre- and post-survey to gauge increase in awareness.

WASHINGTON

2004
WA-HSEES prepared an annual report to describe the distribution of hazardous substance emergencies in Washington State for the 2002–2003 time-period.

2005
WA-HSEES initiated a letter campaign for distribution to first responders throughout the state to increase the awareness of the purpose and importance of immediately reporting all such events and to increase the proportion of events captured by the program within 48 hours of occurrence.

WA-HSEES developed a listserv to increase the distribution of HSEES information in an efficient and timely manner, increase awareness of and interest in the HSEES program, increase requests for and

utilization of HSEES data by first responders; and create a lasting partnership between first responders and the HSEES program.

WA-HSEES gave a presentation about the HSEES program at a conference entitled "Hazardous Materials Incidents: Improving Interagency Response." This conference addressed working with other agencies when responding to a hazardous material incident, and finding out whom to call, when to call, what to ask, and what to do during an emergency. Conference attendees practiced using the Incident Command System with counterparts in Washington agencies.

WA-HSEES distributed a Bleach Fact Sheet at The Fort Lewis Army Installation's Safety Stand Down Day, a safety training day required for military personnel.

WA-HSEES wrote an article titled "Hazardous Substances Releases and Resulting Injuries in Washington 1993-2002" which is an evaluation of historical HSEES events involving multiple casualty events.

WA-HSEES developed, published and distributed a Bleach Fact Sheet in May 2005. A magnet in the shape of a bleach bottle was subsequently created with the message "NEVER mix bleach with common household cleaning products. Mixing these can form deadly gases and cause serious injury. For Emergencies, call Washington Poison Center 1 (800) 222-1222."

WA-HSEES developed, published and distributed an Ammonia Fact Sheet in June 2005.

WA-HSEES developed a 2006 HSEES calendar to highlight the HSEES program and invite collaboration with others interested in emergency event management and surveillance; provide information on the HSEES program and substance releases in Washington State in an effort to protect human health and the environment by preventing future releases; encourage target audiences to immediately report all hazardous materials releases by having contact numbers readily available on the calendar.

WA-HSEES prepared an annual report to describe the distribution of hazardous substance emergencies in Washington State for the year 2004.

2006

WA-HSEES developed a 2007 HSEES calendar to highlight the HSEES program and invite collaboration with others interested in emergency event management and surveillance; provide information on the HSEES program and substance releases in Washington State in an effort to protect human health and the environment by preventing future releases; encourage target audiences to immediately report all hazardous materials releases by having contact numbers readily available on the calendar.

WA-HSEES alerted appropriate public health partners within 48 hours of event occurrence following at least five incidents in which a chemical hazardous substance was identified that threatened the public's health and that needed immediate follow-up action.

WA-HSEES prepared an annual report to describe the distribution of hazardous substance emergencies in Washington State for the year 2005.

2007

WA-HSEES developed a quarterly publication titled "HSEES Highlights" to highlight HSEES events, trend analysis and event summaries in Washington.

WA-HSEES collaborated with other public health partners to identify strategies for preventing carbon monoxide incidents, injuries and death.

WA-HSEES developed a presentation to educate the general public on the hazards of carbon monoxide that result from inappropriate use of alternative heating sources and presented it to at-risk populations.

WA-HSEES developed a 2008 HSEES calendar to highlight the HSEES program and invite collaboration with others interested in emergency event management and surveillance. Staff provided information on the HSEES program and substance releases in Washington State in an effort to protect human health and the environment by preventing future releases. Staff also encouraged target audiences to immediately report all hazardous materials releases by having contact numbers readily available on the calendar.

WA-HSEES alerted appropriate public health partners within 48 hours of event occurrence following at least three incidents in which a chemical hazardous substance was identified that threatened the public's health and that needed immediate follow-up action.

WISCONSIN

2004

In an exhibit booth venue, provided information about transportation-related events to the members of the Wisconsin Motor Carriers Association membership focusing on the frequency and location of events, number of victims and injury types, and the number of evacuees. Feedback forms were the evaluative component.

