A National Assessment of the Status of Planning for Public Health Preparedness for Chemical and Radiological Contaminating Terrorism

Findings and Recommendations

April 2004

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EXECUTIVE SUMMARY

BACKGROUND

The United States must be prepared to adequately detect, respond to, and manage the crisis and recovery phases of contaminating radiological (RT) and chemical terrorism (CT). According to a comprehensive database of terrorist incidents maintained by the Monterey Institute's Center for Nonproliferation Studies, chemical agents have been used more frequently in terrorist events than have biological agents. Funding for chemical and radiological terrorism has focused on traditional first responders. These skilled personnel play a key role in the acute phase of catastrophic chemical and radiological events in public places and the worksite, but they are not equipped to handle all pre-event planning and post-event recovery functions. Public health and environmental agencies would likely be the initial responders to some contaminating terrorist events, such as contamination through food and water, and could take the lead during the recovery phase.

The Council of State and Territorial Epidemiologists (CSTE) developed and administered an assessment to all states and territories, as well as selected major metropolitan areas, to measure how state health departments are planning for, developing partnerships, and allocating resources to support their responses to CT and RT in the face of budget shortfalls and the absence of significant targeted federal funding.

METHODS

In May 2003, a workgroup consisting of representatives from CSTE, CDC, ATSDR, industry, and academia convened a meeting to draft an assessment, *The Status of Planning for Public Health Preparedness for Chemical and Radiological Contaminating Terrorism in the United States*. This assessment measured the extent of planning, the adequacy of resources, and the number of interagency agreements regarding CT and RT preparedness. Between June and September 2003, CSTE administered the assessment electronically and by paper to representatives within all states and territories and three major metropolitan areas. CSTE sent the questionnaire to individuals who the workgroup deemed to have the appropriate knowledge to complete the questionnaire. Many recipients were identified from the Interstate Chemical Terrorism Conference. When an appropriate individual could not be identified from this group,

CSTE sent the questionnaire to the State Epidemiologist, charging him or her with routing the questionnaire to a qualified person(s). As part of this assesment, states were assured that CSTE would release only aggregate data and would not release state-specific information in any reports unless otherwise approved by the state(s). The workgroup analyzed the data and prepared a draft report in December 2003. The report was then sent to members of the workgroup and to the CSTE Executive Committee for several rounds of review and comment.

RESULTS

The response rate for the 50 states, five territories, Washington, D.C., and three large cities combined was 84.7% (n = 50). The response rate for states and District of Columbia alone was 92.2% (n = 47), representing 96.8% of the U.S. population.

Overall, respondents reported a lack of planning and preparedness for a CT or RT event. Respondents were asked to assess their state's or city's preparedness for such an event on a scale ranging from 0 (not prepared) to 10 (completely prepared). The average score for all respondents was 4.1. Health agencies serving a larger population were generally not rated as being more prepared than agencies supporting smaller populations. Additionally, only one-fourth (26.5%) of all agencies had written chemical or radiological response plans. However, health agencies serving larger populations were more likely to have a written response plan than were agencies serving smaller populations.

In most areas relevant to CT, respondents reported insufficient planning. The percentage of respondents reporting *minimal or no planning* in the following CT areas was:

- 69.7% for pre-event syndromic surveillance for stealth attacks;
- 71.4% for recovery-phase epidemiology to document delayed health effects;
- 65.8% for chemical exposure assessment;
- 82.9% for GIS integration of chemical exposure data;
- 61.0% for toxicological interpretation of an acute chemical event;
- 79.5% for environmental medical advice on chemicals;
- 80.0% for workers' health and safety consultation regarding chemicals; and
- 82.5% for community/labor relations for contending stakeholders.

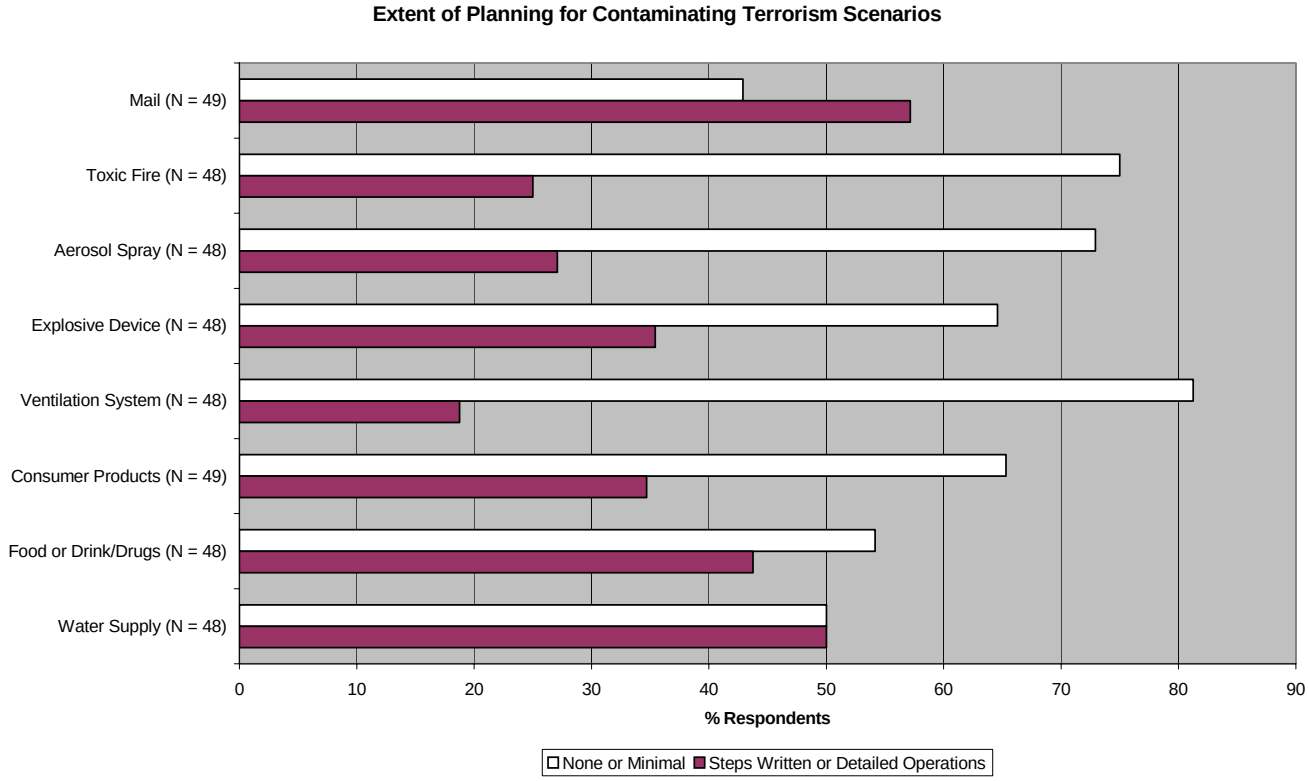
A substantial number of respondents reported having inadequate resources within the state health department to maintain preparedness. Specifically, the percentage of respondents reporting *insufficient resources* to maintain preparedness for the following functions was:

- 83.7% for pre-event syndromic surveillance for stealth attacks;
- 90.7% for crisis-phase epidemiology to document impact;
- 90.5% for chemical exposure assessment;
- 90.4% for GIS integration of chemical exposure data;
- 78.1% for toxicological interpretation of an acute chemical event;
- 87.5% for environmental medical advice on chemicals;
- 95.1% for workers' health and safety consultation regarding chemicals; and
- 82.1% for community/labor relations for contending stakeholders.

Ascertaining resources in other agencies within the state was more difficult than assessing similar resources in state health departments. However, the majority of respondents perceived resources in other state agencies to be similarly inadequate to meet these public health needs.

State health agencies generally are unprepared to respond to an RT event. However, respondents reported slightly more planning for functions related to radiation than for functions related to chemicals. Additionally, aside from preparations for contamination through mail, health agencies have conducted limited planning for specific radiological or chemical contaminating events (Figure 1).

Figure 1. Extent of planning for contaminating scenarios



However, terrorism preparedness is progressing steadily for communication functions. The majority of respondents (82.2%) reported above-minimal planning for health alerts and electronic communication, and 42.2% reported having detailed operational plans for this function. More than half of the respondents (59.1%) reported above-minimal planning for risk communication. Most respondents reported that resources are available in state health departments for communication functions with approximately one-quarter of the respondents reporting adequate resources to maintain these functions.

Most respondents (87.0%) knew their lead local contacts for chemical and radiological public health response, and nearly all (95.8%) reported using a standardized emergency-management structure in which other agencies are assigned roles. However, many respondents had not yet formed partnerships with relevant sister agencies or stakeholders. Specifically:

- Approximately 25% had not yet written MOUs with state EMS or local health departments;

- 48%-67% had not yet written MOUs with regional FBI, water regulators, food regulators, agricultural agencies, hazardous waste regulators, local environmental health agencies, Red Cross, military, National Guard, Poison Control Centers, mental health departments, or academic institutions;
- 75% -87% had no MOUs with departments of education, industry associations, pesticide regulators.

CONCLUSION AND RECOMMENDATIONS

Public health agencies are likely to be called upon to take a major role in the detection, response to, and management of the crisis and recovery phases during terrorism events involving chemicals or radiation. They will be expected to take the lead when routes of delivery involve water, food, drugs or consumer products. There are currently inadequate levels of preparedness, planning, and established interagency partnerships in multiple areas of chemical and radiological contaminating terrorism.

To assist public health agencies in achieving and maintaining CT and RT preparedness, CSTE offers the following recommendations:

1) **Convene a workgroup of stakeholders.** A stakeholder workgroup should convene to develop core environmental and occupational public health competencies, staff capacities, and surveillance systems needed for each state to prepare and respond to chemical and radiological contaminating terrorism. Participating stakeholders can include federal agencies (CDC, FDA, NIOSH, FEMA, NIH, EPA, CPSC) professional associations (CSTE, APHL, ASTHO, NACCHO), state public health agencies, state environmental agencies, Poison Control Centers, industry representatives (such as ACS), academia (ASPH), and law enforcement agencies. In addition, this workgroup will facilitate:
   - *Interagency Coordination*: to successfully manage and control CT and RT events, these agencies should aim to solidify existing partnerships and form new relationships.
   - *Information Sharing*: State, territorial, and federal agencies should aim to share information with each other in an effort to achieve adequate response capacity

among all constituents. Sharing information will help agencies identify how to effectively integrate resources into existing response plans and formulate strategies for previously unconsidered scenarios.

2) **Increase federal funding.** Federal funding should be increased to ensure the necessary public health support to prepare for and respond to chemical and radiological contaminating terrorism. To date, insufficient federal monies have been earmarked for environmental public health planning to respond to and manage the crisis and recovery phases of contaminating terrorism.
3) **Monitor the status of planning.** As funding is allocated, it is important that the status of planning for CT and RT is evaluated periodically in order to monitor progress towards building capacity and identify persistent gaps in resources. The stakeholder workgroup will be key in this process. In addition, future assessments should aim to ascertain the scope of staff dedicated to CT and RT functions. This responsibility can be assumed by professional organizations, such as CSTE, with experience in conducting national assessments.
4) **Establish a trained workforce.** States and territories should focus on establishing a trained workforce capable of executing functions related to all phases of CT and RT. This is particularly important for pre-event and recovery phase functions that require long-term attention. This can be achieved by using the aforementioned funding to hire personnel or cross-train within health departments or other agencies.

TABLE OF CONTENTS

BACKGROUND

The United States must be prepared to adequately detect, respond to, and manage the crisis and recovery phases of contaminating radiological terrorism (RT) and chemical terrorism (CT). Attacks on industrial chemical facilities and nuclear facilities could cause widespread disruption, injury, and in some cases death by creating public health and environmental hazards. Terrorists also could create weapons from stolen toxic chemicals or radioactive material, potentially causing mass disruption, if not mass casualties.[1,2]

According to the Monterey Institute's Weapons of Mass Destruction (WMD) Terrorism Database, when excluding hoaxes from consideration, chemical incidents of terrorism are more common than biological incidents. Over the past 100 years, chemical, biological, radiological, and/or nuclear agents have been used in 246 terrorism events, according to the Institute. Of those, 164 (66.7%) incidents involved chemical agents, 39 (16%) involved biological agents, and 16 (7%) were radiological.[3,4]

The Institute also concluded that biological agents are currently not the most fatal weapons. From the year 1900 through May 2003, a total of 953 fatalities and 4,351 non-fatal injuries had resulted from chemical agents, and only eight fatalities and 1,059 non-fatal injuries had resulted from biological agents during that time period.[4] In fact, no single incident involving the use of a biological agent has resulted in more than five fatalities.

The most likely method for dispersing chemical or radiological agents in a terrorist attack is through contamination of food and water.[4] Data from the Monterey WMD Terrorism Database illustrate that terrorists have delivered these agents by tampering with consumer products, contaminating local water supply, and using food or drink to spread chemical or radiological agents. The array of delivery methods for contamination also can involve central public or private facilities, financial systems, or transportation systems.

Regardless of which delivery methods terrorists use, contaminating terrorism—such as the 2001 Anthrax contamination of several U.S. Postal Service facilities—can cause major disruption and

conflict among labor, management, and community stakeholders, and it can overwhelm public health epidemiology, toxicology, and laboratory capabilities, without causing a high number of deaths.

What is contaminating terrorism?
An example of intentional arsenic poisoning

Contaminating terrorism involves the deliberate pollution or tainting of a medium (i.e., food, water, consumer products) with a chemical, biological, or radiological agent. The infrastructure and interagency coordination needed to rapidly respond to a contaminating terrorism event was demonstrated in Maine during spring 2003 when coffee was intentionally contaminated with arsenic during a church social.

Like many chemical agents that can potentially be used by terrorists, arsenic was accessible to the perpetrator. Arsenic was once used as an agricultural pesticide and is abundant in certain parts of Maine. While over two-dozen church members were exposed to arsenic-laden coffee, there was only one fatality. Casualties were minimized because an existing framework of interagency coordination facilitated a quick response.

Several church members presented at a local medical center with gastrointestinal symptoms. The Maine Bureau of Health was promptly notified, and a public health investigation ensued. This investigation involved epidemiologists, public health labs, environmental toxicologists, sanitarians, the State Health Officer, poison centers, and local social services. These entities worked together to rapidly conduct patient interviews and analyze clinical and food samples. Once arsenic was identified as the poison, a stockpile of antidote was mobilized and distributed to hospitals throughout the state. The public health investigation revealed that coffee was the source of the arsenic and that this event was likely an intentional contamination. As a result, a legal investigation involving the FBI and state police commenced.

Maintaining communication channels between the various agencies to ensure that pertinent information was shared was critical to responding to this event. Those involved in the public health and criminal investigation frequently exchanged information via conference calls, and the Health Alert Network was integral in communicating with health care providers. Much of the public health infrastructure needed to respond to this event existed due to recent federal bioterrorism funds.

In light of these statistics, it is vital that our public health system be adequately prepared to respond to a CT or RT event, particularly at the state and local levels. While federal agencies, such as the Federal Emergency Management Agency (FEMA), have expertise in incident command and control, emergency response, initial recovery, and training and equipping first

responders, public health and environmental agencies take the lead during the recovery phase of a terrorist event. State and local personnel provide the intensive laboratory and epidemiologic capacity that manages the exposure assessment, toxicological assessment, and post-event clearance evaluation required after a contaminating CT or RT event. Furthermore, it is likely that public health surveillance would be the first to identify delivery methods such as water, food, drugs, and consumer products, thereby prompting the immediate involvement of health departments who would often take the lead in coping with such events.[5,6,7]

Specifically, during the three phases of a CT, or RT event—early detection, crisis, and recovery—public health agencies could be involved in the following ways:[8]

During the **early-detection phase**, public health agencies would

1) use pre-established networks of alert physicians and systems such as Poison Control Centers, to detect unusual numbers of patients with unexpected disease; and
2) use principles of epidemiology to develop case definitions and identify likely agents, pathways of exposure, and bodily routes of entry.

During the **crisis phase**, public health agencies would

1) advise on health and safety for first responders and other workers;
2) advise on exposure assessment for immediate decisions and interpret alleged health effects during later phases;
3) document the morbidity, mortality and disposition of affected subjects;
4) identify cohorts at risk of subsequent health effects and find out how to reach the cohorts later;
5) assist with toxicological and medical advice regarding contaminated areas of concern;
6) help staff the standardized emergency management Command and Control organizational structure.
7) provide expert toxicological advice on management and treatment of patients;
8) coordinate and facilitate appropriate collection procedures, storage and transport of biological and environmental sampling to appropriate laboratories;
9) coordinate the epidemiologic investigation and potential criminal investigation with local, state, and national authorities, if needed;

10) monitor workers' health and safety;
11) provide risk communication for labor, management and community stakeholders, and facilitate development of a plan for decontamination;
12) coordinate environmental laboratory procedures for testing;
13) provide toxicological prognoses to the public for the short-term, mid-term, and long-term health and psychological effects of exposures;
14) conduct community surveillance to document short-term, mid-term and long-term health effects using standard epidemiological methods;
15) develop risk communication strategies and work with stakeholders to convey information to the public in a timely and effective manner; and
16) help contending stakeholders in developing a course of action.

During the **recovery phase**, public health agencies would

1) monitor workers' health and safety;
2) provide risk communication for labor, management and community stakeholders, and facilitate development of a plan for decontamination;
3) provide toxicological and medical advice for cleanup and reentry;
4) coordinate environmental laboratory procedures for testing;
5) continue biomonitoring for exposure;
6) integrate multi-media exposure information to assess the range of exposures in the population at risk;
7) provide toxicological prognoses to the public for the short-term, mid-term, and long-term health and psychological effects of exposures;
8) conduct community surveillance to document short-term, mid-term, and long-term health effects using standard epidemiological methods;
9) develop risk communication strategies and work with stakeholders to convey information to the public in a timely and effective manner; and
10) help contending stakeholders develop a course of action.

