Emergency Responder Health Monitoring and Surveillance

DRAFT 1.2

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DISCLAIMER

The set of draft guidelines and recommendations described herein is the product of a consortium of federal agencies, state health departments, and volunteer organizations whose common goal was to create a more comprehensive and systematic approach to ensuring the safety and health of emergency responders. While the workgroup was convened and led by the National Institute for Occupational Safety and Health (NIOSH), this draft manuscript is intended as a future submission to the National Response Team (NRT), Worker Safety and Health sub-committee review board for consideration as an interagency resource document. As a consequence, the final version of this document will not be an official NIOSH document. NIOSH is presenting this draft document to the public to receive input prior to submission for NRT approval.

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Foreword

Previous emergency events have demonstrated that, despite analyzing and applying 'lessons learned', significant gaps and deficiencies continue to exist in health monitoring and worker health surveillance afforded to emergency response workers (including police, fire, and emergency medical personnel, as well as other responder groups such as public health personnel, cleanup, and repair/restoration/recovery workers). These gaps and deficiencies were documented in the Rand reports prepared following the World Trade Center response, but these problems have persisted and, despite improvements, were observed again in Hurricane Katrina and Deepwater Horizon responses.

The persistence of these gaps and deficiencies in emergency responder health monitoring and surveillance, despite considerable attempts to anticipate and correct them, emphasizes that there remains a need for a coherent, comprehensive approach to protecting these groups of workers and a need for detailed, practical guidance in how to implement such an approach. Any effort to meet this need must incorporate a variety of measures, including the following: (1) medical screening that focuses on assessment of fitness and ability to safely and effectively deploy on a response, (2) training regarding hazards to be anticipated and protective measures to mitigate them, (3) approaches to centralized tracking or rostering of responders, (4) surveillance and monitoring for exposures and adverse health effects, including supporting efforts in environmental monitoring and assessment, (5) out-processing assessments on completion of response duties and deployments, and (6) follow-up or long-term surveillance or monitoring for potential delayed or long-term adverse effects of the deployment experience. Similarly, such a system must include activities to be performed at all stages in the response spectrum–prior to, during, and following deployment. Any guidelines or recommendations for procedures to implement these protections must be fully compatible with and function within the National Incident Management System (NIMS) structures, which have been adopted as the accepted standard organizational focus for emergency response at all levels (local, state and federal) and for all incident sizes and types. Further, the procedures must be understood and be able to be used by Incident Command leadership and health, safety, and medical personnel (See Appendix A for a description of the ICS structure).

In response to this continuing need, a consortium of federal agencies, state health departments, and volunteer responder groups was convened by the National Institute for Occupational Safety and Health (NIOSH). This set of guidelines and recommendations is the product of those deliberations. It is intended to address all aspects of protecting emergency responders and should be applicable over the full range of emergency types and settings. It is intended to be of use to all those involved in the deployment and protection of emergency responders, including incident management leadership; leadership of response organizations; health, safety, and medical personnel; and all workers involved.

Executive Summary

When disaster strikes, the nation depends on emergency response workers who are prepared and trained to respond effectively. Response work can range from well-contained, localized efforts to massive diffuse mobilizations and involves a broad array of activities including search, rescue, investigation, assessment, recovery, cleanup and restoration. Such work is carried out by individuals from emergency management, fire service, law enforcement, emergency medical services, public health, construction and other skilled support, disaster relief workers, mental health, and members of volunteer organizations. To ensure that workers can meet the challenges of disasters, every effort must be made to protect emergency workers from the safety and health risks inherent in their work. Concerns about worker safety and health are apparent in nearly every type of response, and an effective framework of health monitoring and surveillance of workers is necessary to recognize possible health issues and bring these potentially devastating hazardous situations under control.

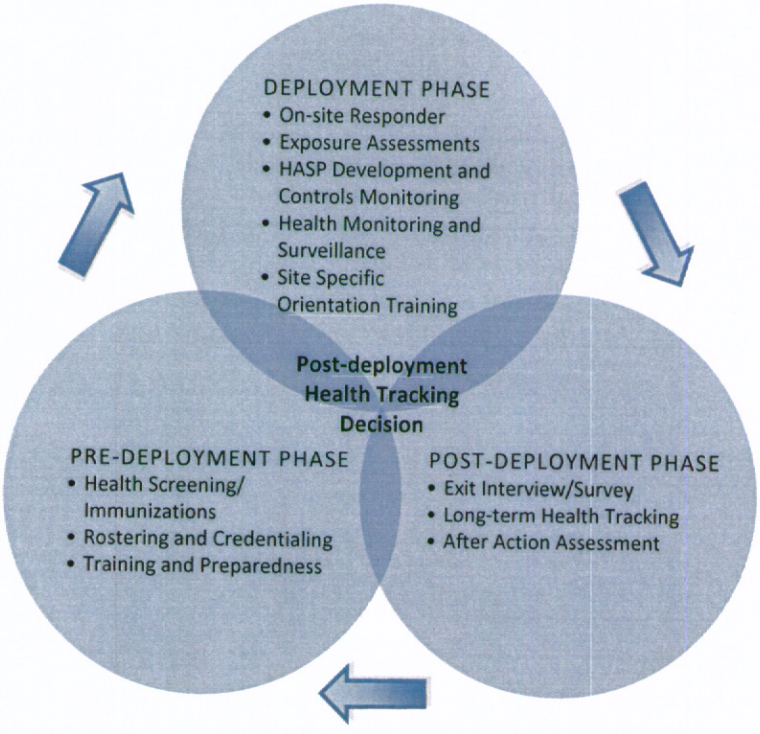

Figure 1: Emergency Responder Health Monitoring and Surveillance Program (ERHMS)

The purpose of this document is to provide a recommended health monitoring and surveillance framework, referred to as the "Emergency Responder Health Monitoring and Surveillance (ERHMS)" system which includes specific recommendations and tools for all phases of a response, including the pre-deployment, during-deployment, and post-deployment phases (see Figure 1 below). The intent of medical monitoring and surveillance is to identify exposures and/or signs and symptoms early in the course of an emergency response in order to prevent or mitigate adverse physical and psychological outcomes and ensure workers maintain their ability to respond effectively and are not harmed in the course of this response work. Monitoring and ongoing assessment may help determine whether protective measures are adequately being provided to the workforce and are sufficient to prevent or reduce harmful exposures to workers. Data collected during the pre-, during-, and post-deployment phases will also help to identify which responders would benefit from medical referral and possible enrollment in a long-term health surveillance program.

This guidance document builds on systems and practices currently in use, and should prove useful to persons or organizations who are responsible for, or design tools for, responder registration, credentialing, training, health screening, health monitoring, exposure assessment, safety, surveillance, and treatment. These may include (1) incident command officials, medical staff, and health and safety professionals; (2) local fire, police, and EMS organizations; (3) state, local, tribal, and territorial health departments; (4) federal agencies; (5) volunteer, non-profit, private-sector, and union organizations; and (6) vendors of responder-specific tools and equipment. Different users may find individual sections of this document more relevant to their responsibilities or areas of expertise. However, we encourage all users to familiarize themselves with the entire document in order to facilitate collaboration with partner organizations and other stakeholders and to better understand how the entire health monitoring and surveillance program is intended to function.