As an exhibitor at the Wisconsin Environmental Health Association (WEHA) 25th Annual Joint Educational Conference and at the Wisconsin Rural Water Association (WRWA) Annual State Conference, presented WI HSEES data detailing frequencies of ammonia and chlorine events, victims and evacuees resulting from releases over 10 years (1993-2002). Feed back forms were the evaluative component.

In collaboration with ATSDR and WI Bureau of Environmental and Occupational Health (BEOH) staff, wrote and published an article and performed statewide educational outreach addressing hazardous tearing-agents contained in theft deterrent devices attached to vault doors. The outreach component of this initiative was in partnership with the WI Jewelers and the WI Bankers Associations, and state locksmiths.

In cooperation with our Department's editing staff, developed and gained approval for new fact sheets and data summaries of WI HSEES data (1993-2003) which were focused on event, victim, and evacuee frequencies which were placed on the WI HSEES web page and on the WI HAN.

2005

For WI Emergency Management Staff and Local Emergency Planning Committee members, developed and exhibited a poster focused on WI HSEES events at the statewide 2005 Governor's Conference on Emergency Management. The poster included general HSEES data but was focused on the transportation sector, where the emphasis was on frequency and location of hazmat events, number of victims, number of evacuees, and frequencies of hazardous substances in relation to their Immediately Dangerous to Life and Health (IDLH) thresholds as stated in the National Institute for occupational Safety and Health (NIOSH) Pocket Guide to Chemical Hazards. Feedback forms were the evaluative component.

Working with Bureau of Environmental and Occupational Health (BEOH) staff, WI Occupational Safety and Health Administration (OSHA) Consultation staff, University of WI-Madison College of Engineering Staff, and ATSDR identified "action partners' (collaborators) and gained consensus for an statewide ammonia prevention/outreach initiative in a manner that met the needs of both the collaborators and the regulated/targeted community. (Phase 1)

As a follow-up to a presentation at the 2004 Collegium, Ramazzini (Bhopal, India 20th Anniversary Session) and in collaboration with ATSDR staff, wrote and published an article addressing the adverse public health effects resulting from acute chlorine and ammonia releases in Wisconsin over the 11-year period of 1993 to 2003.

In cooperation with our the Department's editing staff, developed and gained approval for new fact sheets and data summaries of WI HSEES data (1993-2004) which focused on event, victim, and evacuee frequencies which were placed on the WI HSEES web page and on the WI HAN.

2006

At the WRWA 18th Annual State Conference, presented WI HSEES data detailing frequencies of chlorine events, victims and evacuees resulting from releases over 12 years (1993-2004). Also, provided numerous informational handouts addressing the characteristics and dangers of chlorine. Feedback forms were the evaluative component.

Working with OSHA Compliance Assistance Service Staff and University of WI-Madison College of Engineering Staff as "key action partners" (collaborators) and with WI OSHA Consultation staff and BEOH staff acting as "support partners", gained consensus for an ammonia prevention/outreach initiative utilizing best evidence/best practices precepts in a manner that meets the needs of both the collaborators and the regulated/targeted community. (Phase 2)

In anticipation of working more effectively to support disaster preparedness planning in WI hospitals through accelerated availability of WI HSEES data, provided a brief article for the Wisconsin Hospital Association newsletter which introduced the WI HSEES Program, and provided a brief data summary of spills data over a 12-year period, 1993-2004.

In cooperation with our Department's editing staff, developed and gained approval for new fact sheets and data summaries of WI HSEES data (1993-2005) which focused on event, victim, and evacuee frequencies which were placed on the WI HSEES web page and on the WI HAN.

2007

Performed hazardous spills prevention activities at the Wisconsin Hospital Association (WHA) Annual State Convention via a poster exhibit utilizing HSEES data in support of hospital disaster preparedness and surge capacity. The poster included information about the frequency of HSEES events, victims, evacuees and number of ER visits arranged within seven hospital preparedness regions. Feedback forms were the evaluative component.