Public health agencies also would be responsible for terrorism-related preparations, including:

1) ensuring that there is a chemical and radiological 24/7 on-call system in place;
2) identifying team roles and the people who can fill those roles;
3) establishing how the public health team would fit into the incident-command structure;

4) drilling with the agencies and stakeholders who would be involved with the various possible vectors of contamination;
5) anticipating the most likely scenarios and epidemiological approaches to assessment;
6) fostering the ability to improvise with partners in unanticipated scenarios;
7) maintaining equipment and establishing a means of communication that would be resilient during events that affect the main offices of the public health agency;
8) determining valid environmental and body-burden sampling, and laboratory procedures;
9) evaluating steps used previously during crisis and recovery;
10) disseminating educational materials to local physicians, hospitals, and health agencies;
11) developing resource stockpiles (i.e., antidotes) as well as developing a framework for sharing resources in case of a disaster;
12) establishing a framework for cooperation with local, state, and national authorities to conduct an epidemiologic investigation in conjunction with a potential criminal investigation;
13) developing teams of subject medical experts (i.e., medical toxicologists and radiological experts) in local and state government, as well as in the civilian sector, in case of emergency;
14) identifying and maintaining communication with community "gate keepers" or opinion leaders through whom risk communication may flow in a terrorism event.

Many of these actions would likely involve state public health or other agency programs that are different from those that respond to microbial terrorism, yet lawmakers have offered little funding for the epidemiological and other technical expertise necessary to prepare for—and recover from— chemical and radiological contaminating terrorism. To the extent that policymakers have considered CT or RT, the discussion has focused on exotic military chemicals or increasing security to prevent terrorist attacks on chemical facilities.[1,9] Because the most likely scenarios are ones using chemicals of opportunity, environmental and public health agencies must also be prepared for contaminating terrorism scenarios. [10,11]

Limits on finances, personnel, and time necessitate that the government use resources efficiently and employ resources to address the most pressing threats. Biologic terrorism, with its perceived

potential for infinite spread, is feared (and funded) as a catastrophic threat. For instance, funding for the Department of Health and Human Services/Centers for Disease Control and Prevention (DHHS/CDC) has a strong infectious disease emphasis, and federal funding for state and local health agencies have been directed primarily toward issues related to biological agents. Also, the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 required that $1.6 billion dollars in appropriated funds focus on bioterrorism preparedness activities .[12,13] Finally, the Department of Homeland Security allocated almost twice as much money to biological countermeasures as it did to chemical, radiological, nuclear, and high-explosives countermeasures combined, in the FY2004 Budget.[14] This occurred despite the fact that, at least in terms of the empirical record, bioterrorism is not the most popular choice of agent for terrorists seeking to use unconventional weapons.[4,10] Preparedness for CT and RT historically has been under-funded, resulting in state and local health departments that are ill-equipped to respond to contaminating events. The Association of Public Health Laboratories (APHL) recently conducted a national assessment of public health laboratories' readiness for a chemical terrorism attack and found that public health laboratories largely are unprepared to respond, citing particular deficiencies in planning, protocols, and workforce.[15] The Trust for America's Health echoed these findings in a recent study of state laboratories and recommended increased funding to ensure chemical terrorism response capacity. [16]

The purpose of CSTE's assessment is to describe public health agencies' extent of planning and existing resources for responding to chemical and radiological contaminating terrorism. The information gathered from this assessment will be used to identify crucial gaps in CT and RT preparedness and opportunities for additional funding.

METHODS

In May 2003, a workgroup consisting of representatives of CSTE, CDC, ATSDR, industry, and academia convened a meeting to draft the assessment for *The Status of Planning for Public Health Preparedness for Chemical and Radiological Contaminating Terrorism in the United States*. This assessment was designed to ascertain states' and territories' capacities to respond to CT and RT events, and identify where funding and resources should be channeled.

The questionnaire consisted of six key components (see Appendix A):

1. Contact information
2. Chemical Terrorism/Radiological Terrorism Planning and Resources
3. Local Relationships
4. Chemical and Radiological Terrorism FTEs in State Health Departments
5. Interagency Coordination for Chemical and Radiation Response
6. Organization Chart

CSTE administered the questionnaire to representatives within all state and territories and Washington D.C., Los Angeles, Chicago, and New York City. Data were collected between June and September 2003. The questionnaire was available both electronically and in a paper-based format, allowing respondents to choose their preferred format. For each format, CSTE provided detailed instructions regarding how to complete the questionnaire.

When possible, CSTE sent the questionnaire to individuals who the workgroup deemed to have the appropriate knowledge to complete the questionnaire. CSTE identified many recipients from the Interstate Chemical Terrorism Conference, a group of state and local representatives seeking to define the role for public health agencies, and to share knowledge, materials and resources regarding chemical terrorism. When CSTE could not identify an appropriate individual, the workgroup sent the questionnaire to the State Epidemiologist, charging him or her with routing the questionnaire to a qualified person(s). Often, the primary respondent consulted other parties within the health department and associated environmental agencies to complete the assessment. CSTE made follow-up phone calls and e-mails to those that did not respond to initial requests to complete the questionnaire.

CSTE analyzed data using SAS, and calculated frequencies and descriptive statistics for aggregated data so that responses for any particular state or territory could not be identified. As part of this assessment, states were assured that CSTE would release only aggregate data and would not release state-specific information in any reports unless otherwise approved by the state(s).

RESULTS

The response rate for the 50 states, territories, Washington D.C., and three large cities combined was 84.7% (n = 50). The response rate for the states and District of Columbia was 92.2% (n = 47), representing 96.8% of the U.S. population.

Appendix B contains frequency data for each question. Results presented in this report are organized into five sections:

- *Planning and Resources for Public Health Functions* – describes the extent of planning and resources available to perform core public health functions during the pre-event crisis phase and recovery phase of a CT or RT event.
- *Response Planning*– describes availability of written response plans for CT or RT, and the extent of planning for specific contamination-terrorism scenarios.
- *Personnel Capacity* – describes the availability of health department staff essential to CT and RT terrorism preparation and response.
- *Local and Interagency Relationships* – describes to what extent health departments are collaborating with other agencies to prepare for CT and RT and to formulate response plans.
- *Internal Assessment of Response Capacity* – describes respondent's perceptions of their health agency's preparedness for CT and RT terrorism.

Planning and Resources

Respondents assessed the extent of planning, resources in state health departments, and resources in other state agencies for various public health functions related to CT and RT. These functions

included epidemiologic activities, exposure assessment, health assessment, communication, and safety consultation. Respondents rated their planning for these functions by choosing one of the following responses: “None,” “Minimal,” “Steps Written,” or “Detailed Operations Plan.” When estimating resources within the state health department and in other state agencies for these functions, respondents chose from the following responses: “None,” “None Dedicated,” “Some Dedicated,” “Sufficient Number and Level,” or “Not Easy to Ascertain.”

Table 1 illustrates the percentage of respondents that reported “None” or “Minimal” planning for various public health functions. (See Appendix A for questionnaire. See Appendix B for a full description of frequencies for extent of planning, resources in state health departments, and resources in other state agencies.)

Table 1. Percentage of Respondents Reporting Extent of Planning for Each Function	**% Reporting 'None' or 'Minimal' Planning**
Epidemiologic Functions	
Pre-event Syndromic Surveillance for Stealth Attack (N=43)	69.7
Other Kind of Statistical Surveillance (e.g., poison control calls, pharmaceutical purchases, school absenteeism) (N= 43)	72.1
Surveillance through Alert Clinician Network (N = 41)	78.0
Crisis Phase Epidemiology (e.g., documenting acute morbidity, outbreak style investigation) (N =43)	46.5
Recovery Phase Epidemiology (e.g., documenting delayed health effects) (N=42)	71.4
Exposure Assessment	
Exposure Assessment and Environmental Sampling Advice – Chemical (N=41)	65.8
Exposure Assessment and Environmental Sampling Advice – Radiation (N=43)	48.8
Exposure Assessment and Biological Sampling Advice – Chemical (N = 41)	65.8
Exposure Assessment and Biological Sampling Advice – Radiation (N = 43)	53.5
IT GIS Integration of Exposure Data – Chemical (N = 41)	82.9
IT GIS Integration of Exposure Data – Radiation (N=42)	83.3
Health Assessment	
Toxicological Interpretation of Acute Event – Chemical (N = 41)	61.0
Health Physics Interpretation of Acute Event – Radiological (N=43)	53.5
Toxicological Consultation on Reentry – Chemical (N=41)	73.1
Health Physics Consultation on Reentry – Radiological (N=42)	57.2
Toxicological Predictions on Long-Term Health Effects – Chemical (N=40)	70.0
Health Physics Predictions on Long-Term Health Effects – Radiation (N=42)	64.3
Environmental Medical Consults – Chemical (N=39)	79.5
Environmental Medical Consults – Radiation (N =41)	83.0
Other Public Health Functions	
Worker Health and Safety Consults – Chemical (N=40)	80.0
Worker health and Safety Consults – Radiation (N=42)	64.3
Health Alerts/ Electronic Communication (N=44)	17.8
Risk Communication (N=44)	40.9
Community/Labor Relations for Contending Stakeholders (N=40)	82.5

Overall, planning was most advanced for communication functions and weakest for surveillance functions, *GIS Integration of Exposure Data*, *Environmental Medical Advice for Chemicals*, and *Workers' Health and Safety Consultations*. Furthermore, many respondents reported less planning for functions related to CT than for functions related to RT.

While most respondents reported having at least some resources dedicated for functions delineated in this assessment, the overwhelming majority reported that they did not have a sufficient number or level of resources to maintain preparedness. Finally, respondents reported that it was difficult to assess the availability of resources in other agencies within the state.

Epidemiologic Functions

Most respondents reported only limited planning for the majority of epidemiologic functions. Approximately half of the respondents reported a lack of resources or a deficiency of dedicated resources for each function, and at least 80% reported that they did not have a sufficient level of resources to maintain preparedness.

Respondents reported more planning for *Crisis Phase Epidemiology* than for other epidemiologic functions. Most respondents indicated that they had — at a minimum — documented procedures for the crisis phase of a chemical or radiological contaminating event, Similarly, 58.2% of the respondents reported having at least "Some Dedicated" resources to crisis-phase epidemiologic functions.

Epidemiologic functions in other state agencies were generally unknown. At least 30% of the respondents indicated that other agencies' resources for these functions were "Not Easy to Ascertain" outside of the health department. However, of those who were able to assess epidemiologic resources in other state agencies, more than one-third indicated that resources were either limited or unavailable for each epidemiologic function. This may suggest that other agencies within the state consider these epidemiologic functions to be largely a service of public health agencies.

Exposure Assessment

More respondents reported "None" or "Minimal" planning for exposure assessment and sampling advice for chemicals than for radiation, indicating that agencies may be more prepared to handle exposure assessment for an RT event than for a CT event. In fact, 27.9% of the respondents reported having a "Detailed Operations Plan" for radiological environmental sampling, and 20.9% of the respondents reported having such a plan for biological sampling of radiation exposure. However, sampling plans for chemicals were more limited. Only 4.9% of the respondents had a "Detailed Operations Plan" for chemical environmental sampling and 9.8% reporting having such a plan for biological sampling of chemical exposure. Few respondents reported having no resources within the health department for these functions. Approximately 40% of the respondents reported having some dedicated resources for radiation exposure assessment and sampling (both environmental and biological) within the health department.

The majority of respondents reported little planning for *GIS Integration of Exposure Data* for either chemical or radiological terrorism. In fact, 69.0% of the respondents reported having no resources, or none dedicated, for *GIS Integration of Exposure Data* for chemicals, and 65.2% reported the same for radiation. No agency reported having a "Sufficient Number and Level" of resources for GIS integration of chemical- or radiation-exposure data. Furthermore, according to respondents, these resources generally are absent in other state agencies.

Health Assessment

Respondents reported less planning for chemical health assessment functions than for radiological health assessment functions, except for *Environmental Medical Consults*. More than 45% of the respondents reported above-minimal planning for a *Health Physics Interpretation of a Radiological Acute Event,* and 50.0% of the respondents reported having at least "Some Dedicated Resources" for this function. The percentage of respondents reporting resources available in state health departments for the remaining interpretation, consultation, and prediction health-assessment functions was comparable between chemical and radiological functions.

Most respondents reported minimal planning for—and few resources to address—*Environmental Medical Consults,* either for chemicals or radiation*.* In fact, 67.5% of the respondents reported having no resources or "None Dedicated" for *Environmental Medical Consults –-Chemical*, and 70.0% of the respondents reported no resources or "None Dedicated" for *Environmental Medical Consults–Radiation*. These resources also may be absent in other state agencies because the majority of respondents (87.2 % for chemicals, 82.5% for radiation) reported health assessment resources in other state agencies as "None," "None Dedicated," or "Not Easy to Ascertain."

Other Public Health Functions

Eighty percent of the respondents reported minimal or no planning for *Worker Health and Safety Consults – Chemical* whereas 64.3% of the respondents reported the same for *Worker Health and Safety Consults – Radiation*. Similarly, more respondents reported limited resources in state health departments for chemical-related occupational health and safety than reported limited resources for radiation-related occupational health and safety. Only 2.4% of the respondents reported having a sufficient level of resources for *Worker Health and Safety Consults –Chemical,* while 9.5% of the respondents reported having sufficient resources for *Worker Health and Safety Consults – Radiation.*

Most respondents reported minimal or no planning for *Community/Labor Relations for Contending Stakeholders,* and 59.0% of the respondents reported that resources in the state health department for this function are limited. In fact, only 5.1% of the respondents reported having a sufficient amount of resources for developing stakeholder relations. Nearly 40% of the respondents said that assessing other agencies' resources for *Community/Labor Relations for Contending Stakeholders* was difficult.

Respondents reported more extensive planning for health and risk communication. Nearly 60% of the respondents reported above-minimal planning for *Risk Communication,* and 82.2% reported above-minimal planning for *Health Alerts/ Electronic Communications*. Almost half (42.2%) of the respondents reported having a "Detailed Operations Plan," for *Health Alerts/ Electronic Communications* and 86.3% of the respondents reported having dedicated resources

for this function. Furthermore, approximately 25.0% of the respondents reported having sufficient resources to maintain health and risk communication functions.

Response Planning

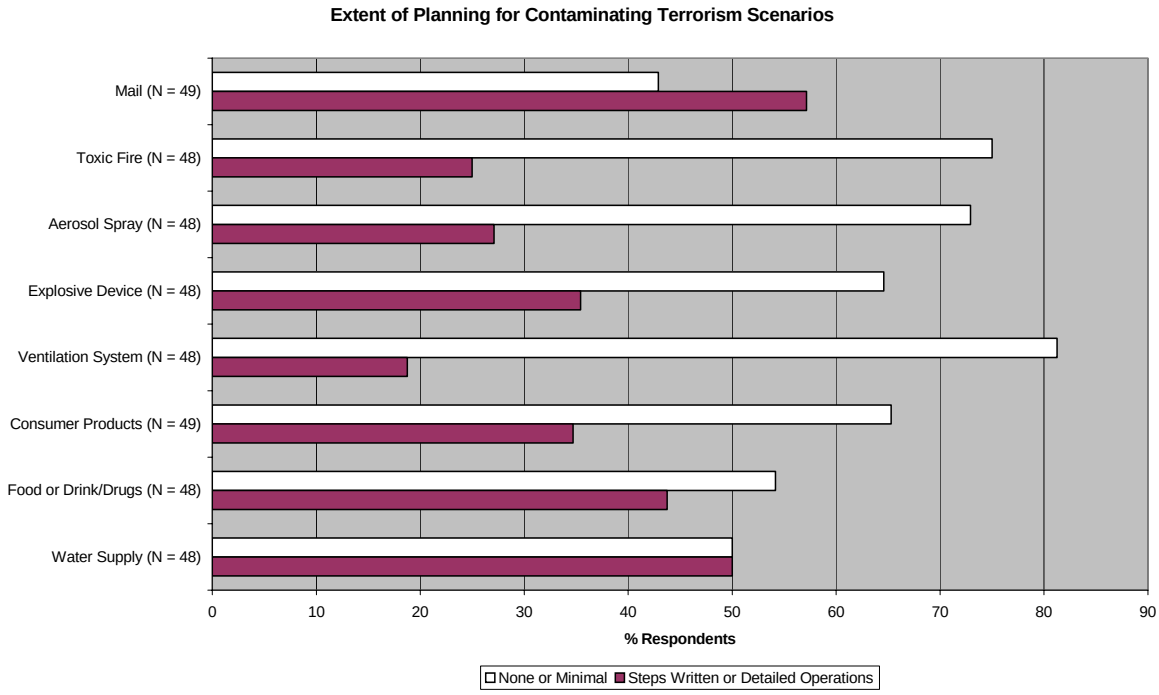
One quarter (26.5%) of the respondents reported having a finalized chemical or radiological written response plan (Q2). Of those who had plans, nearly all (90.9%) reported that they had conducted a drill or exercised a plan (Q2a). Table 2, which is organized by population size, displays the percentage of respondents that have a written response plan. Health agencies serving large populations were more likely to have a written response plan than those serving small populations. (Note: Cities and territories are included. Population categories are as follows: Small: up to 2,692,090; Medium: 2,692,090 – 5,629,707; Large: more than 5,629,707).

Table 2. Health Agencies With a Finalized Chemical/Radiological Written Response Plan

Population Size	Yes
Small (N = 17)	17.6%
Medium (N = 16)	18.7%
Large (N = 16)	43.7%

Figure 1 describes the percentage of respondents reporting "None" or "Minimal" planning for a public health response, according to potential delivery methods for chemical or radiological contaminating terrorism (Q3). Most respondents (81.2%) reported limited or no planning for response to a contaminating event involving ventilation systems, and nearly three-quarters of the respondents reported the same for aerosol sprays and toxic fires. However, more than half of the respondents indicated that they had – at a minimum – documented procedures for a public health response to an incident involving mail.

Figure 1. Extent of planning for specific contaminating terrorism events



Personnel Capacity

Most respondents (83.3%) reported having a 24/7 on-call duty officer system that would respond promptly to a chemical terrorism event (Q5). Similarly, 81.6% of the respondents said they had a continuous on-call duty officer system to respond to a radiological terrorism event (Q6).

Table 3 displays the median number and range of certified employees per health agency for various levels of Hazardous Waste Operations and Emergency Response Standard (HAZWOPER) certification (Q9). Most respondents (80.0%) reported having four or fewer employees certified at the *Awareness* level. Approximately 50.0% of the respondents reported having no staff certified at the *Operator* and *Technician* level.

