Roadmap to a National Hazardous Substance Incident Surveillance System (NHSIS) (Progress Report)

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Why Do We Need Incident Data?

• Incident data is needed to identify problem areas and establish priorities for actions to minimize risk
• Without a thorough understanding of the frequency, circumstances and consequences of chemical releases there is little to guide those who seek to reduce chemical releases.
Purpose of Road Map

• Currently there are numerous systems each dealing with some aspect of hazardous substance releases. Each varies in scope and taxonomy. There are significant gaps in the collection systems.

• The Agency for Toxic Substance Disease Registry (ATSDR) and the Mary Kay O’Connor Process Safety Center (MKOPSC) have held a series of meetings with numerous stakeholders to define the desired characteristics of a NHSIS.
Purpose of Road Map

• The Road Map will describe the desired characteristics and the specific steps and resources needed to achieve the goal of a comprehensive national system of incident surveillance.
Scope of Work

• The MKOPSC under contract has undertaken a number of specific tasks to help define the content of the NHSIS
• The Center has concluded that the HSEES data set has the highest quality data and is the most comprehensive, especially for fixed facilities
• While it covers a limited number of states it reports over 8000 incidents a year.
• It is the most effective database at linking causes to consequences
Scope of Work

The HSEES database provides the primary vehicle for collecting incident for fixed facilities, yet it only covers 14 states and excludes petroleum only incidents. Therefore, several tasks seek to answer questions about these limitations.
Are the 14 HSEES States Representative of the US?

Determine if the demographic makeup of the HSEES states is representative of the entire US

Identify correlating factors between the HSEES States and the entire US to facilitate:
Extrapolation of HSEES data from 14 to all states

Identify states with similar characteristics to facilitate:
Selection of states for inclusion in the program
Grouping states for collaborative activities
Correlating Factors –
HSEES States vs All States

• A number of useful correlating factors have been identified. Some apply to all incidents, others apply only to certain types of events such as fixed facilities or transportation modes. Examples include:

(Correlation Coefficient)
All Events

State Population – All HSEES Events (0.63)
NRC Notifications – All HSEES events (0.92)
Number of Employees in Key Industries – All HSEES events (0.84)

Fixed Facility Events

RMP Incidents – HSEES Fixed Facility Events (0.76)
Demographics of HSEES States and All US

Income
Ethnicity
Education
Age
Employment by Industry
Demographics of HSEES States and All US

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%
Similarity of States

A grouping of states was developed based on the level of employment in the chemical and petroleum refineries and geographic proximity. States were categorized by low, medium and high levels of chemical employment.

It appears the useful groupings of states are possible that will facilitate selection of states and collaboration amongst states with similar types of incidents.
What are the effects of including petroleum incidents?

• Question 1
• Do petroleum incidents cause injuries or fatalities in sufficient numbers to justify their collection?
Petroleum Incident Fatalities

• Conclusion –
• Petroleum incidents result in 19 fatalities per year while other substances resulted in about 100 fatalities per year. This is about one-fifth of the estimated total incidents for the entire US.
• A number of major incidents have resulted from petroleum releases.
• Therefore petroleum incidents should be included in a national surveillance system.
Petroleum Incidents - Question 2

• Is there a threshold release quantity below which injuries are unlikely?
Petroleum – Threshold Quantities

- 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.
Question 3

• 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?
The OSHA data shows that there were 108 fatalities due to light hydrocarbons and 86 due to heavy hydrocarbons from 1993 to 2003.

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.
Petroleum - Conclusions

• 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.
Summary of Status

• A draft white paper describing the characteristics of a National Hazardous Substance Incident Surveillance system has been developed
• MKOPSC has undertaken a number of studies to improve the white paper
• Studies regarding the representativeness of the HSEES states, petroleum incidents and threshold quantities have been completed
• Ongoing work includes developing a taxonomy for the NHSIS and reviewing the incident definition