Worked directly with pre-selected firms in the WI refrigeration sector, OSHA Compliance Assistance Service Staff, and University of WI-Madison College of Engineering Staff as "key action partners" (collaborators) and with WI OSHA Consultation staff and BEOH staff acting as "support partners", to implement a three-part Ammonia Awareness Day prevention/outreach initiative containing a questionnaire as an evaluative component. (Phase 3)

In cooperation with ATSDR and our Department's editing staff, developed and gained approval for new fact sheets, maps and data summaries of WI HSEES data (1993-2006) which focused on event, victim, and evacuee frequencies. The information was placed on the WI HSEES web page and on the WI HAN. Also, expanded and updated the new WI HSEES web site interactive component.

Appendix B. Meeting Participants

Last Name	First Name	College Station, TX 9/07	Washington, DC 11/07	Atlanta, GA 2/08
Agency for Toxic Substances and Disease Registry (ATSDR)				
Williamson	David	X	X	X
Cole	Kelly		X	X
Orr	Maureen	X		X
Melnikova	Natalia		X	X
Guerra	Norys		X	X
Center for Disease Control (CDC)				
Werner	Lora		X	
Ruckart	Perri		X	
Bove	Frank		X	
Kragie	S. Xiah		X	
Holler	James		X	
Godfrey	Nelda		X	
Kapil	Vik	X	X	
Nickle	Richard		X	
Centers for Disease Control (CDC)				
Rzeszotarski	Peter		X	X
Amuzie	Erica		X	X
Madden	Julie			X
Cruz	Miguel		X	X
Leonard	Monica		X	X
Edwards	Peter			X
Ghosh	Sudevi			X
Madden	Julie		X	
Center for Chemical Process Safety (CCPS)				
Sepeda	Adrian	X		

Last Name	First Name	College Station, TX 9/07	Washington, DC 11/07	Atlanta, GA 2/08
Association of State and Territorial Health Officials				
Raziano	Amanda		X	
ChevronPhillips				
Harrington	Kenneth	X		
Contra-Costa				
Sawyer	Randall	X		
County Health Department- Lincoln-Lancaster				
Holmes	Scott		X	
Department of Community Health- Michigan				
Hughes	Noreen		X	
Department of Environmental Protection- New York City				
Catanzaro	Enzo		X	
Fawzy	Mustafa		X	
Department of Environmental Conservation- New York State				
Milstrey	Glenn		X	
Department of Health- Florida				
McCaskill	Michael		X	
Hughes	Brian		X	
Department of Health- Iowa				
Cooper	Debra		X	
Department of Health- Minnesota				
Rice	Nancy			
Department of Health- New York State				
Lizak Welles	Wanda		X	
Wilburn	Rebecca		X	
Department of Health-Utah				
Saw	Louise			X

Last Name	First Name	College Station, TX 9/07	Washington, DC 11/07	Atlanta, GA 2/08
Department of Health and Family Services- Wisconsin				
Drew	James			X
Department of Health and Human Services- North Carolina				
Rigouard	Sherry			X
Department of Health and Senior Services- New Jersey				
Fontecchio	Christa			X
Department of Public Health- California				
Chao	Kevin			X
Department of Public Health-U.S.				
Mason	Tom			
Department of State Health Services-Texas				
Borders	Julie	X		
Department of State- New York State				
LaTourette	Erwin			X
Department of Transportation				
Glode	Michelle		X	X
Lehman	Dave	X		X
Duych	Ronald			X
Division of Public Health- North Carolina				
Giguere	Mary			X
Dow				
Overton	Tim	X		
Emergency Management Office- New York State				
Brunelle	Gregory			X