Despite the wide scales of events for which responder health monitoring and surveillance is needed, the principles contained herein apply to both small and large scale events including local, state, and federal level responses. Our expectation is that improvements in the standard of practice as outlined in this guidance will have positive effects during all events. The ERHMS process should be initiated pre-disaster, but it can and should be implemented as soon as an individual has been tasked to respond. As a last resort, all individuals who unexpectedly participate in response activities that have a high probability of post-incident aftereffects should be afforded the same benefits as described above. This document contains two main sections: (1) a guidance section that includes guidance and recommendations during the pre-, during-, and post-stages of deployment; and (2) a tools section that provides links to relevant existing documents and examples of materials that could be used in a response (e.g., surveys and standardized questionnaires, checklists, databases, and software programs). Major portions of the guidance section include in-depth discussions on the following topics:

Pre-deployment: Rostering and Credentialing of Emergency Response and Recovery Workers. A basic tenet of safety and health in emergency response is to maintain accountability for all emergency responders. The registration and credentialing system of emergency response and recovery workers should be designed to support four interdependent, interoperable functions: (1) registration (records basic and credential information on the worker); (2) emergency credentialing (assigning a credential level based on responder certifications and education); (3) re-verification (periodically verifies responder information); and (4) emergency badging (assigning an identification badge in accordance with the credential level). Since the information requirements of each function are interdependent, these four functions should ideally be integrated within a single database.

Pre-deployment: Health Screening for Emergency Responders. Within the framework of an ERHMS program, pre-deployment health screening is intended to establish a baseline physical and emotional health status. Such information may be obtained from an entrance physical examination to determine fitness for duty, or from subsequent fitness for duty examinations. This baseline information allows for more informed interpretation of possible post-deployment adverse health effects and is particularly valuable when exposure information is difficult to obtain, interpret, or is completely absent. Baseline health status should address not only the responder physical health status, but also emotional health status and immunization status. In addition to providing baseline health information, the pre-deployment screening can serve as an opportunity to assess whether the responder has the appropriate education, training, and experience to perform assigned response capacities.

Pre-deployment: Training Guidance. Training is critical for the preparedness of the responder. The responder is required to be fully certified to perform duty-specific tasks, which may have federal, state or locally mandated training requirements. In addition, the ability of the responder to recognize and avoid possible health and safety incidents will affect the responder's performance, survivability and resilience during and after the disaster response. Regardless of the training a responder has received prior to a disaster, there will be a need for additional training focused on site-specific hazards, operating procedures, and available resources. This training is sometimes referred to as "orientation," "just-in-time (JIT)," and "toolbox or tailgate talks" during the disaster but will be referred to as "site-specific training" in this document. The ERHMS program could provide insight into areas that may be responsive to increased responder training or areas of discussion among the incident command staff regarding procedures that would require adjustment to reduce possible injuries or near misses. Additionally, the ERHMS program could provide a valuable source of post-disaster data to evaluate the impact that responder training had on minimizin responder illness and injury. The ERHMS program may be used as an evaluation tool to determine the effectiveness of preparedness training, as well as the impact of site specific training on specific types of injury or accidents.

Deployment Phase: On-site Rostering, Site Specific Training, and Selection of Personal Protective Equipment. The process of personnel identification, accountability, and tracking can be referred to as the responder roster. Whenever the level of response is greater than what the first tier of local responders can handle, a roster should be used to log everyone who reports to the disaster and is engaged in the response or remediation work. The logistics function is responsible for collecting this

information into a comprehensive rostering system. But components of accountability also include parallel and linkable procedures conducted by Planning (example–demobilization) and by Command (Safety Officer). Site-specific training (SST) should be performed prior to responders entering a designated disaster control zone and is required under 29 CFR 1910.120. Strategies for implementing SST should be pre-planned to the extent feasible with consideration given to different training materials necessary to meet expected and unexpected health and safety haszards on site.

A variety of PPE may be needed by response workers and volunteers, and for many workers, this equipment will be issued or dispensed to them during their SST training or as they arrive at the response scene and are placed on the response roster. This central function or location for issuing PPE to responders serves as an opportunity for recording the amount, type, and condition of the PPE that is issued, allowing for documentation of these data within the ERHMS system.

During-deployment: Health Monitoring and Surveillance. Health monitoring and surveillance are two different but complementary methods to protect the health and safety of incident responders during an emergency operation. Monitoring refers to the ongoing and systematic collection, analysis, interpretation, and dissemination of data related to an individual incident responder's injury and illness status. This allows for the evaluation of the occurrence of an exposure, determination of the level of exposure an individual responder might experience during duties, and assessment of how that exposure is affecting the individual responder. Surveillance refers to the ongoing and systematic collection, analysis, interpretation, and dissemination of illness and injury data related to an event's emergency responder population as a whole. This allows for the tracking of emergency responder health (illness and injury) trends within the defined population during response. A mechanism to allow tracking should be an integral part of the response to any event.

During-deployment: Integration of Exposure Assessment, Responder Activity Documentation, and Controls into ERHMS. Response workers and volunteers may be exposed to many different chemical and environmental hazards in the course of their work. Obtaining accurate and useful worker exposure information is a crucial element in ensuring exposures are correctly characterized, risk is communicated appropriately, and sufficient information is available for making evidence-based decisions (i.e., PPE and work practice controls) to protect the health and safety of response workers. The exposures addressed in this document to include chemical and physical hazards, as well as "psychological toxins". These include sights and smells of death, exposure to the wounded, and risk of becoming a casualty. There are three risk management decisions, as described later in this document, that safety officers, industrial hygienists and other public health professionals ascertain from the assessment process: acceptability of exposures, unacceptability of exposures and uncertainty of exposures (which requires further information gathering).

During-deployment: Communications of Exposure and Health Monitoring and Surveillance Data during an Emergency Response. Communication is critical throughout the course of an emergency response. The scope of communications in an emergency response has many facets, including psychology (phase-dependent), messages (content, timing), audiences, and spokespersons. The collection of environmental exposure data and individual health and safety monitoring data, along with aggregate surveillance data, are relevant to protecting all the responders involved in an event both in the short-term and long-term, but it is not an end unto itself. This information must be communicated to workers, intra-organizationally, inter-organizationally, and inside and outside the ICS structure. Although it is common/typical for organizations to track and report data they are collecting within their own operational structures, the need for tracking and communicating more broadly than a single organization is key to informing responders (e.g., workers, contractors, volunteers) about pro-active steps they can take to protect themselves from hazardous exposures while attempting to protect the environment, identify survivors, or recover those who have died.