Table 3. Median Number of Employees Per Agency with HAZWOPER Certification		
Certification Level	**Median**	**Number of Certified Employees**
Awareness (N = 25)	2.0	0 – 70
Operator (N = 21)	1.0	0 – 24
Technician (N = 24)	1.0	0 – 15

Respondents were also asked to assess the number of employees who spend all or part of their time on various functions related to chemical- and radiological-terrorism response (Q7). Respondents were asked to categorize employees according to funding status and indicate how many positions are vacant per function. At least 76.5% of the respondents reported no current vacancies for each function. In addition, more respondents reported having no employees for each function than those reporting having employees, except for *CDC-funded Planning, CDC-funded Epidemiology, Re-directed State Staff Environmental Laboratory,* and *CDC-funded Risk Communication.* In other words, respondents reported a lack of personnel for various public health functions while concurrently reporting no vacancies for these positions. Most respondents (70.8%) reported having CDC-funded personnel for *Planning,* 50.0% of the respondents reported having CDC-funded personnel for *Epidemiology,* 65.4% of the respondents reported having CDC-funded personnel for *Risk Communication*, and 58.8% of the respondents reported having re-directed state staff in the *Environmental Laboratory*.

Local and Interagency Relationships

Table 4 summarizes the extent to which health agencies have formed relationships in five capacities with other states or agencies. Nearly every respondent reported that their health agency involves other agencies in emergency management, and the majority (87.0%) reported that their health agency has identified lead local contacts for a chemical or radiological public health response. Of the health agencies with mutual-aid agreements with other states, 43.8% said they had exercised with their mutual-aid partners.

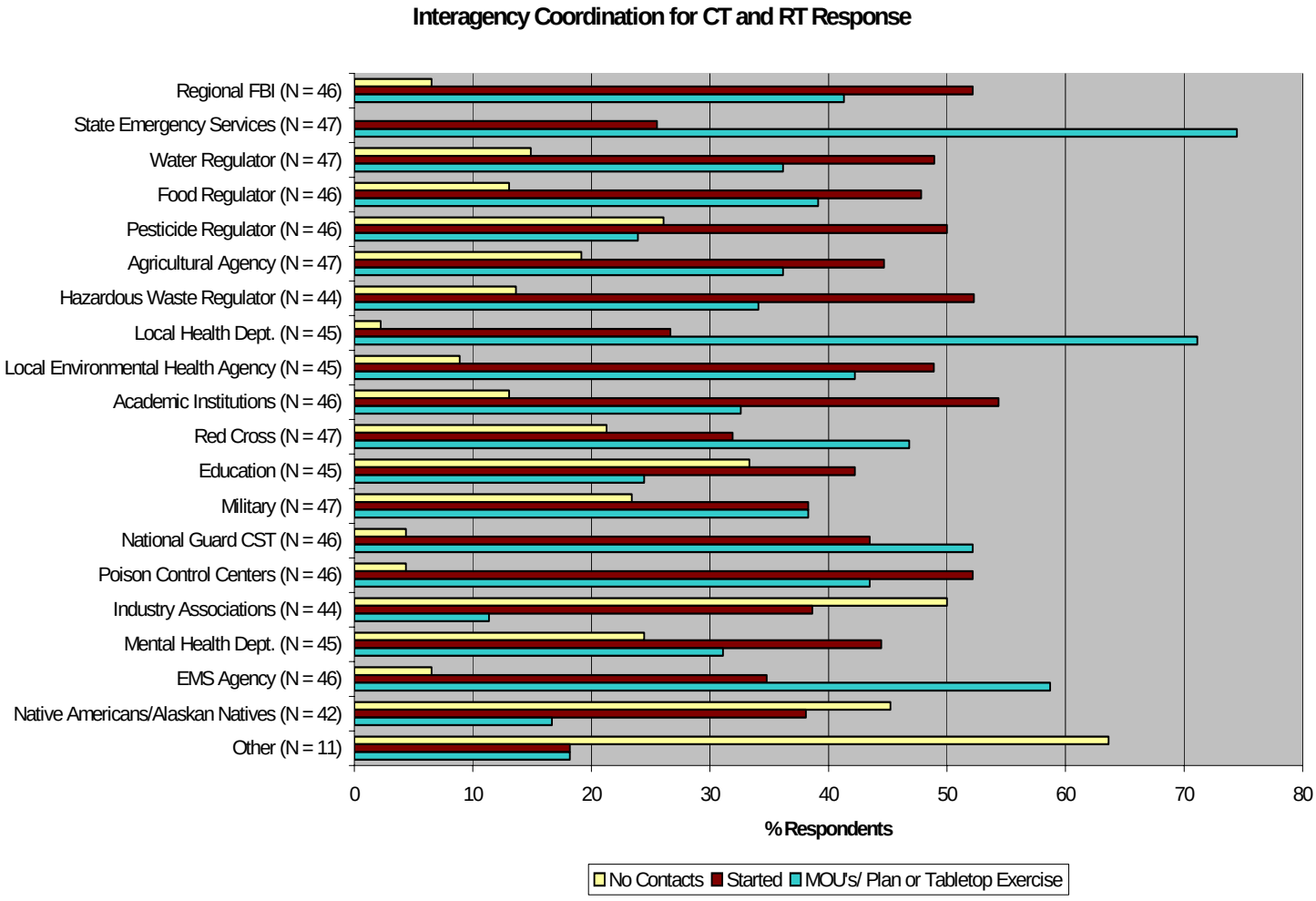
Table 4. Relationships with Other Organizations

	Yes %	No %	Don't Know %
Q4. Do you have mutual-aid agreements with other states? (N = 50)	64.0	24.0	12.0
Q10. Do you (or your staff) know who are lead local contacts for chemical and radiation public health response? (N = 46)	87.0	6.5	6.5
Q11. Does department provide training to local jurisdictions on any aspect of chemical/radiological terrorism? (N = 48)	50.0	47.9	2.1
Q14. Does your state use a standardized emergency management structure into which agencies are assigned roles? (N = 48)	95.8	2.1	2.1
Q16. Have you planned a clear command structure for gathering epidemiological and exposure data and providing coordinated guidance for a terrorist event involving more than one county? (N = 45)	55.6	40.0	4.4

Respondents reported various degrees of coordination between their health agency and other agencies for CT and RT response (Q13). While most respondents reported initial coordination between their health agency and other agencies in formulating a response plan, many said they lacked formal partnerships with key organizations. Additionally, 50.0% of the respondents indicated that their agencies have no contacts in industry associations, and one-third have no contacts with educational systems. On the other hand, all respondents reported initial coordination between their health agency and state emergency services. Thirty percent or more of respondents reported that their agency has conducted table-top exercises with each of the following agencies: regional FBI, state emergency services, local health department, the military,

the National Guard, and an EMS agency. Figure 2 displays health agencies' degree of coordination with each of the aforementioned agencies.

Figure 2. Degree of coordination between health departments and other agencies



Internal Assessment of Response Capacity

CSTE asked respondents to rate their health agencies' preparedness for responding to a chemical/radiological terrorism event on a scale of 0 to 10, with "0" indicating that the agency is not prepared and "10" indicating that the agency is fully prepared (Q13). The average score of preparedness was 4.1 (standard deviation = 2.0, minimum = 0, maximum = 8). When analyzed according to population size, this self-assessment score changed modestly (See Table 5. Data

includes responses from cities and territories. Population categories are as follows: Small: up to 2,692,090; Medium: 2,692,090 – 5,629,707; Large: more than 5,629,707).

Table 5. Average Preparedness Score by Population Size

Population Size	Mean (std. dev.)
Small (N=16)	3.4 (2.2)
Medium (N = 16)	3.9 (1.9)
Large (N = 14)	5.3 (1.5)

More than half (55.3%) of the respondents reported that their role is well defined for the crisis and recovery phases of a chemical/radiological terrorism event. (Q15). (See Table 6.)

Table 6. Respondents Reporting a Well-defined Role For CT and RT Crisis and Recovery (N = 47)

Phase	n (%)
Crisis Only	8 (17.0)
Recovery Only	--
Both	26 (55.3)
Neither	13 (27.7)

DISCUSSION

The Status of Planning for Public Health Preparedness for Chemical and Radiological Contaminating Terrorism in the United States is the first national assessment of core public health functions essential to the response and management of a CT or RT event. This report provides baseline data that policymakers can use to evaluate the impact of future funding for terrorism preparedness. The process of completing this assessment also can serve as a learning tool, prompting respondents to consider CT and RT as a threat and discover deficiencies in their response capacities.

This assessment found a significant lack of public health planning and preparedness for the majority of functions related to chemical and radiological contaminating terrorism. Three factors are key to reducing morbidity and mortality, and facilitating societal recovery from chemical and radiological contaminating terrorism events: (a) early detection of events and related sentinel illness through public health surveillance, (b) local/state response capability, and (c) rapid mobilization of regionally or centrally located federal resources to support the state and local response. These factors imply that adequate preparedness will require the successful coordination of various functions across several agencies, and such coordination will require careful planning.

Public health agencies are integral to planning and responding to chemical and radiological contaminating terrorism. During the acute and recovery phases of terrorism events, public health agencies will be required to provide support in various areas, including toxicology, occupational and environmental medicine, workers' health and safety, and risk communication. Epidemiologic functions, largely the responsibility of public health, are especially crucial for establishing CT and RT response capacity. For example, pre- and post-event surveillance, exposure assessment, sampling advice, and morbidity and mortality tracking are key to determining sources of contamination, minimizing contamination, and mitigating adverse health outcomes. Yet, aside from crisis phase epidemiologic activities, the majority of respondents reported minimal or no planning for these epidemiological functions. In fact, no health agency

believed that it was fully prepared, and the average internal assessment indicated that health agencies were unprepared.

Although public health surveillance most likely will be the first mechanism to identify covert chemical and radiological contaminating events, during which health departments would initially respond, most planning to date has focused on traditional contamination scenarios such as contamination through food and water. In addition, many health agencies have begun to formulate response plans for contamination through mail, a scenario for which awareness has increased since the 2001 Anthrax spore contamination of the U.S. Postal Service. Because these are familiar scenarios, public health agencies are moderately prepared to manage chemical or radiological contamination disseminated through these vehicles. However, terrorism planning cannot merely be reactive. Health agencies must prepare for unconventional scenarios as well. More advanced planning for RT events compared to CT events reflects a pattern of reactive preparation for more familiar scenarios. For example, radiological planning to date most likely stems from existing response plans for catastrophic events involving nuclear power plants. This is evidenced by the fact that respondents reported similar resources for chemical and radiological terrorism, yet reported more planning for radiological functions. State and local health departments should explore opportunities for revising plans for catastrophic radiological events to focus on the more likely scenario of radiological contaminating terrorism.

Planning for chemical and radiological terrorism is problematic for many health agencies because of a lack of resources and a lack of coordination with other relevant stakeholders and agencies. Most respondents reported that they do not have sufficient resources within their agencies, or in other state agencies, to maintain preparedness. The deficiency of resources within health departments for epidemiological functions was striking, particularly for functions related to surveillance, crisis-phase epidemiology and recovery-phase epidemiology. Communication functions were the only areas assessed to which the majority of respondents reported having dedicated resources, and it is likely that communication planning has progressed further than any other function for this reason.

Although respondents generally reported a lack of resources in other state agencies, assessing available resources within those agencies was difficult for respondents. Non-public health agencies can contribute personnel, expertise, and equipment necessary for formulating effective response plans; however, creating a response plan is difficult when health agencies do not know the availability and extent of these resources. Furthermore, respondents generally reported a lack of formal partnerships with key organizations. Coordinating with other agencies not only would strengthen response capacity but also would enable health agencies to identify where true gaps in resources exist.

To date, health agencies have formed some relationships that are necessary for the initial phase of a terrorism event, such as partnerships with state emergency services and the Red Cross, but they have not solidified partnerships necessary for the more extensive pre-event and recovery phases. For example, most respondents reported at least preliminary coordination with Poison Control Centers, which are not traditional partners in terrorism preparedness but which will play an important role in surveillance functions during a CT event. Other entities with which health agencies could solidify important partnerships include industry associations, mental health agencies, and pesticide regulators. Such partnerships would also facilitate the interagency coordination needed to successfully respond to a terrorist attack.

Responding to a terrorist attack involves not only addressing public health concerns but also carrying out a criminal investigation and mitigating municipal chaos. Relevant organizations must have clearly defined roles to execute the expeditious and synchronized response needed to control a CT or RT event. This assessment found that, while health agencies have contacts with organizations that will be involved in these capacities (e.g., FBI, local environmental agencies, and the military) they have not yet executed formal plans and drills.

To date, funding has focused primarily on preparedness for biological terrorism while little emphasis has been placed on CT and RT. The lack of planning and resources revealed by this assessment reflects this dearth of attention given to chemical and radiological terrorism threats. States can achieve adequate preparedness for CT and RT by making a long-term commitment to training a workforce and by identifying opportunities for translating existing resources. It is

possible that health agencies with limited CT and RT planning due to insufficient resources can use an established framework within the agency as a foundation from which to develop these plans. For example, there are biological terrorism response plans in place that could be modified to pertain to certain CT or RT scenarios.

To achieve and maintain preparedness, personnel should be trained and dedicated to performing the various CT- and RT-related public health functions. Most respondents reported a lack of personnel for the various public health positions while concurrently reporting no vacancies for these positions. The reason for this contradiction is unclear. It is possible that health agencies do not have the funding to support such positions, a fact that could contribute to the agencies' lack of planning. Future assessments should aim to ascertain the scope of staff dedicated to CT and RT functions.

Health agencies are far from achieving CT and RT preparedness. Securing funding for additional resources is only the first step in the process of becoming better prepared, and health agencies must be cognizant of future challenges. A recent survey to assess how states have used federal funds for terrorism preparedness to increase infectious disease epidemiology capacity found that states still faced problems in planning, allocating resources, and juggling political and public policy considerations.[17] Health agencies must begin incorporating CT and RT threats into their terrorism response plans immediately.

Assessment Limitations

While it was intended that the assessment provide the most accurate, comprehensive and useful information, CSTE notes several limitations. First, because this was a self-administered questionnaire, it is not certain that all respondents interpreted and responded to questions uniformly. Second, since several activities evaluated in the assessment are not located within a single agency, gauging the agency's state of CT and RT preparedness may be problematic if respondents did not consult additional sources. Next, in certain instances, estimating overall terrorism planning may be difficult for respondents who are in different stages of planning for CT- and RT-related functions. In addition, missing data should be taken into consideration when drawing conclusions about these responses. Finally, it should be noted that this assessment was

conducted 10 months prior to the publication of this report and public health agencies may have made progress in these areas of preparedness since publication. In June 2002, state health departments were awarded federal funding to prepare for bioterrorism and other public health emergencies. While this funding initially was interpreted to focus on terrorism preparedness for biologic agent, the Centers for Disease Control and Prevention directives have become more explicit and state health departments have since shifted towards an "all hazards" approach, which includes CT and RT preparedness activities.

RECOMMENDATIONS

1) **Convene a workgroup of stakeholders.** A stakeholder workgroup should convene to develop core environmental and occupational public health competencies, staff capacities, and surveillance systems needed for each state to prepare and respond to chemical, radiological, and contaminating terrorism. Participating stakeholders can include federal agencies (CDC, FDA, NIOSH, FEMA, NIH, EPA, CPSC) professional associations (CSTE, APHL, ASTHO, NACCHO,), state public health agencies, state environmental agencies, Poison Control Centers, industry representatives (such as ACS), academia (ASPH), and law enforcement agencies. In addition, this workgroup will facilitate:
    - *Interagency Coordination:* to successfully manage and control CT and RT events, these agencies should aim to solidify existing partnerships and form new relationships.
    - *Information Sharing*: State and territorial and federal agencies should aim to share information with each other in an effort to achieve adequate response capacity among all constituents. Sharing information will help agencies identify how to effectively integrate resources into existing response plans and formulate strategies for previously unconsidered scenarios.
2) **Increase federal funding.** Federal funding should be increased to ensure the necessary public health support to prepare for and respond to contaminating terrorism. To date, insufficient federal monies have been earmarked for environmental public health planning to respond to and manage the crisis and recovery phases of contaminating terrorism.
3) **Monitor the status of planning.** As funding is allocated, it is important that the status of planning for chemical and radiological terrorism is evaluated periodically in order to monitor progress towards building capacity and to identify persistent gaps in resources. The stakeholder workgroup will be key in this process. In addition, future assessments should aim to ascertain the scope of staff dedicated to CT and RT functions. This

responsibility can be assumed by professional organizations, such as CSTE, with experience in conducting national assessments.

4) **Establish a trained workforce.** States and territories should focus on establishing a trained workforce capable of executing functions related to all phases of CT and RT. This is particularly important for pre-event and recovery phase functions that require long-term attention. This can be achieved by using the aforementioned funding to hire personnel or cross-train within health departments or other agencies.

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APPENDIX A: Questionnaire

Council of State and Territorial Epidemiologists

THE STATUS OF PLANNING FOR PUBLIC HEALTH PREPAREDNESS FOR CHEMICAL AND RADIOLOGICAL CONTAMINATING TERRORISM IN THE UNITED STATES

BACKGROUND:

Have you been provided the resources and the time to plan for chemical, explosive, radiation and contaminating terrorism? Have you articulated to your partner agencies what your public health functions ought to be in the pre-event, crisis and recovery phases of this type of terrorist event? Have you established clear understandings with those partner agencies? Are you engaging in regular tabletop drills with them? *In order to plan future federal budgets and activities, CSTE and CDC want to know the answers to these questions.* We would like to discuss preliminary results at the end of June at the CSTE meeting in Connecticut. CSTE will not release state-specific information in any reports unless otherwise approved by the state(s). *PLEASE ANSWER THIS ASSESSMENT PROMPTLY*.

INSTRUCTIONS:

Since the responsibility for chemical, radiation and contaminating terrorism is often dispersed in state, territorial and large city governments it may take more than one person to provide the information needed. Assign a “project leader” to assure the various pieces get answered. Make sure that your bioterrorism coordinator knows you are working on the questionnaire, even if they don’t known much about chemical or radiation terrorism. Make sure that the supervisors in charge of the relevant areas know you are working on the questionnaire. There are questions about other agencies.

QUESTIONNAIRE DUE DATE IS ON OR BEFORE CLOSE OF BUSINESS JUNE 9th.

If you are have questions or difficulties in completing the online questionnaire please contact:

Knachelle Hodge
CSTE National Office
Email: khodge@cste.org
Phone: (770)458-3811

Primary respondent's contact information:	
First name	
Last name	
Degree(s)	
Title	
Agency	
Address	
Address	
City	
State	
Zip	
Telephone	
Fax	
Email	

Please include names and contact information for other contributing respondents below:

Contributing respondent's contact information:	
First name	
Last name	
Degree(s)	
Title	
Agency	
Address	
Address	
City	
State	
Zip	
Telephone	
Fax	
Email	

Contributing respondent's contact information:	
First name	
Last name	
Degree(s)	
Title	
Agency	
Address	
Address	
City	
State	
Zip	
Telephone	
Fax	
Email	

Contributing respondent's contact information:	
First name	
Last name	
Degree(s)	
Title	
Agency	
Address	
Address	
City	
State	
Zip	
Telephone	
Fax	
Email	

I. Chemical Terrorism/Radiological Terrorism Planning and Resources

In this table we have listed public health functions in the pre-event crisis phase and recovery phase of a chemical or radiological contaminating event. Please do not count any nuclear power plant preparedness.