Last Name	First Name	College Station, TX 9/07	Washington, DC 11/07	Atlanta, GA 2/08
FEMA				
Civis	Dan		X	
International Association of Fire Chiefs				
Wolfe	Kelly			X
International Institute of Ammonia Refrigeration				
Anderson	Kent			X
LA Department of Health and Hospitals				
Trachtman	William			X
Mary Kay O'Connor Process and Safety Center				
Green	Valerie	X		
Guo	Susan	X	X	X
Mannan	Sam	X	X	X
O'Connor	Mike	X	X	X
Rogers	William	X		
Startz	Donna	X		
Veltman	Lisa	X		X
Monsanto				
Philip	Jeff	X		
National Institute for Chemical Studies				
Mukerjee	Deepay			X
National Institute of Occupational Safety and Health				
Alarcon	Walter		X	
Dewan	Aruna			X
National Response Center				
Qadir	Syed		X	X
Scheye	James	X		
National Institute of Occupational Medicine				
Czerczak	Slawomir			X
Public Health Division- Oregon				
Leiker	Richard			X

Last Name	First Name	College Station, TX 9/07	Washington, DC 11/07	Atlanta, GA 2/08
Safe Energy and Transportation Programs				
Tucker	Elizabeth			X
University of South Florida- College of Public Health				
Mason	Thomas		X	X
U.S. Consumer Product Safety Commission				
Boudreault	Manon			X
U.S. Department of Homeland Security				
Zerbi	Nohemi			X
Negron	Adolfo		X	X
Gooding	Rachel		X	X
Wharton Center				
Rosenthal	Irv	X		
U.S. Environmental Protection Agency (EPA)				
Santiago	Armando			X

Appendix C. Details of Federal Hazardous Substance Surveillance Systems

Specialized Hazardous Substance Chemical Incident Sources

The sources specifically designed for chemical specific incidents are the National Response Center (NRC), the Department of Transportation (Hazardous Materials Information System (HMIS) and Pipelines), the Agency for Toxic Substances and Disease Registry (ATSDR) - Hazardous Substances Emergency Events Surveillance (HSEES), Environmental Protection Agency (EPA) Risk Management Program (RMP) Accident History, and the Center for Chemical Process Safety (CCPS)-Process Safety Incident Database. These systems collect data on a primarily statistical basis. They do not and probably cannot provide root causes as there is no thorough investigation of the incident. They may provide "causes" that are basically the events immediately prior to the release that may have contributed to the release.

The NRC receives initial notification that is required by numerous regulations. They handle more than 32,000 reports annually, and all reports are located in the database even if they are not required. When an accident occurs, many other federal, state, and local agencies are notified of the incident as appropriately determined. Because all reports are in the databases, and updates generally create a new report, duplicate reporting occurs. Any details from the database are preliminary and unreliable, and the extent of reporting is considered questionable.

The Department of Transportation (DOT) Office of Hazardous Materials Safety maintains the HMIS. They are charged with the responsibility for the safety of highways, railroads, airlines, and waterways. When an accident occurs, reports are due from carriers within 30 days of the incident. Numerous summary reports exist on their website, as well as in the format of downloadable database files.

The DOT HMIS requires reporting of a hazardous material leak including radioactive and infectious substances, if a person is killed, or if a person receives an injury requiring admittance to a hospital. If the general public is evacuated for at least one hour, a major transportation artery or facility where the incident occurred is closed or shut down for an hour or more, or the operation flight pattern or routine of an aircraft is altered, the incident needs to be reported.

The DOT Office of Pipeline Safety labels a serious incident as one involving a fatality or injury requiring in-patient hospitalization. There are approximately 50 serious accidents annually. Significant incidents, which number about 300 annually, are those incidents reported by pipeline operators when all of the following conditions are met: there is a fatality or injury requiring in-patient hospitalization, there is $50,000 or more in total costs (circa 1984 dollars), if highly volatile liquid releases of 5 barrels or more or other liquid releases of 50 barrels or more, or if liquid release results in an unintentional fire or explosion. The data gathered from serious and significant incidents, summary reports by state are available. All of these incident reports are available in spreadsheet format, and more than 98% involve petroleum products not covered by HSEES. The DOT does write a detailed "apparent cause" report for any incident greater than 5 barrels. "Apparent causes" could be, but are not limited to corrosion, natural forces, excavation damage, and material or weld failure, equipment failure, and incorrect operation.