Post-deployment Phase: Incident Personnel Out-Processing Assessment. The out-processing assessment is the minimum post-deployment evaluation that should be conducted for incident personnel. Out-processing assessments are conducted to determine the extent, if any, to which individual responders have been adversely affected by their work during deployment and to assess trends within the population of workers for the purpose of identifying potential risks to others. Conditions encountered by incident personnel may involve

complex, uncontrolled environments possibly involving multiple or mixed chemical exposures, hazardous substances, microbial agents, physical agents (temperature, noise, etc.), long work shifts, or stressful experiences. Therefore, all incident personnel should receive an out-processing assessment as part of the demobilization process or as soon as possible after demobilization. Out-processing assessment should be simple, concise, and standardized. Ideally, the out-processing assessment would be a face-to-face interview in the field as incident personnel are preparing to depart back to their routine duty station; however, other good options could include different formats (paper, website, or phone interview) or conducting the assessment 1 to 2 weeks before or after demobilization.

Post-event Tracking of Emergency Responder Health and Function. Because of potential health and safety risks inherent in emergency response work, post-event tracking of responder health may sometimes be appropriate. The goal is to identify adverse health or functional consequences potentially associated with response work (e.g., exposure, illness, injury, or disability–including emotional trauma) and to intervene early to maximize the chances for recovery and to stop further exposure for workers remaining on-scene (i.e., through exposure control or medical treatment). The decision to opt for further tracking should be based on a wide variety of factors, including information regarding the responder hazardous work exposures, hazardous work activities, concerns expressed by the responder or safety and health personnel, the adequacy of control measures (and appropriate adherence), and injuries and illnesses incurred during the deployment. Such information should be viewed in the context of the workers' prior physical and mental health status, and the extent of their prior knowledge and experience with disaster work. Post-event tracking of health may be difficult or costly to conduct on a case-by-case basis, and it is often more suitable for such decisions to be made for categories of responders with similar exposure histories. High-priority worker groups for post-event health tracking would include those most likely to have exposures to hazardous agents or conditions and those reporting outbreaks of similar adverse health outcomes.

Lessons-learned and After-action Assessments. At the conclusion of an event there is a need to assess how the emergency response has been conducted through the pre-deployment, during-deployment, and post-deployment phases and try to identify ways to improve during each of these periods. This insures that the best-possible practices are used and that mistakes are identified and measures taken so that they are not repeated the next time. Often this is accomplished through a document called an After Action Report (AAR) It is essential that ERHMS be included in the general after action report or similar document. Practices such as identifying deficiencies in communications of safety and health protocols, examining when and where there were exposures, noting when rostering was ineffective. All help organizers improve the safety environment and protect emergency responder safety and health during an emergency.

The Role of the Incident Command System and ERHMS. The ERHMS system has been designed to be consistent with, and operationally incorporated within, the Incident Command System (ICS) and the National Response Framework (NRF). The ICS safety officer, who reports directly to the incident commander, is in a unique and centralized position to oversee and support many of the processes that provide data to and perform the functions of ERHMS. The ICS safety officer should work in coordination with the medical unit leader to accomplish these tasks. These functions, which may be carried out by different sections in the ICS, include Health Screening, Rostering, Training, Credentialing, Exposure Assessment and Controls, Medical Monitoring, and Medical Surveillance. Each area is integral and interdependent to the overall safety and health of the responder at all incidents.

Responder safety and health is addressed in this document systematically to ensure only medically cleared, trained, and properly equipped personnel are selected for deployment; their work environment and health is effectively monitored and surveyed throughout the event; and provisions are made for post-event health medical monitoring and surveillance where indicated. The guidance provides a comprehensive set of strategies and tactics for enhancing the safety and health of responders to help managers, medical personnel, and health and safety representatives prepare thoroughly before an event and subsequently help ensure worker health and safety during and following an event.

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Note: Asterisks indicate lead authors for ERHMS sections

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Acronyms

AAR	After Action Report
ACGIH	American Conference of Governmental Industrial Hygienists
AHJ	Authority Having Jurisdiction
BSI	Brief Symptom Inventory
DOT	U.S. Department of Transportation
EMAC	Emergency Management Compact
EMS	Emergency Medical Services
EMT	Emergency Medical Technicians
EPA	U.S. Environmental Protection Agency
ERHMS	Emergency Responder Health Monitoring and Surveillance
ESAR-VHP	Emergency System for Advance Registration of Volunteer Health Professionals
ETOH	Ethanol
FEMA	Federal Emergency Management Agency
HAZWOPER	Hazardous Waste Operations and Emergency Response Standard
HASP	Health and Safety Plan
HAV	Hepatitis A
HIPAA	Health Insurance Portability and Accountability Act
IC	Incident Commander
ICS	Incident Command System
K10	Kessler Questionnaire
MMR	Measles, Mumps, Rubella Vaccine
MSDS	Material Safety Data Sheets
NFPA	National Fire Protection Association
NIMS	National Incident Management System
NIOSH	National Institute for Occupational Safety and Health
NORA	National Occupational Research Agenda
NRC	Nuclear Regulatory Commission
NRF	National Response Framework
OSHA	Occupational Safety and Health Administration
PETS	Pets Evacuation and Transportation Standards Act
PFT	Pulmonary Function Tests
PPE	Personal Protective Equipment
PPSV	Pneumococcal Vaccine
PTSD	Post-Traumatic Stress Disorder
SDS	Sheehan Disability Scale
SOFR	Safety Officer
UC	Unified Command
USCG	U.S. Coast Guard

Guidance Section

Pre-deployment

1. Rostering and Credentialing of Emergency Response and Recovery Workers

Practical Summary

1. **What information and data are needed for this section?**

Information that needs to be collected includes any pertinent data, based on the guidance below, that contains material relevant to the basic employment data, authorizations, credentials, and badging details for those responders on the roster of a response organization. See Rostering Tools.

2. **Who will collect and maintain these data in the pre-deployment period?**

These data will typically be collected by the personnel or human resources department of a given response organization.

3. **Where and in what form will this information be stored?**

This information could be stored in the personnel record kept on file by the human resources department of a response organization, either in paper or electronic format. It may otherwise be contained in personnel questionnaires that were given to responders by the safety section of a responder organization.

4. **When in the pre-deployment period should this information be gathered?**

This information should be obtained on responders when they first join a response organization, and updated on a regular basis, typically annually.

A basic tenet of safety in emergency response is to maintain accountability for all emergency responders under one's command. In the pre-event setting, accountability entails knowing which responders are available to be deployed and documenting that each of those members has the proper certification to perform his or her assigned job safely. A database that contains this type of information can later be utilized for accountability on scene. It could potentially serve as the basis for establishing an on-site roster of deployed responders and to help account for their whereabouts and condition throughout the response. Improving personnel identification and credentialing systems was among the recommendations in a report produced by the RAND Corporation designed to improve emergency responder safety and health. [NIOSH 2004] This report noted that "more robust identification and credentialing systems are needed to protect the safety and health of responders during major disaster responses. Incident Commanders must be able to identify authorized responders at a disaster scene, track their location and activity if needed, and have access to information on whether they possess the right qualifications/credentials for working in a specific environment."