1. In the space provided, select the phrase that best characterizes your state of planning to perform these functions and the resources available to do them.

Function	Extent of Planning	Resources in State Health Department	Resources in other state agencies
	1. None 2. Minimal 3. Steps Written 4. Detailed operations plan	1. None 2. None dedicated 3. Some dedicated 4. Sufficient # and level 5. Not easy to ascertain	1. None 2. None dedicated 3. Some dedicated 4. Sufficient # and level 5. Not easy to ascertain
Epidemiologic Functions			
Pre-event Syndromic Surveillance for Stealth Attack			
Other kind of Statistical Surveillance (e.g. poison control calls, pharmaceutical purchases, school absenteeism)			
Surveillance through Alert Clinician Network			
Crisis phase epidemiology (e.g. documenting acute morbidity, outbreak style investigation)			
Recovery phase epidemiology (e.g. documenting delayed health effects)			
Exposure Assessment			
Exposure assessment and environmental sampling advice - Chemical			
Exposure assessment and environmental sampling advice - Radiation			
Exposure assessment and biological sampling advice - Chemical			
Exposure assessment and biological sampling advice - Radiation			
IT GIS integration of exposure data – Chemical			
IT GIS integration of exposure data - Radiation			

Function	**Extent of Planning**	**Resources in State Health Department**	**Resources in other state agencies**
	1. None 2. Minimal 3. Steps Written 4. Detailed operations plan	1. None 2. None dedicated 3. Some dedicated 4. Sufficient # and level 5. Not easy to ascertain	1. None 2. None dedicated 3. Some dedicated 4. Sufficient # and level 5. Not easy to ascertain
Health Assessment			
Toxicological Interpretation of Acute Event – Chemical			
Health Physics Interpretation of Acute Event – Radiological			
Toxicological Consultation on Reentry – Chemical			
Health Physics Consultation on Reentry – Radiological			
Toxicological Predictions on Long Term Health Effects - Chemical			
Health Physics Predictions on Long Term Health Effects - Radiation			
Environmental Medical Consults – Chemical			
Environmental Medical Consults - Radiation			
Other Public Health Functions			
Worker Health and Safety Consults - Chemical			
Worker Health and Safety Consults – Radiation			
Health Alerts/ Electronic Communication			
Risk Communication			
Community/Labor Relations for contending stakeholders			

2. Do you have a finalized chemical/ radiological written response plan in your state or territorial agency?
☐Yes ☐No ☐Don't Know

2a. If yes, has your agency conducted a drill or exercise of your plan?
☐Yes ☐No ☐Don't Know

3. Which of the following scenarios have you considered for *public health response*?

In the space provided, select the phrase that best characterizes your state of planning to perform these functions and the resources available to do them.

Delivery Methods	Extent of Planning
	1. None 2. Minimal 3. Steps Written 4. Detailed operations plan
Mail	
Toxic fire	
Aerosol spray	
Explosive device	
Ventilation system	
Consumer products	
Food or drink / drugs	
Water supply	

4. Do you have mutual aid agreements with other states?
☐Yes ☐No ☐Don't Know

4a. Have you ever drilled or exercised with your mutual aid partners?
☐Yes ☐No ☐Don't Know

5. Does your agency have a 24/7 on-call, duty officer system that would provide a prompt response to a **chemical** terrorism event?
☐Yes ☐No ☐Don't Know

6. Does your agency have a 24/7 on-call, duty officer system that would provide a prompt response to a **radiological** terrorism event?
☐Yes ☐No ☐Don't Know

II. Chemical and Radiological Terrorism FTE's in State Health Departments

7. Please denote the number of employees that spend all or part of their time on chemical terrorism.

	CDC Funded	New State Funded	Re-Directed State Staff	Other Federal Funds	Currently Vacant
Planning					
Epidemiology					
Toxicology					
Biomonitoring Laboratory					
Environmental Laboratory					
Radiation					
Occupational Health/ IH					
Risk Communication					
Sanitary Engineering					
Food Science					
Other					
Total					

8. Has your agency considered using a fiscal intermediary (financial arrangement with outside hiring source) for hiring?

☐Yes ☐No ☐Not allowed

9. How many staff in your health department have up-to-date Hazwoper certification in the following areas?

☐ Awareness
☐ Operator
☐ Technician

9a. If any of your staff are certified at the operator or higher level how does it fit into your public health response?

III. Local Relationships

10. Do you (or your staff) know who are lead local contacts for chemical and radiation public health response?

☐Yes ☐No ☐Don't Know

11. Does your department provide training to local jurisdictions on any aspect of chemical/radiological terrorism?

☐Yes ☐No ☐Don't Know

IV. Matrix for Interagency Coordination on Chemical and Radiation Response

12. Please check the box that best describes the degree of coordination with the following agencies:

	No Contacts	Started	MOU's/Plan	Tabletop Exercise
Regional FBI	☐	☐	☐	☐
State Emergency Services	☐	☐	☐	☐
Water Regulator	☐	☐	☐	☐
Food Regulator	☐	☐	☐	☐
Pesticide Regulator	☐	☐	☐	☐
Agricultural Agency	☐	☐	☐	☐
Hazardous Waste Regulator	☐	☐	☐	☐
Local Health Dept	☐	☐	☐	☐
Local Environmental Health Agency	☐	☐	☐	☐
Academic Institutions	☐	☐	☐	☐
Red Cross	☐	☐	☐	☐
Education	☐	☐	☐	☐
Military	☐	☐	☐	☐
National Guard CST	☐	☐	☐	☐
Poison Control Centers	☐	☐	☐	☐
Industry Associations	☐	☐	☐	☐
Mental Health Dept	☐	☐	☐	☐
EMS Agency	☐	☐	☐	☐
Native Americans/Alaskan Natives	☐	☐	☐	☐
Other:	☐	☐	☐	☐

13. Overall, how prepared is your state or territorial health agency to respond to a chemical/radiological terrorism event? *(On a scale of 0-10, with 0 being not prepared and 10 being fully prepared)*

14. Does your state use a standardized emergency management structure into which different agencies are assigned roles?

☐Yes ☐No ☐Don't Know

15. Is the role of the public health agency well-defined for the crisis and recovery phases?
    - ☐ Crisis only
    - ☐ Recovery only
    - ☐ Both
    - ☐ Neither

16. Have you planned a clear command structure for gathering epidemiological and exposure data and providing coordinated guidance for a terrorist event involving more than one county?
    ☐ Yes ☐ No ☐ Don't Know

VI. Organization chart

Please fax relevant organization charts of your health department and indicate the entities in it that are responsible for terrorism response related to: food/drug water, radiation and toxicology, worker health and safety, laboratory and epidemiological responses to chemical and radiological terrorism.

Also, please indicate where in the organization the entities responsible for chemical and radiological terrorism reside in your health department.

APPENDIX B: Frequencies

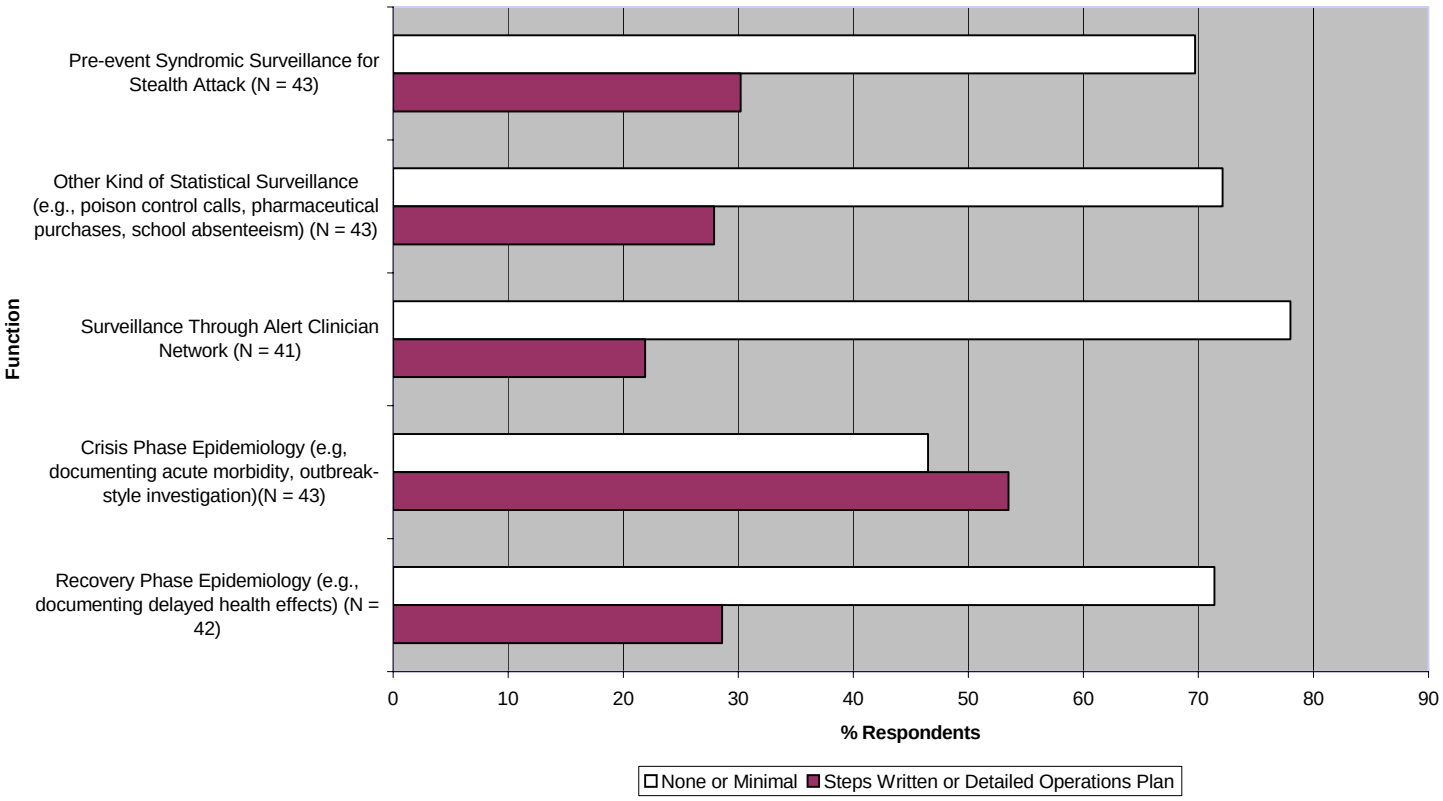
Frequencies for the "The Status of Planning for Public Health Preparedness for Chemical and Radiological Contaminating Terrorism in the United States" Assessment

I. Chemical Terrorism/Radiological Terrorism Planning and Resources

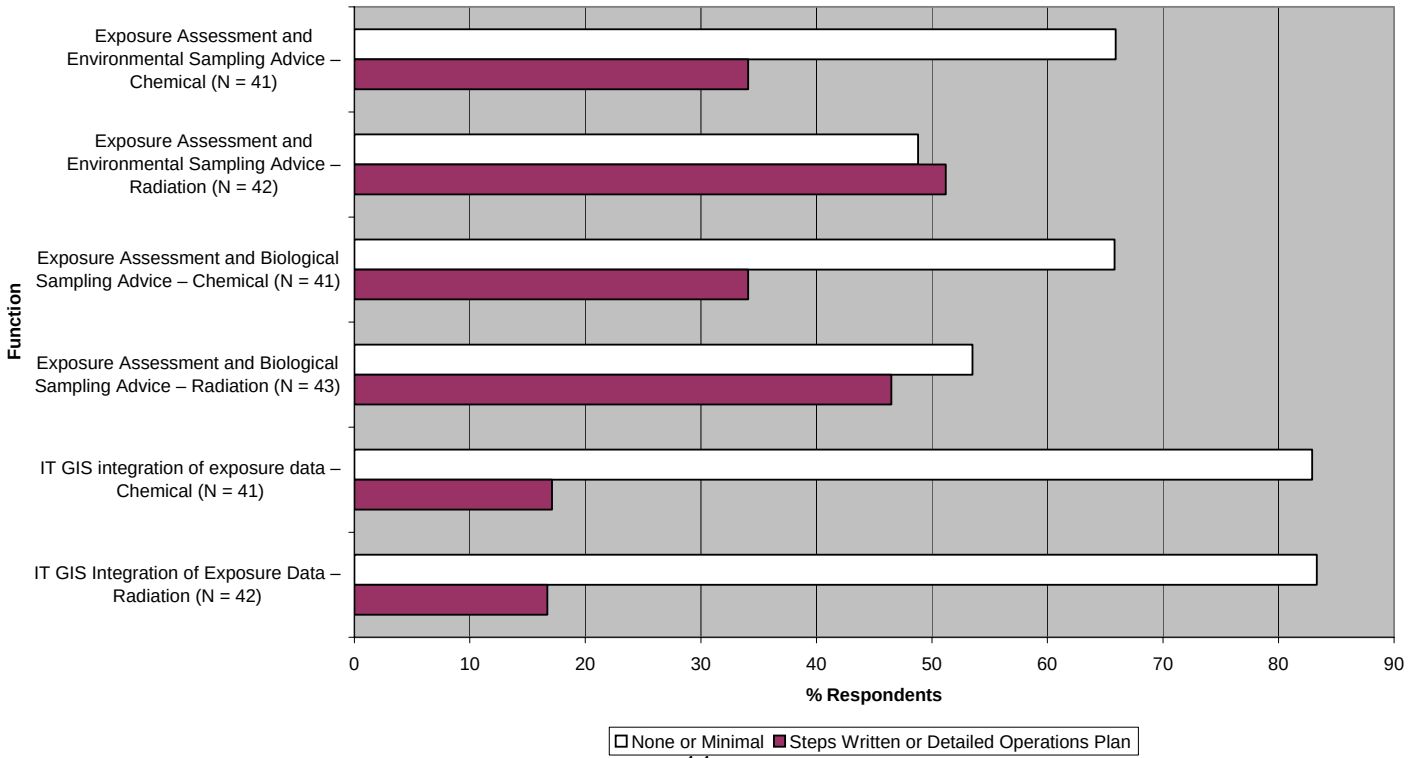
1. In the space provided, indicate the phrase that best characterizes your state of planning to perform these functions and the resources available to do them.

EXTENT OF PLANNING				
	None n (%)	Minimal n (%)	Steps Written n (%)	Detailed Operations Plan n (%)
Epidemiologic Functions				
Pre-event Syndromic Surveillance for Stealth Attack	14 (32.5)	16 (37.2)	7 (16.3)	6 (14)
Other Kind of Statistical Surveillance (e.g., poison control calls, pharmaceutical purchases, school absenteeism)	8 (18.6)	23 (53.5)	9 (20.9)	3 (7)
Surveillance Through Alert Clinician Network	14 (34.2)	18 (43.8)	4 (9.8)	5 (12.2)
Crisis Phase Epidemiology (e.g., documenting acute morbidity, outbreak style investigation)	5 (11.6)	15 (34.9)	17 (39.5)	6 (14)
Recovery Phase Epidemiology (e.g., documenting delayed health effects)	9 (21.4)	21 (50.0)	10 (23.8)	2 (4.8)
Exposure Assessment				
Exposure Assessment and Environmental Sampling Advice – Chemical	1 (2.4)	26 (63.4)	12 (29.3)	2 (4.9)
Exposure Assessment and Environmental Sampling Advice – Radiation	5 (11.6)	16 (37.2)	10 (23.3)	12 (27.9)
Exposure Assessment and Biological Sampling Advice – Chemical	5 (12.2)	22 (53.6)	10 (24.4)	4 (9.8)
Exposure Assessment and Biological Sampling Advice – Radiation	9 (20.9)	14 (32.6)	11 (25.6)	9 (20.9)
IT GIS Integration of Exposure Data – Chemical	19 (46.3)	15 (36.6)	6 (14.6)	1 (2.5)
IT GIS integration of Exposure Data – Radiation	25 (59.5)	10 (23.8)	5 (11.9)	2 (4.8)