ATSDR- HSEES has fourteen participating states and reports all chemical releases except for petroleum without any other components. The full dataset of their findings is available only with a data sharing agreement, and the public dataset disguises location and victim details and does not include the text description of an incident. ATSDR reports an estimated 6,000 incidents per year and is estimated to cover around 40% of the US population. The specialties of ATSDR include fixed facility and transportation incidents and reports feature details of personnel protective gear, decontamination, and health effects.

The EPA RMP Accident History is required for about 15,000 facilities which store chemicals above the threshold quantities. These reports are only released every 5 years, and security restrictions control the release of the data. About 300 incidents are reported on average per year. Incidents are only reported if the chemical released was stored above the threshold quantity, the chemical is on the "list", and there were significant consequences of the incident. It has been observed that, "if you look at the so-called safety pyramid the RMP incidents belong at the top."

Furthermore, when ERNS has information, secondary information is developed based on follow-up contacts. The onsite coordinator goes and verifies information and then inputs the findings.

General Incidents Sources that Include Hazardous Substance Events

This type of source gathers many types of incidents but only some of them involve hazardous materials. The sources for general incidents include, but are not limited to: the National Fire Information Reporting System, the Coast Guard – Marine Casualty and Pollution Database, Minerals Management Service (MMS), and the (Consumer Product Safety Commission) CPSC.

The US Fire Administration manages the Fire Information Reporting System (NFIRS), which includes various states and municipalities who voluntarily report to the system. NFIRS contains an optional Hazmat Module, and for Fire Service Casualty has details about personnel protective equipment.

The Coast Guard Marine Casualty and Pollution Database, which provides details about marine casualty and pollution incidents, are investigated by the US Coast Guard Marine Safety Officer. Data on incidents between the years of 1982 and 2005 is available on CD from NTIS, and data between the years of 1982 and 2001 is available for download. Summary tables that cover 1973 to 2004 are called the Polluting Incident Compendium. In 2004, there were 3667 oils spills of less than 100 gallons, and 220 spills of greater than 100 gallons. Approximately 99% of these spills were petroleum.

The MMS tracks spill incidents that are one barrel or greater in size, and are comprised of either petroleum, or other toxic substances resulting form Federal Outer Continental Shelf oil and gas activities. Historically, MMS has produced counts and summaries for spills greater than or equal to 50 barrels or 2,100 gallons. Each year, there are 10 to 50 large spills, greater than 50 barrels, which is highly dependent on hurricane activity.

The CPSC utilizes the National Electronic Injury Surveillance System (NEISS), composed of a national probability sample of hospitals in the US and its territories. Within the system, patient information is collected from each NEISS hospital for every emergency visit involving an injury associated with consumer products. Relevant "consumer products" could include acids, automotive chemicals, caustics, school lab chemicals, ammonia, propane, and antifreeze. In 2006,

there were 50 ammonia injuries reported, by statistical extrapolation indicates that 2,400 occurred nationwide. The National Injury Information Clearinghouse includes the incident summary database, the death certificate database, the investigation summary database, and other information that is available upon request.

Incident Investigation Sources

Sources that perform and report detailed incident investigation include the Chemical Safety Board (CSB), the National Transportation Safety (NTSB), and OSHA Accident Investigations.

The CSB and NTSB report their findings in individual reports rather than as a database.

OSHA Accident Investigation Reports has records for incidents that have greater than two injuries or a fatality. In the searchable online database, the reports usually have a one-paragraph description of the event. However, there is an approximately 5 year lag in getting reports published online. This process is slowed by requirements for redaction of personally identifying information. Searches are further complicated by the fact that all types of injuries are included in records, not just those involving hazardous materials.