The rostering system of emergency response and recovery workers should be designed to support four interdependent, interoperable functions. These four functions are:

1. *Registration* records basic and credential information about the emergency response and recovery worker, including the required responder authorizations.

2. *Emergency Credentialing* assigns each emergency responder and recovery worker an emergency credential level in accordance with credentialing standards that are based on credential information inputs.
3. *Emergency Verification* verifies the emergency responder and recovery worker information and authorizes the information's use in an emergency.
4. *Emergency Badging* assigns each emergency responder and recovery worker an ID badge in accordance with his or her credential level.

More details and description of these four functions are provided below. Because the information requirements of each function are interdependent, these four functions should ideally be integrated within a single database. Additionally, each function should be performed in a secure manner with close consideration given to privacy issues. The emergency operations agency should ensure that the acquisition, use, disclosure, and storage of personally identifiable information are all consistent with local, state, and federal information privacy laws. A description of each function follows.

1.1 Registration

The first requirement of a system for rostering and credentialing of emergency response and recovery workers is the registration of those workers into a database. By registering in the system, the responder agrees to provide emergency response and recovery services during an emergency and has also authorized the emergency operations agency to collect the information necessary to determine that individual's credential status and emergency credential level.

Registering emergency response and recovery workers, verifying credential information and assigning appropriate credentialing levels may be performed in a variety of ways. For example, registration may be performed in cooperation with existing registration processes used by volunteer organizations or other professionally recognized organizations. However, the emergency operations agency must aggregate all registration information into a central database containing required registration information for all of the emergency response and recovery workers in order to perform the additional required functions of emergency credentialing and re-verification.

1.2 Emergency Credentialing

Emergency credentialing is the process of collecting the emergency responder and recovery worker's credential information, processing the information, and assigning an emergency credential level according to the appropriate professionally recognized organization. The emergency credential standards are designed to facilitate the orderly management and coordination of resources in an emergency. Emergency credential levels for emergency responders are designed to help the delegated authorities determine how to utilize the services of the emergency response and recovery workers. The assignment of an emergency credential level to an emergency responder neither designates professional responder privileges for the response and recovery workers nor does it authorize them to provide emergency response and recovery services without proper authorization and supervision. The granting of emergency responder privileges is the responsibility of the appropriate authority utilizing the emergency response and recovery worker.

As an example, the credentialing system for healthcare workers must be able to determine if emergency response and recovery workers have an active license in the profession or discipline for which they are prac-

ticing. In order to do so, access to licensing databases or direct coordination with licensing authorities is necessary. State and federal legal authorities should be consulted to determine whether an emergency response worker will be eligible to practice across state lines, and in which states such practice is authorized. State to state Emergency Management Compacts (EMACs) can be used to address some of these issues as well.

1.3 Re-verification

This system function entails the ability for delegated authorities to periodically access a responder's information and verifies that information, including just prior to deployment in an emergency. The emergency response or recovery worker's information is stored in the emergency response worker database. The emergency response worker's record is the complete set of information maintained on the individual by the database system. Information from the emergency response and recovery worker record, in some form, should be accessible to perform verification of information. When planning a database system, the emergency operations agency should define protocols on how entities are to support the coordination of emergency response and recovery workers and how to confirm the information of the responders, either before they deploy or as they check-in to an emergency. Specifically, the emergency operations agency will need to clearly define and communicate who has the authority to dispatch the emergency response and recovery workers based on information in the database. Any electronic communications passed over shared lines should be encrypted to prevent inadvertent release of data. Furthermore, appropriate security precautions, such as firewalls, should exist between the database system and any entity with access to the emergency response and recovery worker information. When a dispatched emergency response or recovery worker checks-in at an emergency staging area, the receiving entity must then be able to verify information about the responder, such as identity, credential information, and emergency credential level.

1.4 Emergency Badging

Rostering and credentialing information is most useful if it is portable and can be brought to the event. This will facilitate the process of on-site check in/out and job task assignments. One way to do this is through issuing a temporary ID badge or card to the emergency response or recovery worker for the specific emergency response event, once the professional credentials of the responder have been verified. Some of the critical information may be available on the ID card, through a networked electronic system, or by other means. In all cases, efforts should be made to access the most currently available information from the system when verifying an emergency response or recovery worker's information. The system must provide the capability to verify an emergency responder's identity and necessary information with the most current information available on the system. At a minimum, an authorized party should be able to ascertain from the ID card, then verify electronically, if possible, the emergency responder or recovery worker's identity, credential information and credential level in an easily understood format.

2. Pre-deployment Health Screening for Emergency Responders

Practical Summary

1. **What information and data is needed for this section?**

Information that needs to be collected includes any pertinent data, based on the guidance below, that describes the pre-event health status of the responders on the roster of a response organization. See Health Screening Tools.

2. **Who will collect and maintain this data in the pre-deployment period?**

This data will typically be collected by the medical department or medical contractor of a given response organization.

3. **Where and in what form will this information be stored?**

This information could be stored in the medical record kept on file by the medical department of a response organization, either in paper or electronic format. It may otherwise be contained in health questionnaires which were given to responders by the safety section of a responder organization.

4. **When in the pre-deployment period should this information be gathered?**

This information should be obtained on a responder when they first join a response organization, and updated on a regular basis, typically annually.

Emergency response inherently involves the risk of exposure to a wide variety of hazardous conditions or agents, many of which may not be easily predicted, adequately characterized, or effectively controlled. As a result, appropriate health screening for emergency responders is challenging and requires a customized risk assessment that considers the varying nature and settings of work performed by various responder personnel. Within the framework of an ERHMS program, pre-deployment health screening is intended to establish a baseline physical health, emotional health, and immunization status. Such information may be obtained from an entrance physical examination for fitness for duty, or from subsequent fitness for duty examinations; however, this section is not intended to establish fitness for duty standards. Such standards must be determined by each agency/organization for their employees. This baseline information allows for more informed interpretation of possible post-deployment adverse health effects and is particularly valuable when exposure information is difficult to obtain, interpret, or is completely absent. In addition to providing baseline health information, the pre-deployment screening exam can serve as an opportunity to assess whether the responder has the appropriate education, training, and experience to deploy in his or her assigned response capacities.

Although pre-deployment health screening approaches will necessarily vary depending upon the anticipated work activities, working conditions and work settings in which a responder is expected to perform, a screening exam must at minimum establish whether the responder has the physical and emotional fitness to perform the essential functions of his or her job. Some responder groups, particularly volunteers, may not routinely have an opportunity to receive a medical examination prior to deployment. Health screening is highly recommended for all emergency responders, and it forms an important part of the overall ERHMS program. The physical and emotional health status of a responder can vary over time. Screening should occur on a periodic basis, at the discretion of the responsible response organization. Furthermore, a focused and brief "just-in-time" health screening just prior to an actual deployment is recommended as a part of the ERHMS system,

and it is covered in the Deployment section of this guidance.