Extent of Planning: Epidemiology Functions

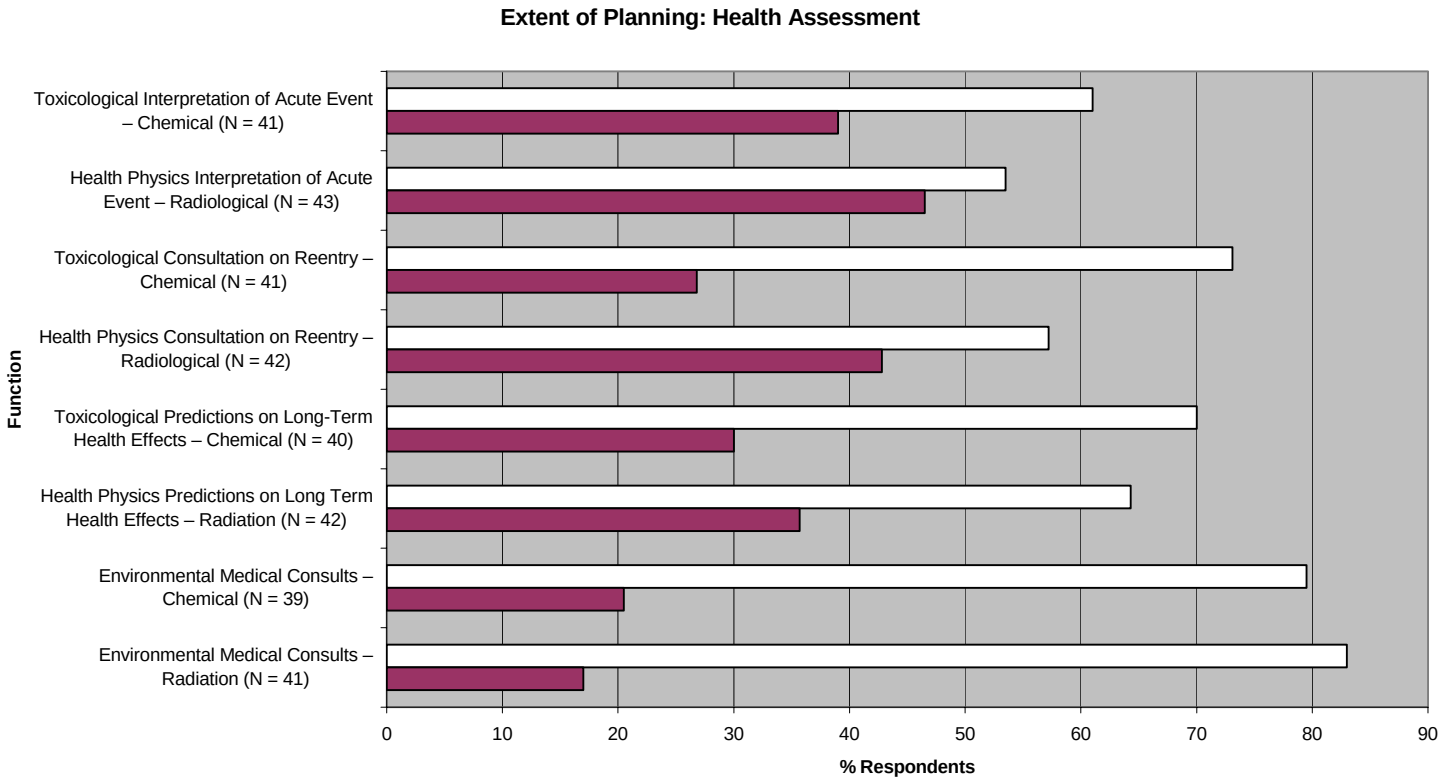


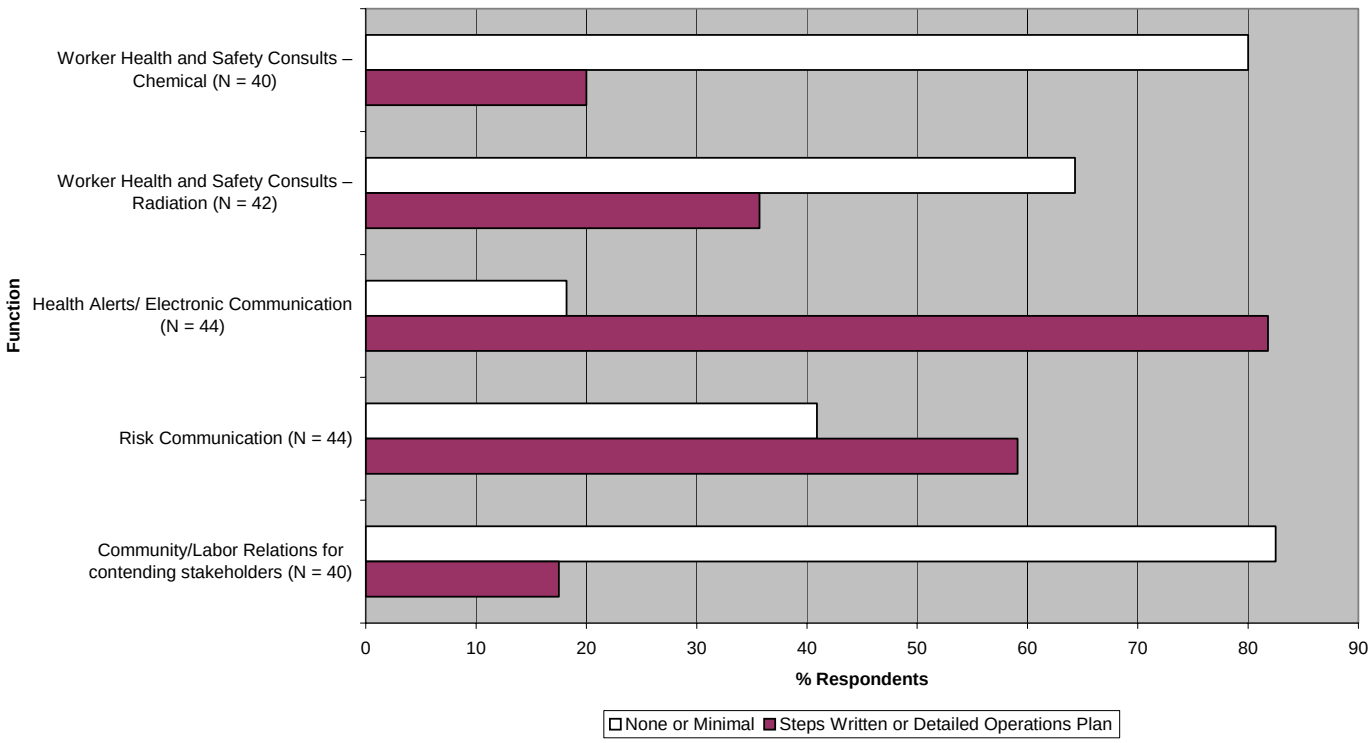
Extent of Planning: Exposure Assessment



1. (continued)

EXTENT OF PLANNING				
	None n (%)	Minimal n (%)	Steps Written n (%)	Detailed Operations Plan n (%)
Health Assessment				
Toxicological Interpretation of Acute Event – Chemical	3 (7.3)	22 (53.7)	14 (34.1)	2 (4.9)
Health Physics Interpretation of Acute Event – Radiological	5 (11.6)	18 (41.9)	13 (30.2)	7 (16.3)
Toxicological Consultation on Reentry – Chemical	8 (19.5)	22 (53.6)	9 (22.0)	2 (4.9)
Health Physics Consultation on Reentry – Radiological	8 (19.1)	16 (38.1)	9 (21.4)	9 (21.4)
Toxicological Predictions on Long-Term Health Effects – Chemical	6 (15.0)	22 (55.0)	10 (25.0)	2 (5.0)
Health Physics Predictions on Long-Term Health Effects – Radiation	10 (23.8)	17 (40.5)	11 (26.2)	4 (9.5)
Environmental Medical Consults – Chemical	13 (33.3)	18 (46.2)	6 (15.4)	2 (5.1)
Environmental Medical Consults – Radiation	16 (39.0)	18 (44.0)	6 (14.6)	1 (2.4)
Other Public Health Functions				
Worker Health and Safety Consults – Chemical	11 (27.5)	21 (52.5)	5 (15.0)	2 (5.0)
Worker Health and Safety Consults – Radiation	7 (16.7)	20 (47.6)	10 (23.8)	5 (11.9)
Health Alerts/ Electronic Communication	1 (2.2)	7 (15.6)	18 (40.0)	19 (42.2)
Risk Communication	1 (2.3)	17 (38.6)	16 (36.4)	10 (22.7)
Community/Labor Relations for contending stakeholders	12 (30.0)	21 (52.5)	5 (12.5)	2 (5.0)

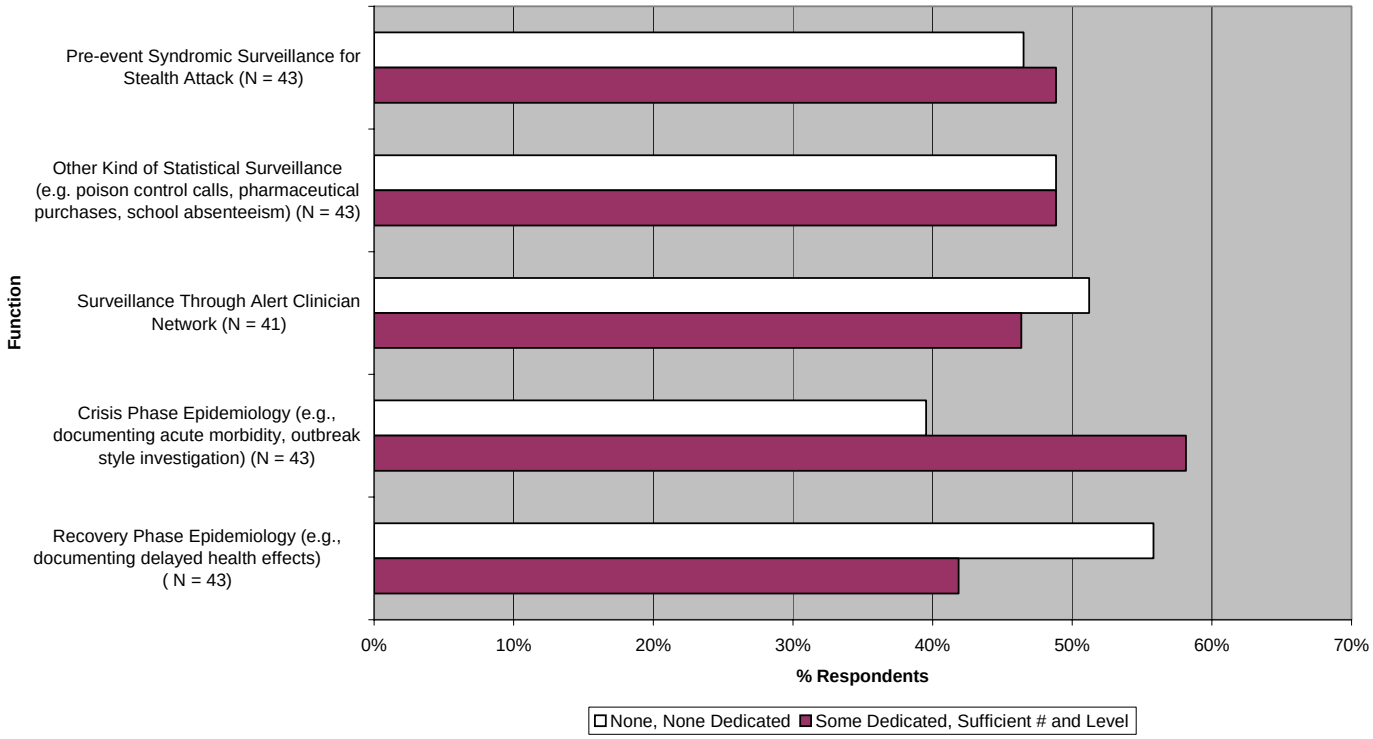

Extent of Planning: Health Assessment
Toxicological Interpretation of Acute Event – Chemical (N = 41)
Health Physics Interpretation of Acute Event – Radiological (N = 43)
Toxicological Consultation on Reentry – Chemical (N = 41)
Health Physics Consultation on Reentry – Radiological (N = 42)
Toxicological Predictions on Long-Term Health Effects – Chemical (N = 40)
Health Physics Predictions on Long Term Health Effects – Radiation (N = 42)
Environmental Medical Consults – Chemical (N = 39)
Environmental Medical Consults – Radiation (N = 41)
Function
0 10 20 30 40 50 60 70 80 90
% Respondents
None or Minimal
Steps Written or Detailed Operations Plan


Worker Health and Safety Consults – Chemical (N = 40)
Worker Health and Safety Consults – Radiation (N = 42)
Health Alerts/ Electronic Communication (N = 44)
Risk Communication (N = 44)
Community/Labor Relations for contending stakeholders (N = 40)
Function
0 10 20 30 40 50 60 70 80 90
% Respondents
None or Minimal
Steps Written or Detailed Operations Plan

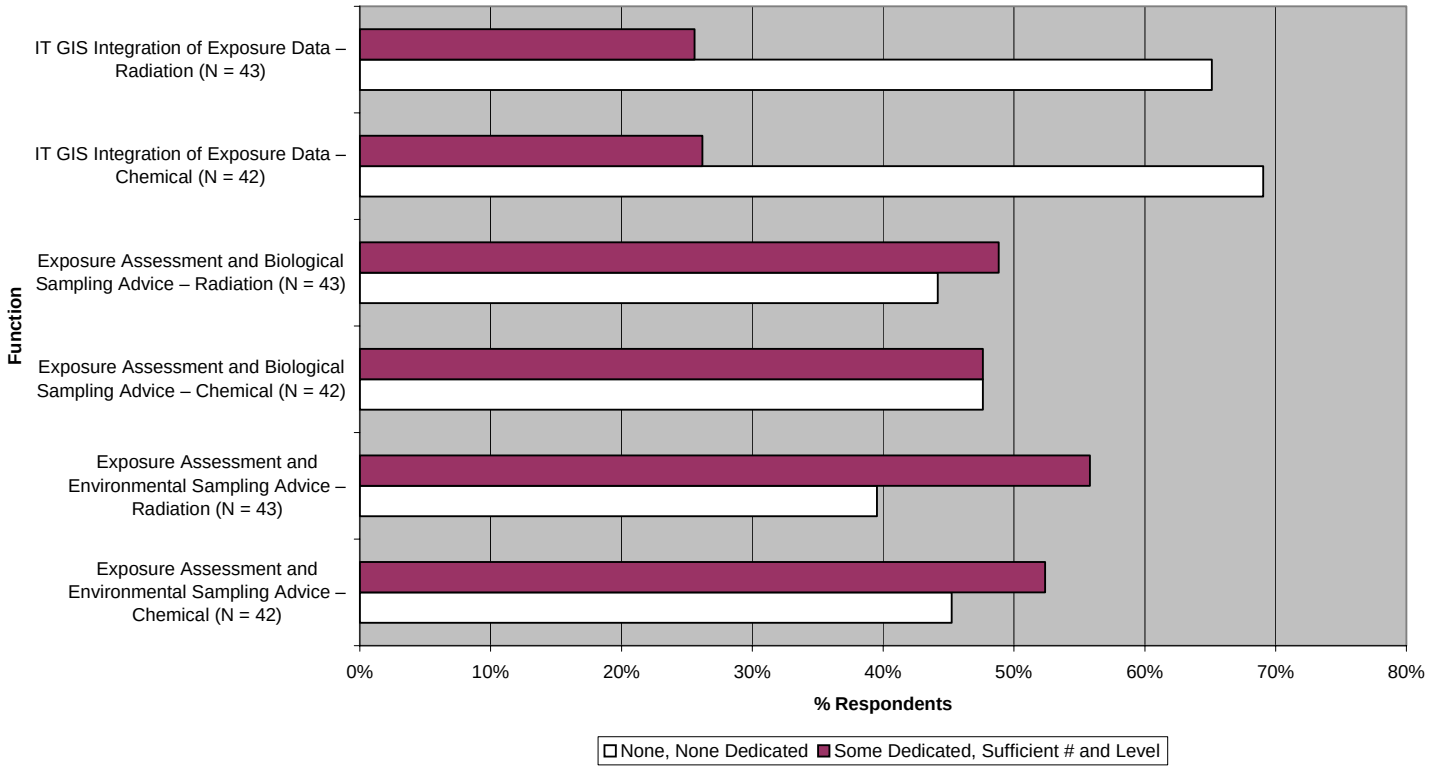
1. (continued)

RESOURCES IN STATE HEALTH DEPARTMENTS					
	None n (%)	None Dedicated n (%)	Some Dedicated n (%)	Sufficient # and level n (%)	Not easy to ascertain n (%)
Epidemiologic Functions					
Pre-event Syndromic Surveillance for Stealth Attack	8 (18.6)	12 (27.9)	16 (37.2)	5 (11.6)	2 (4.7)
Other Kind of Statistical Surveillance (e.g., poison control calls, pharmaceutical purchases, school absenteeism)	5 (11.6)	16 (37.2)	17 (39.6)	4 (9.3)	1 (2.3)
Surveillance Through Alert Clinician Network	13 (31.7)	8 (19.5)	12 (29.3)	7 (17.1)	1 (2.4)
Crisis Phase Epidemiology (e.g., documenting acute morbidity, outbreak style investigation)	5 (11.6)	12 (27.9)	22 (51.2)	3 (7.0)	1 (2.3)
Recovery Phase Epidemiology (e.g., documenting delayed health effects)	8 (18.6)	16 (37.2)	16 (37.2)	2 (4.7)	1 (2.3)
Exposure Assessment					
Exposure Assessment and Environmental Sampling Advice – Chemical	4 (9.5)	15 (35.7)	19 (45.3)	3 (7.1)	1 (2.4)
Exposure Assessment and Environmental Sampling Advice – Radiation	4 (9.2)	13 (30.2)	18 (41.9)	6 (14.0)	2 (4.7)
Exposure Assessment and Biological Sampling Advice - Chemical	4 (9.5)	16 (38.1)	16 (38.1)	4 (9.5)	2 (4.8)
Exposure Assessment and Biological Sampling Advice – Radiation	5 (11.6)	14 (32.6)	17 (39.5)	4 (9.3)	3 (7.0)
IT GIS Integration of Exposure Data – Chemical	10 (23.8)	19 (45.2)	9 (21.4)	2 (4.8)	2 (4.8)
IT GIS Integration of Exposure Data – Radiation	14 (32.6)	14 (32.6)	11 (25.6)	0 (0)	4 (9.2)