Appendix D. Incident Data Sources and Links

OSHA Census of Fatal Occupational Injuries

http://www.bls.gov/iif/oshcfoi1.htm

OSHA Occupational Injury and Illness - States

http://www.bls.gov/iif/oshstate.htm

OSHA Accident Investigation Database

http://www.osha.gov/pls/imis/accidentsearch.html

DOT 2004 Hazardous Materials Incident Data

http://hazmat.dot.gov/pubs/inc/data/2004/2004frm.htm

DOT Hazardous Materials Incident Data form

http://hazmat.dot.gov/pubs/inc/spill/IncidentForm010105.pdf

Marine Casualty and Pollution Database (Raw Data File on CD-ROM). - Data file.

http://www.ntis.gov/search/product.aspx?ABBR=SUB5441

US Coast Guard Polluting Incident Compendium

http://www.uscg.mil/hq/g-m/nmc/response/stats/Summary.htm

MMS – Spills Statistics

http://www.mms.gov/incidents/spills1996-2007.htm#1996-1999

DOT Office of Pipeline Safety

http://ops.dot.gov/stats/stats.htm

http://primis.phmsa.dot.gov/comm/reports/safety/psi.html

CPSC NEISS

http://www.cpsc.gov/library/neiss.html

CPSC Injury Info Clearinghouse

http://www.cpsc.gov/ABOUT/clrnghse.html

NFIRS

http://nfirs.fema.gov/_download/nfirs50crg2006_0328.pdf

Appendix A is input forms

Appendix B is equipment list, material type codes, location codes, property use codes,

Appendix D is chemical list

Report of American Assoc Poison Control Centers 2005, 1261 cases

http://www.aapcc.org/Annual%20Reports/05report/2005%20Publsihed.pdf

AAPCC data request form

http://www.aapcc.org/AAPCC%20Data%20Request%20Form%20ver%202262007.pdf

FARS query

http://www-fars.nhtsa.dot.gov/QueryTool/QuerySection/SelectYear.aspx

Other Types of Data

States Census of Employment by NAICS

http://censtats.census.gov/cbpnaic/cbpnaic.shtml

Commodity Flow Survey

http://www.bts.gov/publications/commodity_flow_survey/

Appendix E. HSEES Based Publications

2007

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Appendix F. HSEES Data Elements

- **Substance(s) Released**
- **Quantity Released**
- **Time and Place**
  - Start time
  - End time
  - Location
  - Surroundings
  - Secondary site contamination
- **Cause(s)**
- **Industry type**
- **Response**
  - Decontamination
  - Restrictions
  - Evacuations
  - Road closures
  - Responders
- **Primary Factors**

  Equipment failure
  Operator Error
  Other
  Intentional
  Bad weather condition
  Illegal act
- **Secondary Factors**
-

Improper mixing	Equipment failure
Human error	Improper filling, loading, or packing
Other	Performing maintenance
System/process upset	System start up and shutdown
Power failure/electrical problems	Unauthorized/improper dumping
Vehicle or vessel collision	Forklift Puncture
Fire	Explosion
Overspray/misapplication	Illicit drug production related
No secondary factor	Load shift
Vehicle or vessel derailment/rollover/capsizing	

- **Who Responded**

  No response
  Certified HazMat team
  Company's response team
  Law enforcement agency
  Fire department
  Emergency Medical Services (EMS)
  Hospital personnel/Poison Control Center
  Health department/health agency
  Environmental agency/ Environmental Protection Agency (EPA) response team
  3rd Party Clean-up Contractor
  Specialized multi-agency teams
  Department of works/utilities/transportation (includes coast guard)
  State, County or local Emergency managers/coordinators/planning committees
  Other

- **Victims**
  - Injuries
  - Demographic information
  - Severity
  - Distance from release
  - Personal protective equipment status
  - Decontamination