2.1 Basic Medical and Physical Fitness Screening Principles

Assessing medical fitness for duty involves the identification and evaluation of any pre-existing medical conditions that could affect a responder's ability to perform safely and effectively or could place the responder at an increased risk of adverse health effect. Physical fitness for duty is assessed in relation to the level of physical activity that may be maximally required from the responder while performing his or her job. The following exemplifies the basic principles upon which medical and physical fitness standards are based when screening emergency responders:

- The responder should be physically able to safely perform the usual activities of daily living without requiring direct assistance of another individual or mechanical devices.
- The responder should not have an acute, progressive, or recurrent disease or condition that:
    - may cause significant functional limitations while performing assigned duties within the essential functions of their response mission,
    - could cause the appearance of symptoms or complications that could endanger the safety of self or others during emergency response activities,
    - will or may require frequent or prolonged periods of absence from duty,
    - may make it difficult to wear and use appropriate personal protective gear.
- The responder should not be significantly limited in musculoskeletal mobility or exercise tolerance regardless of the assignment given. Routine, ordinary physical activity should not cause undue fatigue, shortness of breath, pronounced muscular weakness, or severe pain.
- The responder should be capable of receiving essential and requisite immunizations, prophylaxis, treatments, pharmaceuticals, and other interventions that are necessary to safeguard health and allow assigned duties to be successfully completed.
- The responder should be able to independently travel safely to and from the assigned duty area using public or private transportation. Likewise, the individual should be capable of traveling on official business without assistance using provided transportation.

2.2 Basic Emotional Health Screening Principles

Establishing the emotional health status of an emergency responder should include the identification and evaluation of any pre-existing psychiatric or psychological conditions that could affect a responders' ability to perform safely and effectively, or could place the responder at an increased risk of adverse health effect. The evaluation should also document the quantity and periodicity of the history of traumatic exposures that may have occurred in past deployments. Emotionally traumatic events during an emergency response can serve as a "trigger" for severe emotional reactions among people who are vulnerable because of previous exposures or other predisposing factors. The cumulative effect of a series of traumatic exposures should be considered and surveyed. A responder may not be aware of the effect that repeated emotionally traumatic exposures may have on his or her emotional health, and this screening process may serve to raise his or her awareness of this effect.

Screening for emotional health raises a many concerns regarding patient confidentiality, social stigma, and the over-medicalization of behavioral conditions. Despite these issues, it is important for an emotional health screening exam to identify any past history of psychiatric diagnosis and treatment that could have an impact on the safety and health of an emergency responder. Psychiatric conditions that are considered well-controlled may not be suitable for emergency response, as this state of control may be overturned by the stresses that occur during emergency response.

A number of instruments have been developed to assess one's vulnerability to strong reactions to traumatic events, such as a vulnerability to developing post-traumatic stress disorder (PTSD), as well as other disorders specifically associated with emergency response. Although useful in assessing emotional vulnerability, they are not validated as a means to certify an emergency responders' emotional fitness for duty. These screening instruments, however, can be utilized in order to produce a set of surveillance data points that help to establish a responder's baseline emotional health status. This baseline then

serves as a basis for comparison and decision-making in the ERHMS program.

2.3 Key Components of a Baseline Health Screening Exam

Based on these basic principles for medical, physical, and psychological screening, the following screening elements have been identified as the minimal components of an emergency responder screening exam intended to assess fitness for response activities. These components elicit the basic set of data elements that are necessary for the health screening data contained in a potential ERHMS program. Although many of these components can be obtained through self-report by the employee or elicited by a supervisor or safety officer, others require the judgment of a health professional.

Identifying and Contact Information

- Name, address, telephone number(s), e-mail address(es)
- Age, date of birth, birthplace, sex
- Unique identifier (e.g., Social Security Number or uniquely assigned number)
- Contact person's name and telephone number (current)
- Contact information of someone who will know where the worker resides 6 months after leaving response work (if different from contact person above)
- Organizational affiliations
- Employee vs. volunteer

Occupational History

- Current industry, occupation, job tasks, number of years
- Past employment
- History of previous major emergency responses, including approximate dates

Social History

- Tobacco use
- Alcohol use

Pre-existing medical and psychiatric conditions

- Chronic illnesses and injuries, recent illnesses and injuries
- Repeat injury or undue fatigue
- List of current prescription medications and over-the-counter medications
    - Determine if the worker could likely obtain enough prescription medications to last the expected duration of a deployment (with a comfortable safety margin in case of delayed return to home).
    - Assess the impact if medication were lost due to inadequate storage capabilities (i.e., refrigeration) or other reasons.
- History of medical control over chronic conditions, and ability to maintain that control in the field setting (including listing of measures required to maintain control, e.g., blood sugar testing) [professional judgement required]
- Assessment of vulnerability or risk of exacerbation given likely field settings and resources [professional judgement required]
- History of psychiatric conditions:
    - Depression
    - Psychosis
    - Poor adaptation to stress
    - Anxiety or phobic disorder, claustrophobia
    - Panic attacks/hyperventilation
    - Uncontrollable rage
    - Diagnosed personality disorder or neuroses
    - Previous emotionally traumatic exposures
    - Other relevant psychological conditions

History of Traumatic Exposures

- Listing of date and nature of past response activities
- Cognitive and emotional stability in chaotic and stressful environments
- History of occupational and non-occupational functional impairment after traumatic exposures

Special Needs

- Primary language and foreign language capabilities
- Known allergies and severity (e.g., allergies to food, medication, airborne allergens)

- Pregnancy status (female workers)
- Care, maintenance, and mobility requirements for durable medical equipment or assistance animals; ability to evacuate
- Family or dependent care issues that may interfere with concentration and performance at work
- Immunizations
- Immunization status: routine adult and any special risk (e.g., healthcare worker); See table below for recommended immunizations for emergency responders.

Further baseline emotional health status bullets may be derived from a review of the following five basic screening tools. These materials can be found in the Tools section of this document.

Brief Symptom Inventory (BSI)

- Kessler questionnaire (K10)
- Sprint-E
- Sheehan Disability Scale (SDS)
- Medical Outcomes Study Short Form-12 (MOS SF-12)

2.4 Additional Screening Information Needs

Beyond the core elements of health screening outlined previously, many responders will require more extensive screening based on the nature of their anticipated work and any individual risk factors identified in the core screening process. Additional screening may include a more comprehensive medical history and review of systems; a physical examination; medical testing, such as spirometry; or, in some instances, laboratory testing, as indicated by clinical judgment and good occupational medical practice. Pre-deployment biological monitoring for exposure to hazardous chemicals is generally not recommended. Such monitoring is not practical for unanticipated exposures to hazardous chemicals. When exposures to specific chemical agents are predictable, workers should be adequately protected. However, there may be some limited instances in which obtaining baseline clinical specimens prior to deployment for work in environments with predictable exposures (e.g., baseline cholinesterase levels prior to deploying for an organophosphate pesticide spill) may be helpful in subsequently assessing whether the protections used during this work are adequate and performing as intended.