Resources in State Health Departments: Epidemiologic Functions



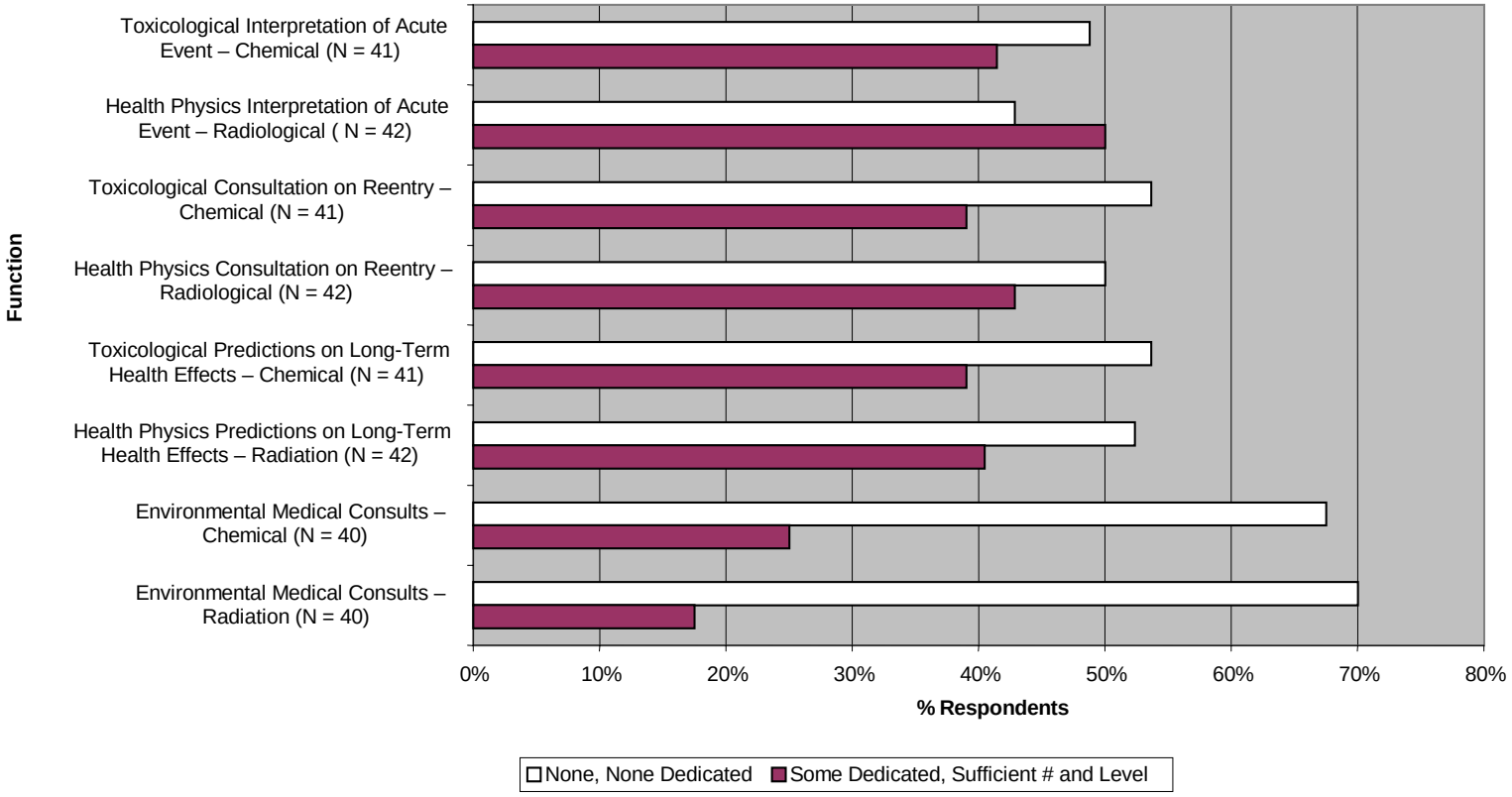
Resources in State Health Departments: Exposure Assessment



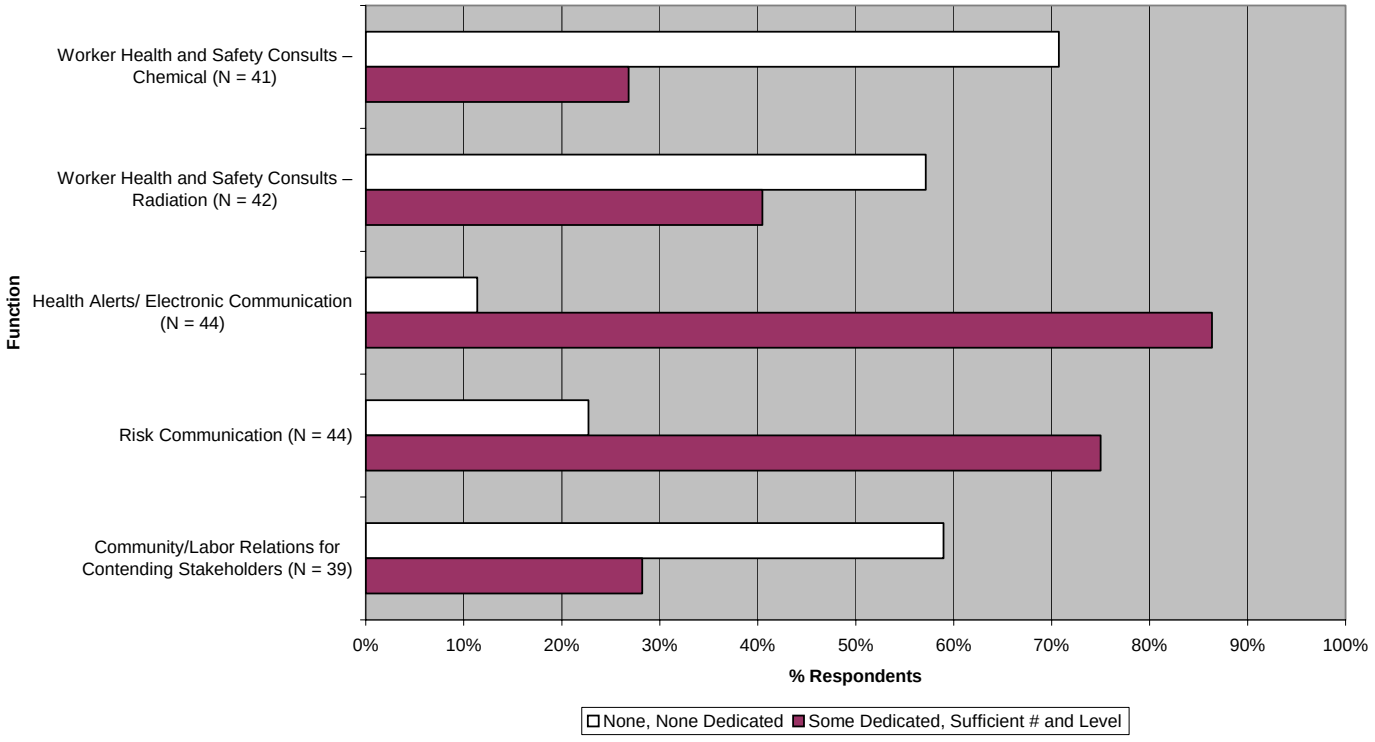
1. (continued)

RESOURCES IN STATE HEALTH DEPARTMENTS					
	None n (%)	None Dedicated n (%)	Some Dedicated n (%)	Sufficient # and level n (%)	Not easy to ascertain n (%)
Health Assessment					
Toxicological Interpretation of Acute Event – Chemical	5 (12.2)	15 (36.6)	12 (29.3)	5 (12.1)	4 (9.8)
Health Physics Interpretation of Acute Event – Radiological	7 (16.7)	11 (26.2)	18 (42.9)	3 (7.1)	3 (7.1)
Toxicological Consultation on Reentry – Chemical	7 (17.1)	15 (36.6)	15 (36.6)	1 (2.4)	3 (7.3)
Health Physics Consultation on Reentry – Radiological	8 (19.1)	13 (31.0)	16 (38.1)	2 (4.7)	3 (7.1)
Toxicological Predictions on Long-Term Health Effects – Chemical	7 (17.1)	15 (36.6)	14 (34.1)	2 (4.9)	3 (7.3)
Health Physics Predictions on Long-Term Health Effects – Radiation	9 (21.4)	13 (31.0)	16 (38.1)	1 (2.4)	3 (7.1)
Environmental Medical Consults – Chemical	13 (32.5)	14 (35.0)	8 (20.0)	2 (5.0)	3 (7.5)
Environmental Medical Consults – Radiation	14 (35.0)	14 (35.0)	6 (15.0)	1 (2.5)	5 (12.5)
Other Public Health Functions					
Worker Health and Safety Consults – Chemical	10 (24.4)	19 (46.4)	10 (24.4)	1 (2.4)	1 (2.4)
Worker Health and Safety Consults – Radiation	8 (19.1)	16 (38.1)	13 (31.0)	4 (9.5)	1 (2.3)
Health Alerts/ Electronic Communication	0 (0)	5 (11.4)	28 (63.6)	10 (22.7)	1 (2.3)
Risk Communication	0 (0)	10 (22.7)	22 (50.0)	11 (25.0)	1 (2.3)
Community/Labor Relations for contending stakeholders	7 (18.0)	16 (41.0)	9 (23.1)	2 (5.1)	5 (12.8)

Resources in State Health Departments: Health Assessment

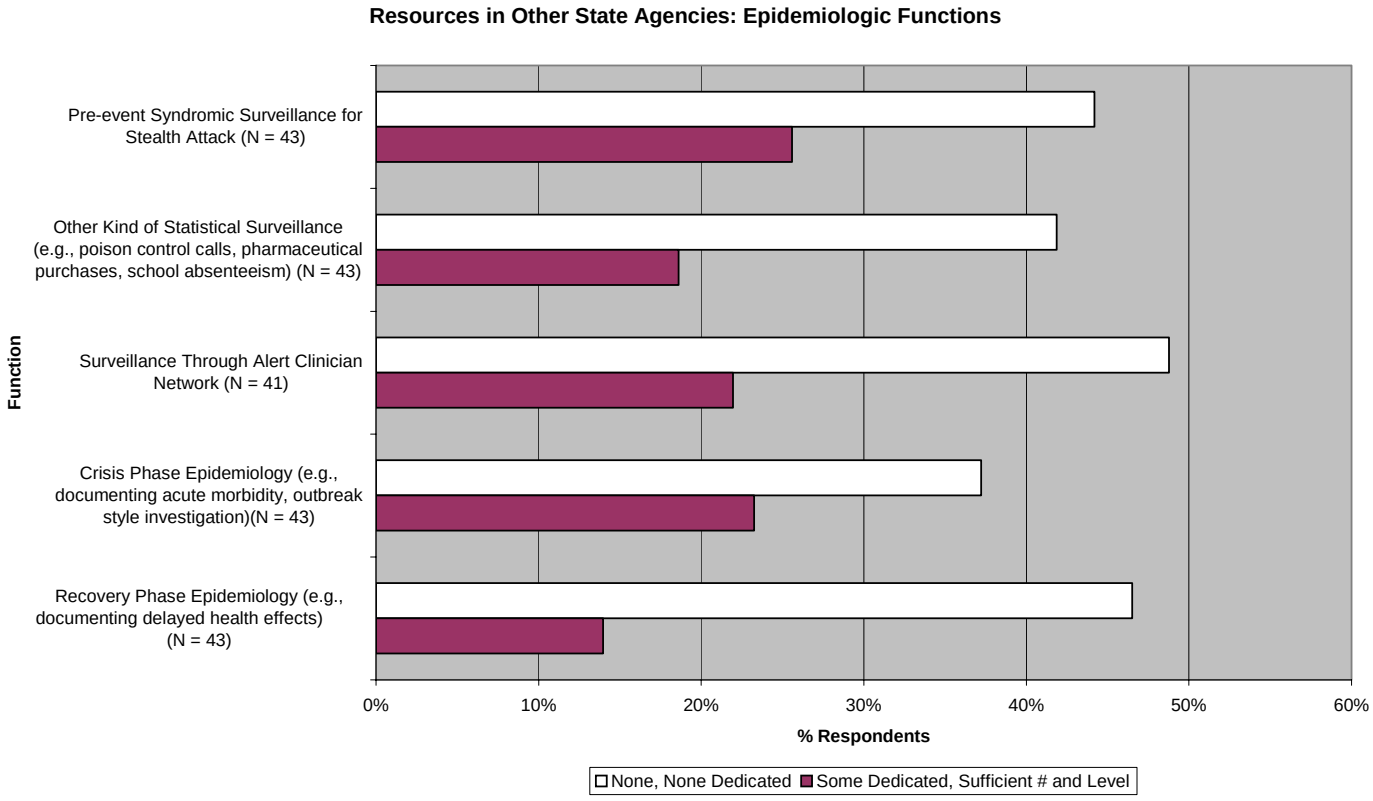


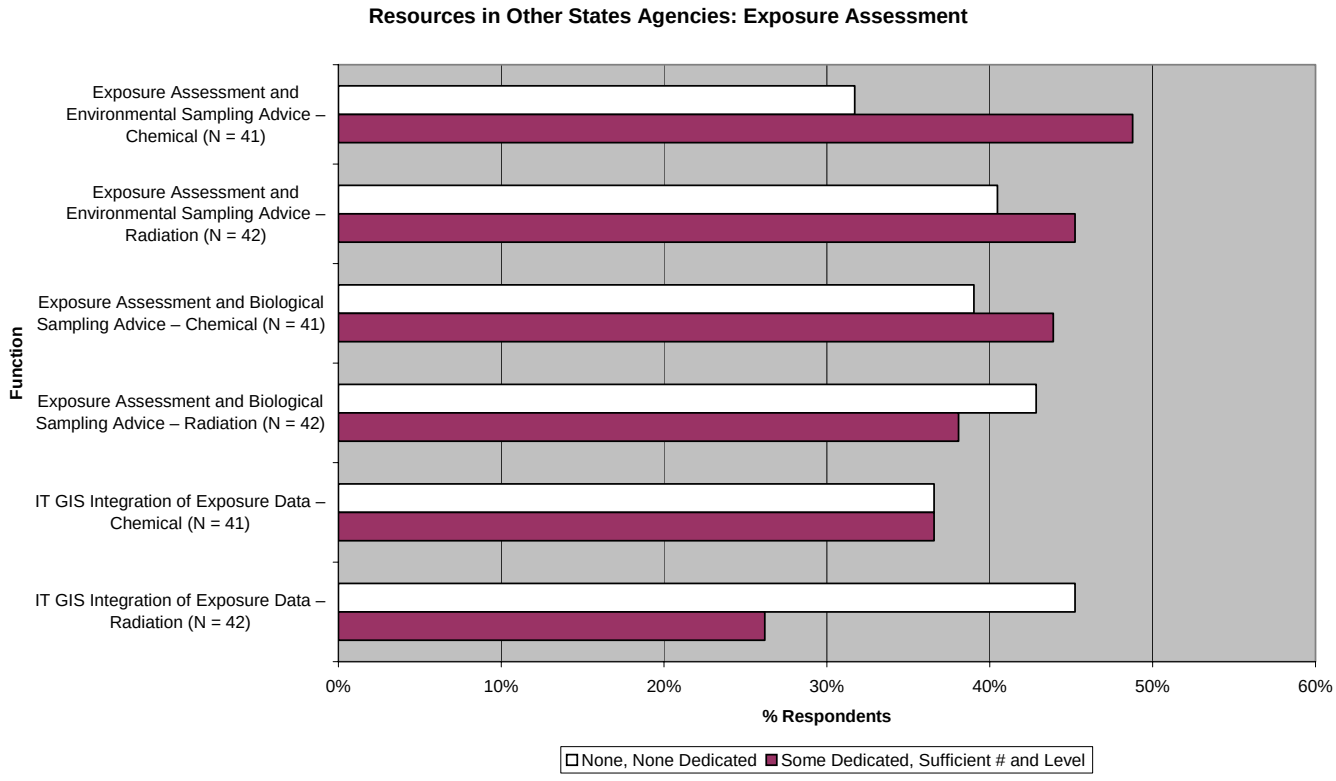
Resources in State Health Departments: Other Public Health Functions



1. (continued)

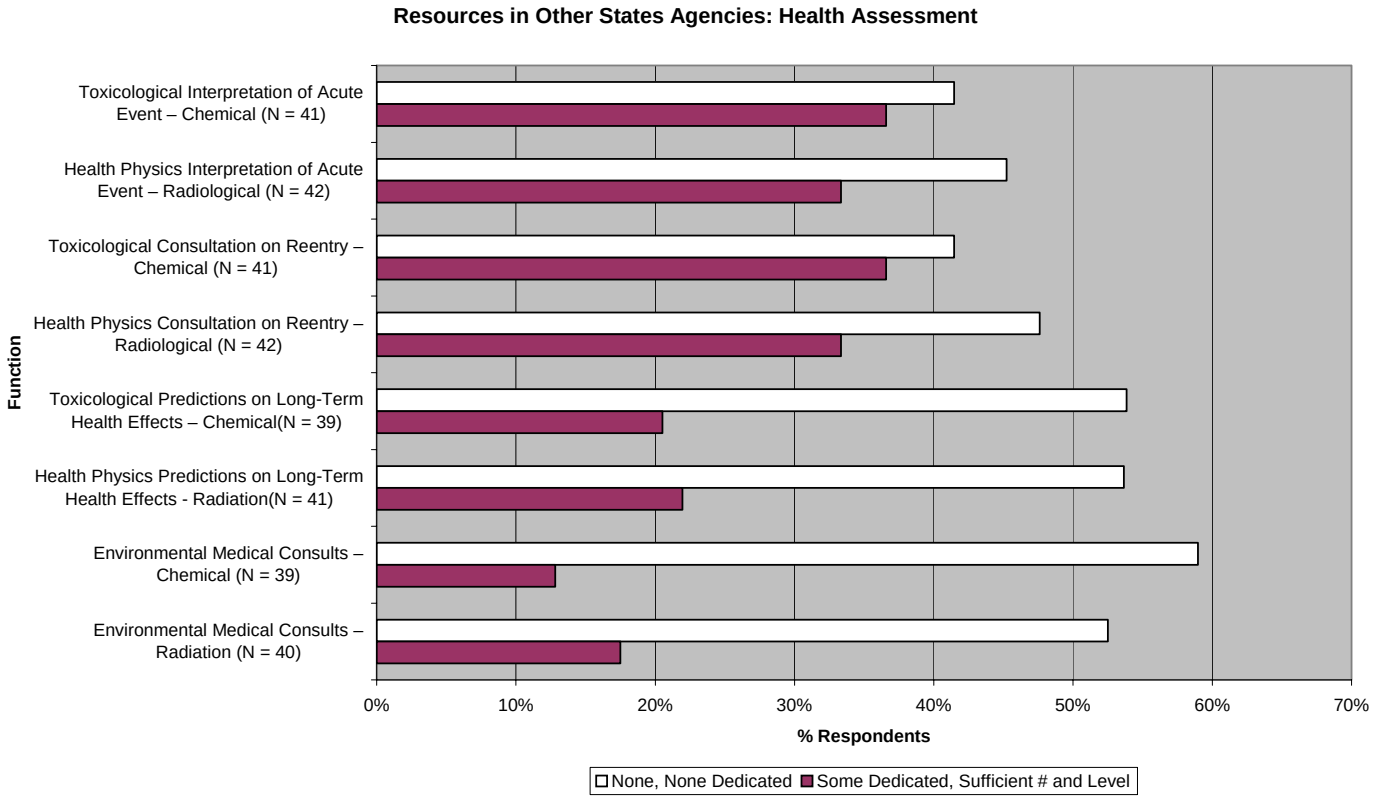
RESOURCES IN OTHER STATE AGENCIES					
	None n (%)	None Dedicated n (%)	Some Dedicated n (%)	Sufficient # and level n (%)	Not easy to ascertain n (%)
Epidemiologic Functions					
Pre-event Syndromic Surveillance for Stealth Attack	12 (27.9)	7 (16.3)	9 (20.9)	2 (4.7)	13 (30.2)
Other Kind of Statistical Surveillance (e.g., poison control calls, pharmaceutical purchases, school absenteeism)	10 (23.3)	8 (18.6)	7 (16.3)	1 (2.3)	17 (39.5)
Surveillance Through Alert Clinician Network	17 (41.4)	3 (7.3)	7 (17.1)	2 (4.9)	12 (29.3)
Crisis Phase Epidemiology (e.g., documenting acute morbidity, outbreak style investigation)	10 (23.3)	6 (14.0)	8 (18.6)	2 (4.6)	17 (39.5)
Recovery Phase Epidemiology (e.g., documenting delayed health effects)	11 (25.6)	9 (21.0)	5 (11.6)	1 (2.3)	17 (39.5)
Exposure Assessment					
Exposure Assessment and Environmental Sampling Advice - Chemical	3 (7.3)	10 (24.4)	16 (39.0)	4 (9.8)	8 (19.5)
Exposure Assessment and Environmental Sampling Advice - Radiation	9 (21.4)	8 (19.1)	15 (35.7)	4 (9.5)	6 (14.3)
Exposure Assessment and Biological Sampling Advice - Chemical	6 (14.6)	10 (24.4)	15 (36.6)	3 (7.3)	7 (17.1)
Exposure Assessment and Biological Sampling Advice - Radiation	8 (19.1)	10 (23.8)	14 (33.3)	2 (4.7)	8 (19.1)
IT GIS Integration of Exposure Data - Chemical	7 (17.1)	8 (19.5)	13 (31.7)	2 (4.9)	11 (26.8)
IT GIS Integration of Exposure Data - Radiation	11 (26.2)	8 (19.0)	11 (26.2)	0 (0)	12 (28.6)

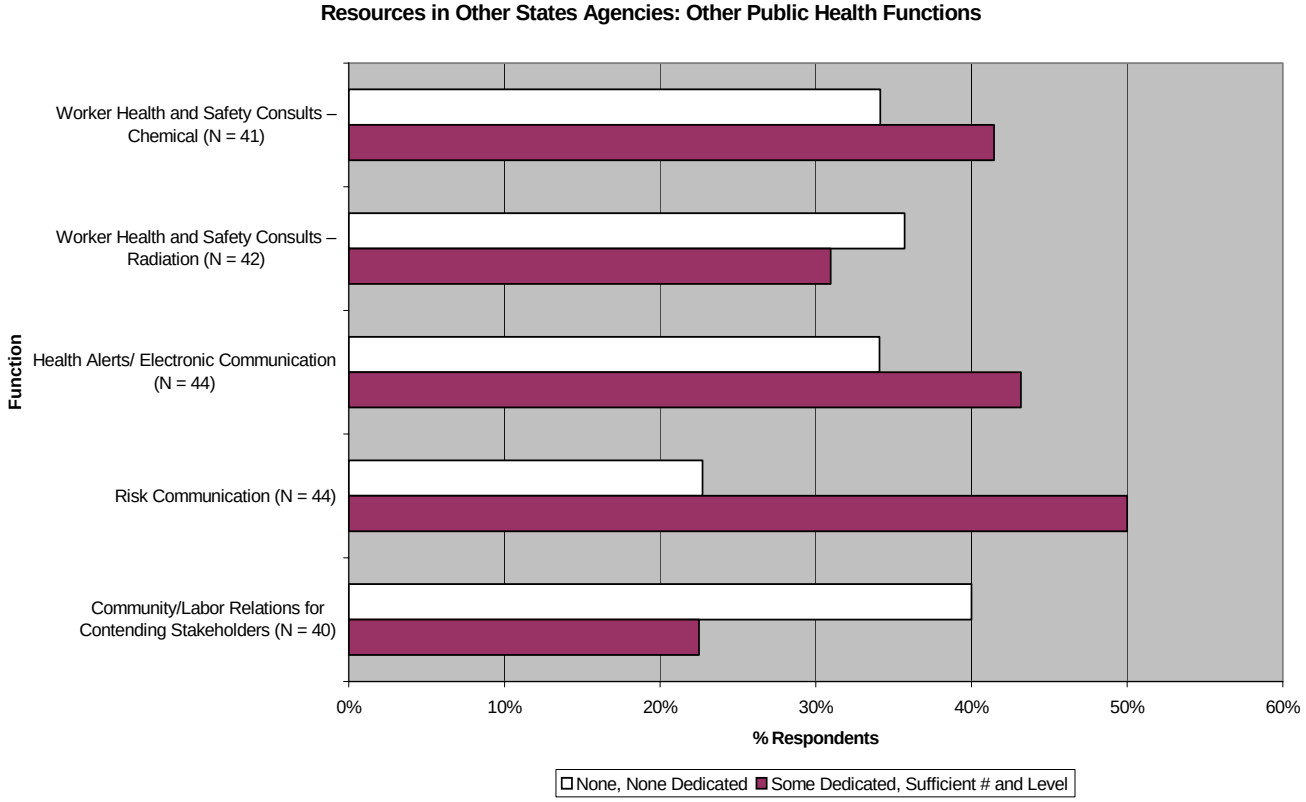

Resources in Other State Agencies: Epidemiologic Functions
Function
Pre-event Syndromic Surveillance for Stealth Attack (N = 43)
Other Kind of Statistical Surveillance (e.g., poison control calls, pharmaceutical purchases, school absenteeism) (N = 43)
Surveillance Through Alert Clinician Network (N = 41)
Crisis Phase Epidemiology (e.g., documenting acute morbidity, outbreak style investigation)(N = 43)
Recovery Phase Epidemiology (e.g., documenting delayed health effects) (N = 43)
0%
10%
20%
30%
40%
50%
60%
% Respondents
None, None Dedicated
Some Dedicated, Sufficient # and Level


Resources in Other States Agencies: Exposure Assessment
Function
Exposure Assessment and Environmental Sampling Advice – Chemical (N = 41)
Exposure Assessment and Environmental Sampling Advice – Radiation (N = 42)
Exposure Assessment and Biological Sampling Advice – Chemical (N = 41)
Exposure Assessment and Biological Sampling Advice – Radiation (N = 42)
IT GIS Integration of Exposure Data – Chemical (N = 41)
IT GIS Integration of Exposure Data – Radiation (N = 42)
0%
10%
20%
30%
40%
50%
60%
% Respondents
None, None Dedicated
Some Dedicated, Sufficient # and Level

1. (continued)

RESOURCES IN OTHER STATE AGENCIES					
	None n(%)	None Dedicated n(%)	Some Dedicated n(%)	Sufficient # and level n(%)	Not easy to ascertain n(%)
Health Assessment					
Toxicological Interpretation of Acute Event – Chemical	9 (22.0)	8 (19.5)	13 (31.7)	2 (4.8)	9 (22.0)
Health Physics Interpretation of Acute Event – Radiological	11 (26.2)	8 (19.0)	13 (31.0)	1 (2.4)	9 (21.4)
Toxicological Consultation on Reentry – Chemical	9 (22.0)	8 (19.5)	14 (34.1)	1 (2.4)	9 (22.0)
Health Physics Consultation on Reentry – Radiological	14 (33.3)	6 (14.3)	13 (31.0)	1 (2.4)	8 (19.0)
Toxicological Predictions on Long-Term Health Effects – Chemical	13 (33.3)	8 (20.5)	6 (15.4)	2 (5.1)	10 (25.6)
Health Physics Predictions on Long-Term Health Effects **–** Radiation	14 (34.2)	8 (19.5)	8 (19.5)	1 (2.4)	10 (24.4)
Environmental Medical Consults – Chemical	12 (30.8)	11 (28.2)	3 (7.7)	2 (5.2)	11 (28.1)
Environmental Medical Consults – Radiation	15 (37.5)	6 (15.0)	6 (15.0)	1 (2.5)	12 (30.0)
Other Public Health Functions					
Worker Health and Safety Consults – Chemical	5 (12.2)	9 (21.9)	13 (31.7)	4 (9.8)	10 (24.4)
Worker Health and Safety Consults – Radiation	9 (21.4)	6 (14.3)	11 (26.2)	2 (4.8)	14 (33.3)
Health Alerts/ Electronic Communication	7 (15.9)	8 (18.2)	12 (27.3)	7 (15.9)	10 (22.7)
Risk Communication	4 (9.1)	6 (13.6)	18 (40.9)	4 (9.1)	12 (27.3)
Community/Labor Relations for contending stakeholders	8 (20.0)	8 (20.0)	8 (20.0)	1 (2.5)	15 (37.5)

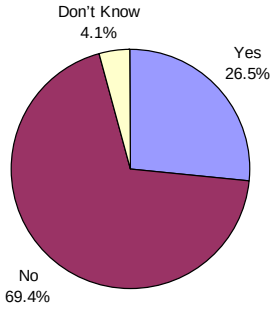

Resources in Other States Agencies: Health Assessment
Toxicological Interpretation of Acute Event – Chemical (N = 41)
Health Physics Interpretation of Acute Event – Radiological (N = 42)
Toxicological Consultation on Reentry – Chemical (N = 41)
Health Physics Consultation on Reentry – Radiological (N = 42)
Toxicological Predictions on Long-Term Health Effects – Chemical(N = 39)
Health Physics Predictions on Long-Term Health Effects - Radiation(N = 41)
Environmental Medical Consults – Chemical (N = 39)
Environmental Medical Consults – Radiation (N = 40)
Function
0%
10%
20%
30%
40%
50%
60%
70%
% Respondents
None, None Dedicated
Some Dedicated, Sufficient # and Level


Resources in Other States Agencies: Other Public Health Functions
Worker Health and Safety Consults – Chemical (N = 41)
Worker Health and Safety Consults – Radiation (N = 42)
Health Alerts/ Electronic Communication (N = 44)
Risk Communication (N = 44)
Community/Labor Relations for Contending Stakeholders (N = 40)
Function
0%
10%
20%
30%
40%
50%
60%
% Respondents
None, None Dedicated
Some Dedicated, Sufficient # and Level

2. Do you have a finalized chemical/radiological written response plan in your state or territorial agency? (N = 49)

	n (%)
Yes	13 (26.5)
No	34 (69.4)
Don't Know	2 (4.1)

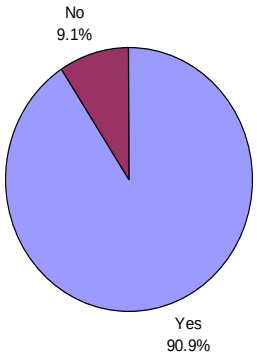
Finalized Chemical/Radiological Written Response Plan



2a. Has your agency conducted a drill or exercised your plan? (N = 11)

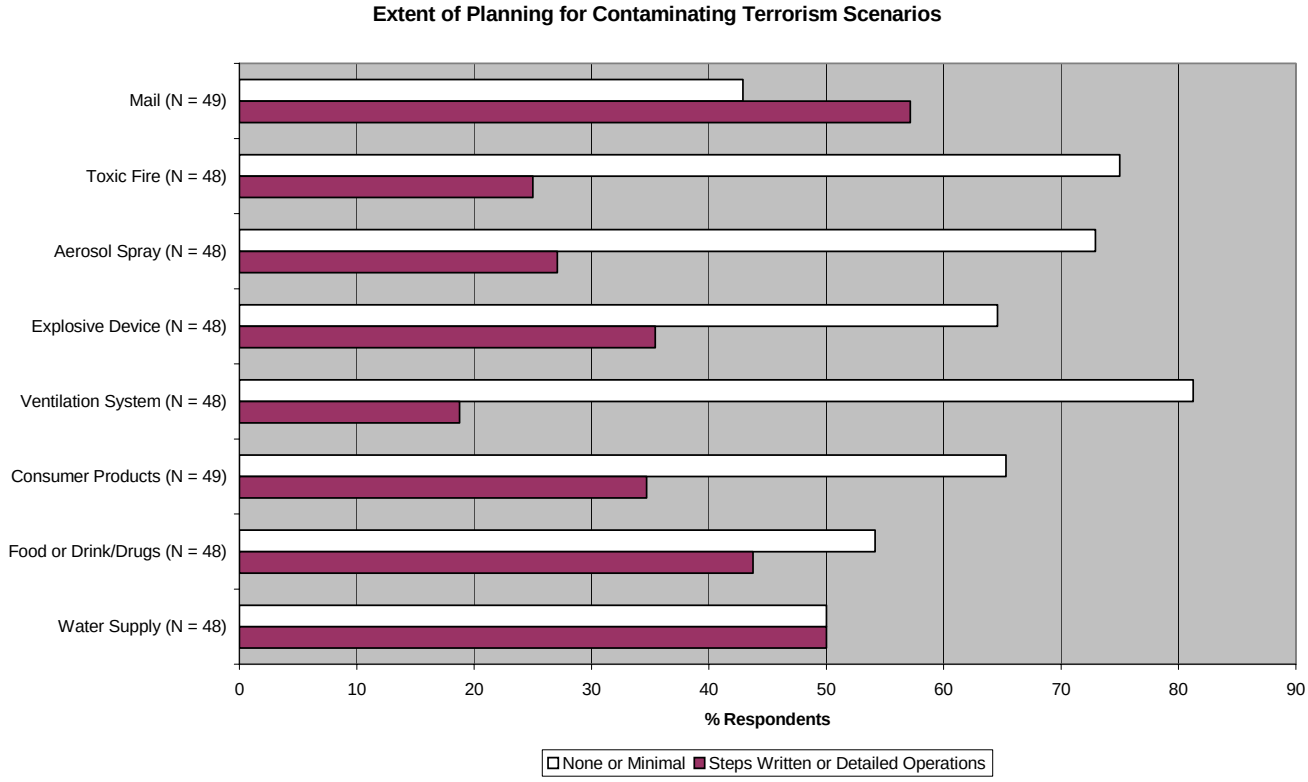
	n (%)
Yes	10 (90.9)
No	1 (9.1)
Don't know	--

Conducted a Drill or Exercised Plan



3. Which of the following scenarios have you considered for public health response?

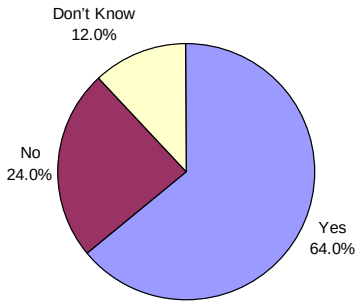
DELIVERY METHOD	EXTENT OF PLANNING			
	None n (%)	Minimal n (%)	Steps Written n (%)	Detailed Operations Plan n (%)
Mail (N = 49)	5 (10.2)	16 (32.6)	21 (42.9)	7 (14.3)
Toxic Fire (N = 48)	10 (20.8)	26 (54.1)	9 (18.8)	3 (6.3)
Aerosol Spray (N = 48)	6 (12.5)	29 (60.4)	12 (25.0)	1 (2.1)
Explosive Device (N = 48)	9 (18.8)	22 (45.8)	11 (22.9)	6 (12.5)
Ventilation System (N = 48)	10 (20.8)	29 (60.4)	8 (16.7)	1 (2.1)
Consumer Products (N = 49)	8 (16.3)	24 (49.0)	15 (30.6)	2 (4.1)
Food or Drink/Drugs (N = 48)	4 (8.3)	22 (45.9)	17 (35.4)	5 (10.4)
Water Supply (N = 48)	2 (4.2)	22 (45.8)	17 (35.4)	7 (14.6)



4. Do you have mutual - aid agreements with other states? (N = 50)

	n (%)
Yes	32 (64.0)
No	12 (24.0)
Don't Know	6 (12.0)

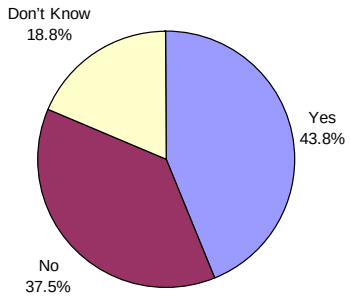
Mutual Aid Agreements with Other States



4a. Have you ever drilled or exercised with your mutual aid partners? (N = 32)

	n (%)
Yes	14 (43.8)
No	12 (37.4)
Don't Know	6 (18.8)

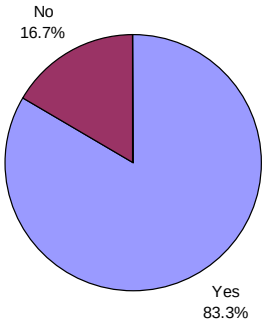
Drills or Exercises with Mutual Aid Partners



5. Does your agency have a 24/7 on-call duty officer system that would provide a prompt response to a chemical terrorism event? (N = 48)

	n (%)
Yes	40 (83.3)
No	8 (16.7)
Don't Know	--

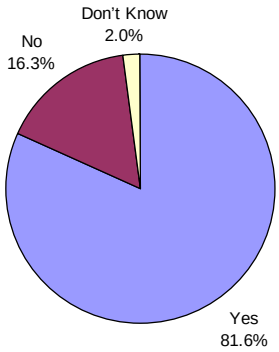
24/7 On-Call Duty Officer System for Chemical Terrorism



6. Does your agency have a 24/7 on-call duty officer system that would provide a prompt response to a radiological terrorism event? (N = 49)

	n (%)
Yes	40 (81.6)
No	8 (16.3)
Don't Know	1 (2.0)

24/7 On-Call Duty Officer System for Radiological Terrorism



II. Chemical and Radiological Terrorism FTEs in State Health Departments

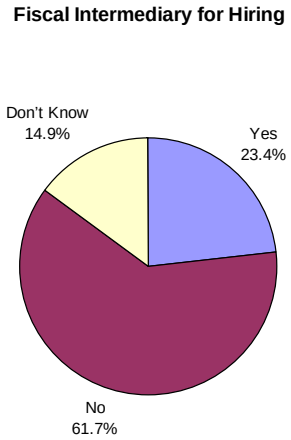
7. Agencies that have personnel vs. agencies without personnel

	CDC Funded No n (%) Yes n (%)	New State Funded No n (%) Yes n (%)	Re-Directed State Staff No n (%) Yes n (%)	Other Federal Funds No n (%) Yes n (%)	Currently Vacant No n (%) Yes n (%)
Planning	7 (29.2) 17 (70.8)	16 (94.1) 1 (5.9)	11 (61.1) 7 (38.9)	15 (88.2) 2 (11.8)	14 (82.4) 3 (17.7)
Epidemiology	13 (50.0) 13 (50.0)	13 (76.5) 4 (23.5)	10 (52.6) 9 (47.4)	14 (93.3) 1 (6.7)	13 (76.5) 4 (23.5)
Toxicology	13 (65.0) 7 (35.0)	13 (86.7) 2 (13.3)	12 (60.0) 8 (40.0)	14 (87.5) 2 (12.5)	15 (83.3) 3 (16.7)
Biomonitoring Laboratory	15 (60.0) 10 (40.0)	15 (93.8) 1 (6.3)	13 (86.7) 2 (13.3)	15 (93.8) 1 (6.3)	14 (93.3) 1 (6.7)
Environmental Laboratory	14 (63.6) 8 (36.4)	12 (70.6) 5 (29.4)	7 (41.2) 10 (58.8)	15 (93.8) 1 (6.3)	13 (81.3) 3 (18.8)
Radiation	18 (72.0) 7 (28.0)	19 (86.4) 3 (13.6)	12 (54.6) 10 (45.5)	18 (100.0) 0 (0.0)	15 (79.0) 4 (21.1)
Occupational Health/IH	14 (73.7) 5 (26.3)	15 (93.8) 1 (6.3)	12 (63.2) 7 (36.8)	15 (100.0) 0 (0.0)	14 (93.3) 1 (6.7)