There are times when it may be appropriate to bank blood or tissue samples from responders in order to compare contaminants, metabolites, nutrients, biomarkers, etc. with samples obtained after an event. Collecting biological specimens from responders pre-deployment to be stored or banked for future use or comparison purposes is a decision that must involve institutional review boards (IRBs) and/or organizations that are familiar with regulations for tissue and blood banking. Aside from complex methodological and ethical issues, banking involves many issues that need pre-planning, including cost, custodial care, confidentiality, specimen handling, and long term-storage.

The following are examples of the types of issues that should be considered when determining the need for additional health screening.

Response Settings and Conditions

- Office settings
- Operations center settings
- Healthcare setting (routine, makeshift, shelter)
- Austere settings (temperature stress and few services/supplies)
- Disaster zone settings (physical hazards, contaminated floodwaters, infectious vectors)
- Hazardous materials release or uncharacterized and complex exposure zones (industrial explosions, major structural collapses, commercial transportation crash)
- Radiation or nuclear contamination settings
- Long work hours
- Inconsistent opportunities for rest and nutrition

Response Tasks

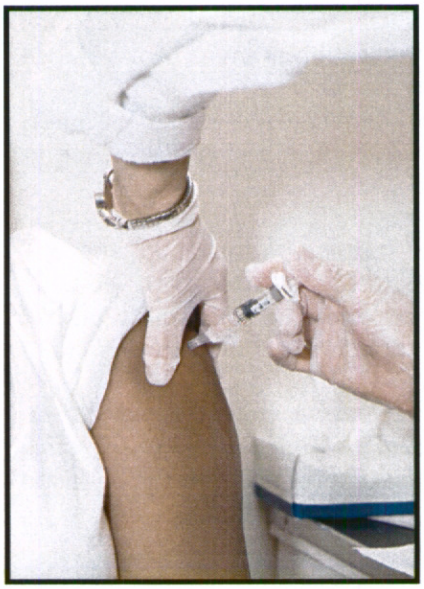
- Heavy lifting or physical exertion
- Hazardous duty requiring use of heavy or cumbersome protective equipment
- Respiratory protection requirements

Personal Risk Factors

- Chronic illness, degree of medical control, and ability to maintain that control in the field setting; degree of vulnerability or risk of exacerbation given field settings and resources
- Drug allergies, particularly to medications used for post-exposure prophylaxis for bioterror agents

- Recent injury and likelihood of repeat injury or undue fatigue
- Care, maintenance, and mobility requirements for durable medical equipment or assistance animals; ability to evacuate
- Cognitive and emotional stability in chaotic and stressful environments
- Impact if medication is lost or subjected to inadequate storage capabilities (e.g., inadequate refrigeration)
- History of adverse consequences after traumatic exposures
- Demands that may interfere with concentration and performance at work due to family or dependent care issues.

See Health Screening Tools section for examples.



2.5 Health Screening Outcomes

An emergency responder may, based on the results of a health-screening exam, be placed into a range of fitness for duty categories. A standard list of such categories would be the following:

- Cleared for emergency response with no restrictions
- Cleared for emergency response with specified restrictions (e.g., regarding types of activities/ exposures)
- Recommended for additional training prior to clearance
- Recommended for further medical screening
- Not cleared for deployment
  - Permanent disqualification
  - Pending medical consultation or workup

2.6 Immunization Guidance

As has been described, pre-deployment health screening is primarily intended to establish a baseline physical and emotional health status, but it is also an opportunity to document the immunization status of the responder and to correct any gaps. Emergency responders who normally operate within the United States are recommended to be up-to-date regarding certain immunizations. Other vaccinations may need to be considered if additional or out-of-the-ordinary infectious disease exposure risks are identified resulting from the nature of anticipated response activities. Conditions and circumstances may be different in countries other than the United States and may necessitate the use of other immunizations to provide appropriate protection for responders deploying outside of the United States. For each vaccine, it is important to be aware of the medical contraindications that may be relevant to the responder needing to be immunized.

The specific immunizations should, ideally, be current at the time of deployment and up-to-date on recommended schedules. This guide also identifies those immunizations that are not indicated for use among responders.

This guidance should apply to all categories of responders, including paid professionals, military personnel, civilian contractors, and volunteers.

2.7 Recommended Immunizations for All Emergency Responders

Tetanus booster: A tetanus booster is required every 10 years, or after a potentially contaminated wound if more than 5 years since the last booster. This is especially important because of the increased risk of wounds that exists during most emergency responses, as well as the possible reduced/inconvenient access to appropriate care. (As a general public health principle, a tetanus booster generally should include diphtheria toxoid and adult acellular pertussis components, known as Tdap, when feasible.)

Hepatitis B vaccine: A Hepatitis B vaccine series should have been administered for persons who

will be performing direct patient care or otherwise expected to have contact with bodily fluids–the full series should be completed.

Seasonal influenza vaccine: An annual *seasonal* vaccine should be given to workers. (Vaccination is particularly important for those with risk factors for more severe disease.)

Pandemic influenza vaccine: A pandemic influenza vaccine should be given (when available) during ongoing or impending pandemic activity.

2.8 Immunizations to Strongly Consider for Certain Responder Groups or Types

The following immunizations may be appropriate for specific individuals in specific situations.

Pneumococcal vaccine (PPSV): A PPSV is recommended for emergency responders more than 65 years old, or any emergency responder who has a long-term health problem or has a disease or condition that lowers the body's resistance to infection, OR any adult 19 through 64 years of age who is a smoker or has asthma.

Hepatitis A vaccine: There appears to be a low probability of exposure to hepatitis A in the United States. The vaccine will take at least 1 to 2 weeks to provide substantial immunity. Hepatitis A vaccine may be appropriately offered to high risk (HazMat, Search and Rescue, SCUBA) and other personnel with frequent or expected frequent contaminated water exposures—especially in situations of seriously degraded sanitation and/or where a local population is known to have high incidence of hepatitis A.

Measles, mumps, rubella vaccine (MMR). As a routine public health measure, consider giving this vaccine to a responder when there is no documentation of it being previously received, provided that doing so will not interfere with their ability to respond in an expedient manner.

Polio vaccine: As a routine public health measure, a polio vaccine should be given to responders if vaccination or disease is not documented.

Varicella vaccine: As a routine public health measure, a varicella (chickenpox) vaccine should be offered to all non-immune personnel.

Rabies vaccine series: The full rabies series is required for protection. Persons who are exposed to potentially rabid animals should be evaluated and receive standard post-exposure prophylaxis, as clinically appropriate. (Note: There has been heightened concern about potential rabies exposures as a result of the "Pets Evacuation and Transportation Standards Act (PETS Act)," also known as the "No Pet Left Behind Act," which requires local and state emergency preparedness authorities to include in their evacuation plans how they will accommodate household pets and service animals in the event of a major disaster.)