	CDC Funded No n (%) Yes n (%)	New State Funded No n (%) Yes n (%)	Re-Directed State Staff No n (%) Yes n (%)	Other Federal Funds No n (%) Yes n (%)	Currently Vacant No n (%) Yes n (%)
Risk Communication	9 (34.6) 17 (65.4)	13 (81.3) 3 (18.8)	12 (75.0) 4 (25.0)	14 (100.0) 0 (0.0)	13 (81.3) 3 (18.8)
Sanitary Engineering	15 (93.8) 1 (6.3)	14(93.3) 1 (6.7)	12 (85.7) 2 (14.3)	13 (81.3) 3 (18.8)	15 (100.0) 0 (0.0)
Food Science	15 (57.7) 11 (42.3)	14 (77.8) 4 (22.2)	10 (55.6) 8 (44.4)	16 (94.1) 1 (5.9)	14 (77.8) 4 (22.2)
Other	11 (84.6) 2 (15.4)	13 (92.9) 1 (7.1)	12 (100.0) 0 (0.0)	12 (100.0) 0 (0.0)	11 (91.7) 1 (8.3)

8. Has your agency considered using a fiscal intermediary for hiring? (N = 47)

	n (%)
Yes	11 (23.4)
No	29 (61.7)
Don't Know	7 (14.9)



9. How many staff in your health department have up- to- date HAZWOPER certification in the following areas?

Number of Staff Certified for *Awareness*	n[1] (%) of respondents reporting this number
0	9 (36.0)
1	3 (12.0)
2	2 (8.0)
3	3 (12.0)
4	3 (12.0)
5	2 (8.0)
15	1 (4.0)
40	1 (4.0)
70	1 (4.0)
Median = 2.0	

[1] Total number of respondents (N = 25)

Number of Staff Certified for *Operator*	n[1] (%) of respondents reporting this number
0	10 (47.6)
1	2 (9.5)
2	1 (4.8)
3	3 (19.1)
5	1 (4.8)
10	1 (4.8)
12	1 (4.7)
24	1 (4.7)
Median = 1.0	

[1] Total number of respondents (N = 21)

Number of Staff Certified for *Technician*	n[1] (%) of respondents reporting this number
0	12 (48.0)
1	8 (32.0)
3	1 (4.0)
4	2 (8.0)
5	1 (4.0)
15	1 (4.0)
Median = 1.0	

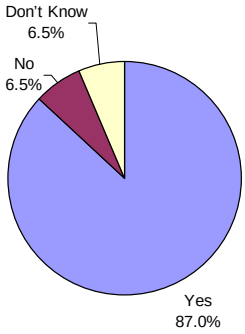
[1] Total number of respondents (N = 24)

III. Local Relationships

10. Do you (or your staff) know who are lead local contacts for chemical and radiation public health response? (N = 46)

	n (%)
Yes	40 (87.0)
No	3 (6.5)
Don't Know	3 (6.5)

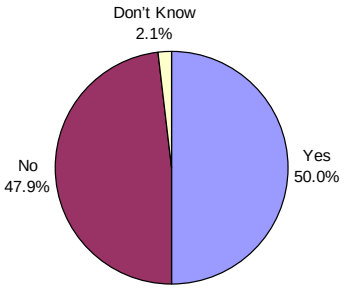
Knowledge of Lead Local Contacts for Chemical and Radiation Public Health Response



11. Does your department provide training to local jurisdictions on any aspect of chemical/radiological terrorism? (N = 48)

	n (%)
Yes	24 (50.0)
No	23 (47.9)
Don't Know	1 (2.1)

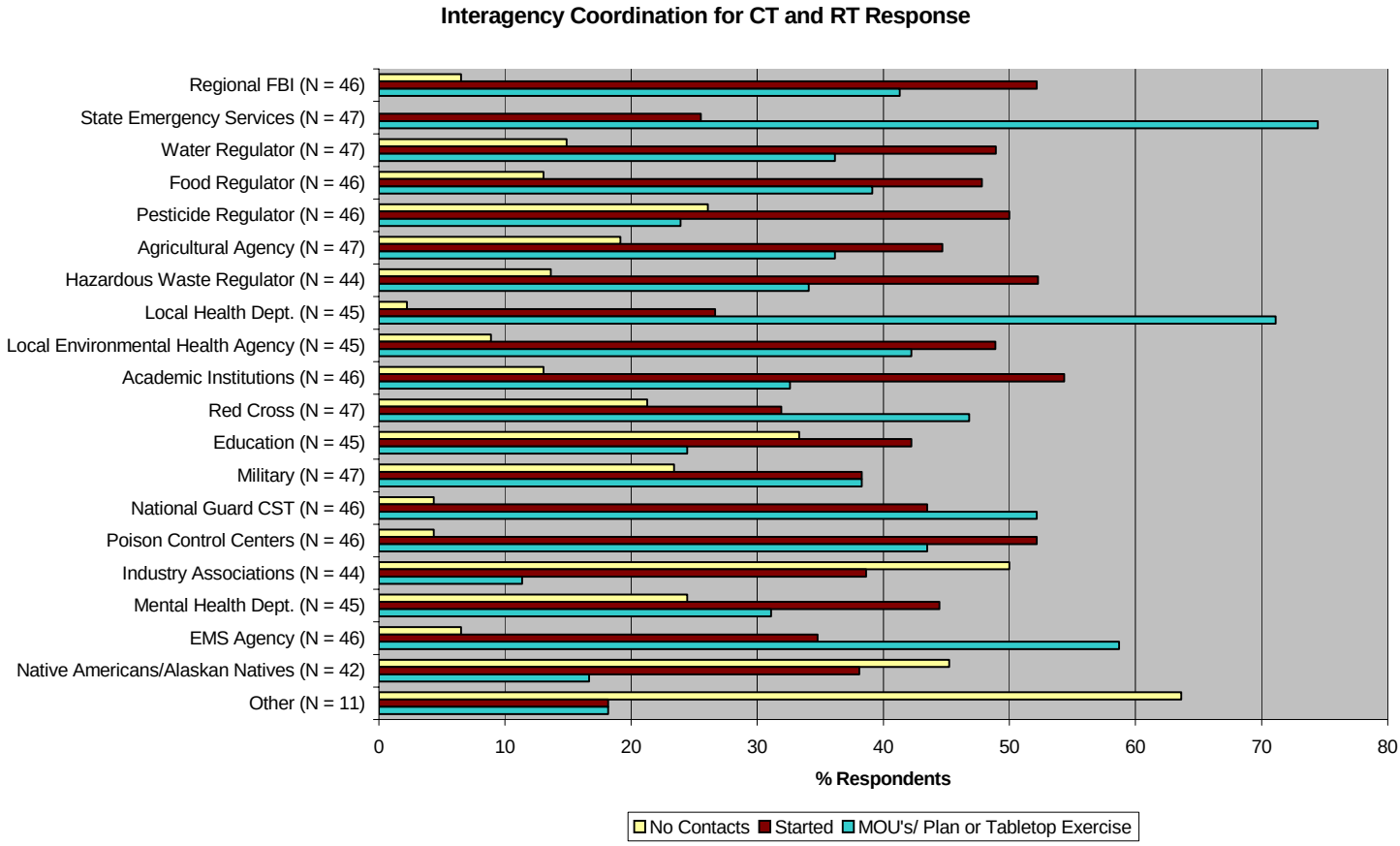
Training to Local Jurisdictions on Any Aspect of Chemical/Radiological Terrorism



IV. Matrix for Interagency Coordination on Chemical and Radiation Response

12. Please choose the phrase that best describes the degree of coordination with the following agencies:

	No Contacts N (%)	Started N (%)	MOUs/Plan N (%)	Tabletop Exercise N (%)
Regional FBI (N = 46)	3 (6.5)	24 (52.2)	3 (6.5)	16 (34.8)
State Emergency Services (N = 47)	--	12 (25.5)	11 (23.4)	24 (51.1)
Water Regulator (N = 47)	7 (14.9)	23 (48.9)	11 (23.4)	6 (12.8)
Food Regulator (N = 46)	6 (13.0)	22 (47.8)	11 (23.9)	7 (15.2)
Pesticide Regulator (N = 46)	12 (26.1)	23 (50.0)	9 (19.6)	2 (4.4)
Agricultural Agency (N = 47)	9 (19.2)	21 (44.7)	9 (19.2)	8 (17.0)
Hazardous Waste Regulator (N = 44)	6 (13.6)	23 (52.3)	9 (20.5)	6 (13.6)
Local Health Dept. (N = 45)	1 (2.2)	12 (26.7)	12 (26.7)	20 (44.4)
Local Environmental Health Agency (N = 45)	4 (8.9)	22 (48.9)	12 (26.7)	7 (15.6)
Academic Institutions (N = 46)	6 (13.0)	25 (54.4)	9 (19.6)	6 (13.0)
Red Cross (N = 47)	10 (21.3)	15 (31.9)	9 (19.2)	13 (27.7)
Education (N = 45)	15 (33.3)	19 (42.2)	7 (15.7)	4 (8.9)
Military (N = 47)	11 (23.4)	18 (38.3)	3 (6.4)	15 (31.9)
National Guard CST (N = 46)	2 (4.4)	20 (43.5)	5 (10.9)	19 (41.3)
Poison Control Centers (N = 46)	2 (4.4)	24 (52.2)	13 (28.3)	7 (15.2)
Industry Associations (N = 44)	22 (50.0)	17 (38.6)	3 (6.8)	2 (4.6)
Mental Health Dept. (N = 45)	11 (24.4)	20 (44.4)	10 (22.2)	4 (8.9)
EMS Agency (N = 46)	3 (6.5)	16 (34.8)	12 (26.1)	15 (32.6)
Native Americans/Alaskan Natives (N = 42)	19 (45.2)	16 (38.1)	4 (9.5)	3 (7.1)
Other (N = 11)	7 (63.6)	2 (18.2)	1 (9.1)	1 (9.1)



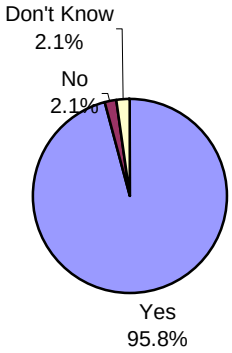
13. Overall, how prepared is your state or territorial health agency to respond to a chemical/radiological terrorism event? *(On a scale of 0 – 10, with 0 being not prepared and 10 being fully prepared)* (N = 45)

Mean: 4.1 Standard Deviation: 2.0 Minimum: 0 Maximum: 8

14. Does your state use a standardized emergency management structure into which different agencies are assigned roles? (N = 48)

	n (%)
Yes	46 (95.8)
No	1 (2.1)
Don't Know	1 (2.1)

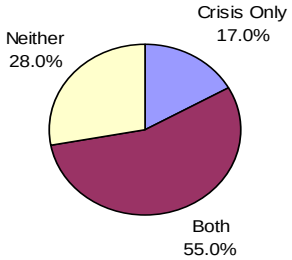
Health Agencies Using a Standard EMS With Other Agencies



15. Is the role of the public health agency well defined for the crisis and recovery phases? (N = 47)

	n (%)
Crisis Only	8 (17.0)
Recovery Only	--
Both	26 (55.3)
Neither	13 (27.7)

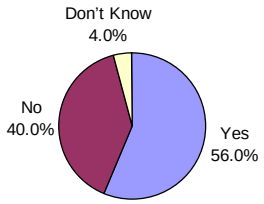
Health Agencies With Well-Defined Roles Per Phase



16. Have you planned a clear command structure for gathering epidemiological and exposure data and providing coordinated guidance for a terrorist event involving more than one county? (N = 44)

	n (%)
Yes	25 (55.6)
No	18 (40.0)
Don't Know	2 (4.4)

Planned a Clear Command Structure



Summary of Select Questions According to Population Size

Note: Cities and territories included. Health agencies were categorized according to the population size of their respective state, territory, or city. Population categories are as follows: Small: up to 2,692,090; Medium: 2,692,090 – 5,629,707; Large: more than 5,629,707).

1. Do you have a finalized chemical/radiological written response plan in your state or territorial agency? (N =49)

Population Size	Yes n (%)	No n (%)	Don't know n (%)
Small	3 (17.6)	14 (82.4)	--
Medium	3 (18.7)	12 (75.0)	1 (6.3)
Large	7 (43.7)	8 (50.0)	1 (6.3)

2. Overall, how prepared is your state or territorial health agency to respond to a chemical/radiological terrorism event? *(On a scale of 0 – 10, with 0 being not prepared and 10 being fully prepared)* (N = 46)

Population Size	Mean (std dev.)
Small (n=16)	3.3 (2.2)
Medium (n = 16)	4.3 (1.8)
Large (n = 14)	5.0 (1.6)

3. Median number of employees with HAZWOPER Certification by population size

Population size	Awareness	Operator	Technician
Small	0 (n = 9)	0 (n = 8)	0 (n = 8)
Medium	3 (n = 9)	2.5 (n = 6)	1 (n = 7)
Large	3 (n = 7)	2 (n = 7)	1 (n = 10)

APPENDIX C: Abbreviations

The following abbreviations are used throughout the report to denote the corresponding names and terms:

ACS	American Chemical Society
APHL	Association of Public Health Laboratories
ASPH	Association of Schools of Public Health
ASTHO	Association of State and Territorial Health Officials
ATSDR	Agency for Toxic Substances and Disease Registry
CDC	Centers for Disease Control and Prevention
CPSC	Consumer Product Safety Commission
CSTE	Council of State and Territorial Epidemiologists
CT	Chemical terrorism
DHHS	Department of Health and Human Services
EMS	Emergency Management Structure
EPA	Environmental Protection Agency
FBI	Federal Bureau of Investigations
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency
FTE	Full-time Employee
GIS	Geographic Information System
MOU	Memorandum of Understanding
NACCHO	National Association of City and County Health Officials
NIH	National Institutes of Health
NIOSH	National Institute for Occupational Health and Safety
RT	Radiological terrorism

APPENDIX D: Glossary

Contaminating Terrorism: Terrorism can be defined as the instrumental use or threatened use of violence by an organization or individual against innocent civilian targets in furtherance of a political, religious, or ideological objective. Contaminating terrorism involves the deliberate pollution or tainting of a medium (i.e., food, water, consumer products) through which a chemical, biological, or radiological agent can be delivered. (Source: Tucker JB, ed. *Toxic Terror*. *Assessing Terrorist Use of Chemical and Biological Weapons*. Cambridge, MA: MIT Press; 2001)

Crisis Phase: Initial phase that includes event assessment, containment, rescue and recovery efforts. During a terrorist attack, communications, fire suppression, law enforcement, emergency medical, and other rescue and recovery personnel may perform their respective functions in this phase (Source: Everly, GS, Mitchell, JT America Under Attack: The '10 Commandments' of Responding to Mass Terrorist Attacks. *International Journal of Emergency Mental Health.* 2001 3(3):133-5.).

Fiscal Intermediary: A fiscal intermediary is an organization that assists managing financial accountability and employer responsibilities, ensuring that funds are well spent and effectively managed. A fiscal intermediary is not service provider and is not able to make decisions about the type of services received, but manages the financial aspect of securing services. (Source: http://www.state.hi.us/health/resource/tbi/fiscal_intermediary.pdf)

HAZWOPER Certification: The Hazardous Waste Operations and Emergency Response Standard (HAZWOPER) applies to five distinct groups of employers and their employees. This includes any employees who are exposed to or potentially exposed to hazardous substances—including hazardous waste—and who are engaged in operations as specified by 1920.120 (a)(1)(I-v) and 1926.65(a)(1)(I-v). (Source: http://www.osha.gov/html/faq-hazwoper.html)

-*Awareness level*: certifies employees to be first responders, or those who are likely to witness or discover the release of a hazardous material, recognize the situation as one requiring specialized assistance, and notify the proper authorities. They would take no further action beyond notifying the authorities of the release.

-*Operator level*: certifies employees to be first responders to the release of a hazardous material and initiate actions to limit contamination. They are trained to respond in a defensive manner without actually trying to stop the release. Their function is to contain the release, keep it from spreading and prevent exposures.

-*Technician level*: certifies employees to initiate actions to contain and clean up hazardous materials. These workers are trained to use personal protective equipment (respirators and clothing) to safely work with the materials and to approach the point of release to control the materials without becoming contaminated by it.

Health Alert Network: The Health Alert Network (HAN) is a nationwide, integrated information and communications system used to distribute health alerts, disseminate prevention guidelines and other information, conduct distance learning, and facilitate national disease surveillance and electronic laboratory reporting. The HAN serves as a forum to advance CDC's bioterrorism and related initiatives to strengthen preparedness at the local and state levels (Source: http://www.phppo.cdc.gov/han/FactSheet.asp)

Recovery phase: The period following the response when immediate threat to human life has passed and general evacuation has ceased. This phase includes: (1) Recovery phase decontamination, as necessary, (2) Reentry, (3) Restoration. This is the "cleanup and repair" phase that can be divided into short-term and long-term recovery to restore an area to pre-emergency conditions. Activities in the recovery phase of a terrorist attack can vary, depending on the event size and type (i.e., chemical or radiological attack). Short-term recovery returns vital systems to minimum operating standards, seeks to restore critical services to the community, and provides for the basic needs of the public. Long-term recovery focuses on restoring the community to its normal, or improved state of affairs and on returning life to normal or improved levels. The recovery period is also an opportune time to institute mitigation measures, particularly those related to the recent emergency, (Source: http://www.nbc-med.org/ie40/Default.html)

Syndromic Surveillance: Surveillance using health-related data that precede diagnosis and signal a sufficient probability of a case or an outbreak to warrant further public health response. (Source: www.cdc.gov/epo/dphsi/syndromic.htm)