2.9 Immunizations Linked to Identified Biological Threats

The following immunizations should be considered by those responders who would be considered among the primary groups expected to respond to specific biological incidents.

Anthrax vaccine: An anthrax vaccination is considered for those reasonably anticipated to have repeated/recurrent/prolonged exposures to *Bacillus anthracis* in the event of an incident(s) (e.g., environmental samplers, cleanup workers).

Smallpox vaccine: Consider smallpox vaccinations for those reasonably anticipated to be deployed for a smallpox event and likely to have a particularly high risk for exposure (e.g., patient care responsibilities, contact with large populations, environmental sampling in highly contaminated situations). For a large-scale incident involving smallpox, vaccination for further back-up responders can be conducted in a "just-in-time" fashion. (Note: vaccination within 3 days of exposure will completely prevent or significantly modify smallpox in the vast majority of persons. Vaccination 4 to 7 days after exposure likely offers some protection from disease or may modify the severity of disease.)

There is currently no indication for the following vaccines for disaster responders in the United States because of the low probability of exposure:

- Typhoid vaccine
- Cholera vaccine
- Meningococcal vaccine

3. Health and Safety Training

Practical Summary

1. **What information and data is needed for this section?**

Information that needs to be collected includes any pertinent data, based on the guidance below, that contains material relevant to the training backgrounds and ongoing training acquired by those responders on the roster of a response organization. See Training Tools.

2. **Who will collect and maintain this data in the pre-deployment period?**

This data will typically be collected by the safety department of a given response organization.

3. **Where and in what form will this information be stored?**

This information could be stored in the safety record kept on file by the safety department of a response organization, either in paper or electronic format.

4. **When in the pre-deployment period should this information be gathered?**

This information should be obtained on responders when they first join a response organization, and updated on a regular basis, typically annually.

Training is critical for the preparedness of the responder. The responder is required to be be fully certified to perform duty-specific tasks, which may have federal, state or local training requirements. Aside from that, the ability of the responder to recognize and avoid possible health and safety incidents will affect the responder's performance, survivability and resilience during and after the disaster response. While our primary concern is the responder, the impact of a disaster extends beyond the responders to their families and communities.

What is the minimum preparedness training that responders should be provided prior to a disaster? Most emergency responders, such as law enforcement, fire, and emergency medical services, have this training integrated into their credentialing standards. For example, National Fire Protection Association Standard 1001 [CDC 2008], Standard for Fire Fighter Professional Qualification, outlines the skills and knowledge necessary to perform as a fire fighter, which includes safety issues related to performing the job at various incidents. The same applies to the Department of Transportation, which has a national curriculum standard for Emergency Medical Technicians (EMT) that also integrates the health and safety of the EMT prior to arrival and on-scene. Law enforcement certifications also reinforce the need for personal safety when performing duties. What may be lacking is the hundreds of other responders whose certification or job training programs do not include performing their duties in a disaster zone. The ERHMS program could capture what training arriving responders have when reporting to the disaster and document its effectiveness to the response and afterward.

The pre-deployment training that responders need largely depends on their previous training and experience as well as the nature of the work they will be doing. Pre-deployment training regarding the following topics may be considered: (See Training Tools section for details.)

- Safety awareness
- Communications
- Self care/Buddy care
- Organization
- Decontamination
- Site operations
- Disaster characterization

Regardless of the training a responder has already received prior to a disaster, more training will be needed that focuses on site-specific hazards,

operating procedures, and available resources. This training is sometimes referred to during the disaster response as "orientation," "just-in-time," and "toolbox or tailgate talks." Throughout this document, these trainings are referred to as site-specific trainings (SST). This type of focused training can be provided over a short time on a specific topic and has proven to be effective in providing reinforcement or new knowledge to address an ongoing problem or a problem that had not been identified prior to arrival to a disaster site. Many responders infrequently respond to disasters despite having had preparedness training. The problem with infrequent occurrence is lack of reinforcement and loss of retention. The ERHMS program could provide insight into trends that indicate areas that may be responsive to increase responder training or areas of discussion among the incident command staff regarding procedures that would require adjustment to reduce possible injuries or near misses. The ERHMS program can be the mechanism that is in place to identify and to react to trends identified that indicate a risk to responder health and safety.

The ERHMS program could provide a valuable source of data post-disaster to assess the training's impact on responders' illness and injury. It may be possible to be used as an evaluation tool to determine the effectiveness of preparedness training as well as the impact of site-specific training on specific types of injury or accidents. The data, much like lessons learned, could be used for responder's preparedness training for the next disaster of a similar type.

3.1 ERHMS Training Data

Responder training data should be collected at all phases of an incident. As part of preparedness and certification training, the Authority Having Jurisdiction (AHJ) for the responder will have documentation of certification and refresher training per local, state and federal requirements. This is currently in place for law enforcement, fire, and EMS. Other skilled support crafts (transportation, heavy equipment, medical) also have similar requirements. In addition, most responders who participate as a FEMA "typed" resource will have requirements to be National Incident Management System (NIMS) compliant [CDC 2004]. During the rostering process, these data should be collected and maintained through a designated office and be available to other components of the Incident Command System (Logistics, Safety, Training, and Operations). Data collected should include all training completed to support certification, particularly training that is mandated by federal or state authorities to support job performance and meet health and safety requirements. Throughout the incident there may be a need to increase or add to training requirements due to incident-specific hazards or change to operating procedures that was not anticipated prior to arrival. Any additional training should also be captured in training logbooks to ensure accountability, reduce liability, and improve responders' health and safety. Prior to demobilizing, efforts should be made to ensure that the AHJ obtains a copy or has access to the data collected on the responders' training accomplishments, as well as perform an out-processing assessment to ensure that identified training gaps are resolved prior to the next deployment.

4. Data Management and Information Security

Practical Summary

What is the purpose of this section?

This section of ERHMS guidance focuses on the challenges involved in the management of data utilized by the ERHMS system during all three phases of response. This includes issues surrounding data security, data inter-operability, data privacy matters, and ethical use of data

Computer databases provide an excellent format with which to manage emergency responders' roster, health, site-specific training, and credential information throughout all phases of disaster preparedness. However, this information includes private and personally identifiable information that may be collected and reported in a variety of formats. In order to maintain privacy required by law and to facilitate efficient communication between responding agencies, issues of information security and interoperability must be considered. As agencies begin ERHMS-related activities for their employees, addressing these concerns in the pre-deployment phase will ensure accurate management of responders during deployment and enable reliable, comprehensive monitoring and surveillance post-deployment.

The suggestions described below are based on the ISO/IEC 27002 information security standard published by the International Organization for Standardization (ISO) [ISO 2010] and recommendations from the National Institute of Standards and Technology (NIST) Computer Security Division. [Swanson and Guttman 1996; McCallister et al. 2010].Together, these documents outline best practice recommendations on initiating, implementing, and maintaining a secure information system that maintains (1) *confidentiality*, information is only accessible to authorized personnel; (2) *integrity*, information is accurate and complete; and (3) *availability*, authorized personnel can access information when necessary.

4.1 Implementation

These six steps outline the basic procedure for developing an effective pre-deployment information system security plan for use in field settings. These small considerations can significantly improve information confidentiality, integrity, and availability. For further detail, refer to the coordinating components below.

Step 1 – Form an information security structure. This can be a single individual, often the Information Security Officer (ISO), whose responsibility is to lead the development and implementation of all information security policies and procedures (Refer to the *Organization of Information Security* component.)

Step 2 – Perform a baseline assessment of security needs. Identify and evaluate any pre-existing internal policies and procedures, mutual contracts or obligations, and all security-related assets. (Refer to the *Asset Management* component.)

Step 3 – Identify relevant laws, regulations, and statutes applicable to the agency and information collected. (Refer to the *Security Policy* and *Compliance* components.)

Step 4 – Develop a work plan. Outline the necessary steps and responsibilities based on the baseline assessment and the applicable regulations (Refer to the *Risk Management, Human Resource Security, Physical and Environment Security,* and *Access Controls* components.)

Step 5 – Acquire and implement necessary security procedures. (Refer to the *Communications and Operations Management* component.)

Step 6 – Begin to manage risk through incremental changes. (Refer to the *Information Systems Acquisition, Development, and Maintenance*, *Incident Management*, and *Continuity Management* components.)

4.2 Components of Information Security

Regardless of the size or complexity of the information management system, there are 12 essential

components to consider while implementing a secure information management system in the field.

1. Risk Management: Risk management encompasses a three-step process of risk assessment, mitigation, and evaluation. Risk assessment is the identification of potential threats and the extent to which they could impact the parties involved. Risk mitigation involves the prioritizing and implementing of risk controls to address the issues identified in the assessment. Once in place, these controls must then be periodically evaluated to ensure their effectiveness.
2. Security Policy: Information security policies should define the security systems in place, assign responsibilities for their management, and address compliance issues as described in the other components of information security. Furthermore, these policies should be communicated, revised as necessary, and must comply with all legislative, regulatory, and contractual requirements. It is important to think about mobile devices used in field situations, such as laptops, flash drives, and wireless devices.
3. Organization of Information Security: It is important to establish a structure for the governance of the security program. Defining positions related to these issues combined with support from management assures efficient allocation of resources and policy compliance. Typically an Information Security Officer (ISO) will be tasked with managing information security issues. It is important in events where data are being shared between agencies/organizations that the ISO's from each agency/organization communicate and facilitate the safe transfer of data.
4. Asset Management: Asset protection involves the inventory and classification of information assets, agreement of their ownership, and protection against their loss to damage or theft. These assets include, most notably, the responder information data, but also the software, hardware, and other services (i.e., phone, Internet, electricity) that are used to manage the data. Loss, theft, and data security all need to be considered when deciding about the use of flash drives, wireless networks, laptops, etc.
5. Human Resources Security: Human resources security involves developing processes to ensure the confidentiality and availability of data while accounting for changes in personnel and position responsibilities. Thought must be given when thinking about staff shift changes and rotating deployments to think about handing off the data securely.
6. Physical and Environmental Security: This component should include safeguards that consider the physical structures that house and support the information systems (i.e., buildings) and where they are located, how they are accessed by authorized personnel, and how they are monitored for breaches or compromises. This is particularly important in field situations.
7. Communications and Operations Management: System communications management refers to the processes in place to maintain the appropriate level of security. These processes can involve backup protection, encryption, and protection from malicious code. Operations management occurs throughout the scope of the information system, from purchasing the physical assets, to maintaining and resolving any issues that arise.
8. Access Control: In order to maintain confidentiality of information and privacy of individuals, it is imperative that only authorized personnel can access emergency responder information systems. Access control usually involves the identification (assigning unique identifiers to each user), authentication (ensuring that the user identified is in fact the person they claim to be), and authorization (granting the user a previously determined level of access). An example is having a policy that data containing personally identifiable information (PII) not be kept on laptops used in the field. Rather, the data should be kept on agency's/organization's servers and accessed only via the agency's/organization's virtual private network (VPN).
9. Information Systems Acquisition, Development, and Maintenance: Building secure processes into the entire lifecycle of the information system is necessary to address all concerns of confidentiality, integrity, and availability. Furthermore, it is essential that all policies and procedures developed meet all legal and contractual obligations (e.g., HIPAA).
10. Information Security Incident Management: Steps should be in place to identify, respond to, and manage any information security

incident, whether it is theft or loss of data or physical assets. Primary (e.g., the ISO officer) and secondary contacts should be established along with criteria for when to be notified. Tracking these incidents can allow for the identification of possible trends.

11. Continuity Management: Procedures for recovering system functioning need to be in place should an incident occur involving the loss or damage of data or physical assets. Recovering important information and processes is essential to maintaining a fully functioning response.
12. Compliance: A process framework should be implemented to ensure that all agencies and individuals comply with established security policies and that necessary groups have authority to enforce these policies.

4.3 Protecting Personally Identifiable Information

Personally Identifiable Information (PII) refers to any information that can be used to distinguish or trace a specific individual and any other information that can be directly linked to that individual. Thus PII includes, but is not limited to, name, address, telephone number, Social Security Number, health records. Breaches involving PII can not only have negative consequences for the individuals identified in the records, but also for the organization that was responsible. Furthermore, in a time of emergency, loss of responders' information can cause serious problems in the identification and management of responders. Ensuring confidentiality of PII can be maintained by not only developing policies and frameworks for security (see 12 components above), but also by modifying the information itself with privacy-specific safeguards.

Privacy-specific safeguards are applications that apply directly to the information collected about the responders. The most basic safeguard to implement is to minimize the collection, use, and retention of PII. Certain PII is necessary to collect in order to accurately contact and manage emergency responders (i.e., name, telephone number); however, reducing the amount of PII collected from individuals will reduce the risk associated with the information. In order to determine what specific PII is necessary, organizations can conduct privacy impact assessments to specify what information is absolutely necessary, how the information will be collected and secured, and with whom it will be shared. Once the PII has been collected, confidentiality can be maintained by de-identifying the information. De-identified information is data where enough of the PII has been obscured or masked to make sure that the remaining information cannot be used to distinguish or trace an individual. This information can later be re-identified via the code or algorithm that was originally used to mask the information. For instance, if a group should request to analyze responder data for trends in health behaviors, a de-identified dataset can be provided where names, addresses, and phone numbers have been masked. Because the motive is to establish population-level trends, this inquiry does not necessitate certain PII. This application is only effective if the algorithm is not publicly accessible. Thus, this process does require that secure procedures are in place for protecting the algorithm used to maintain confidentiality and availability. It is imperative that the technique used complies with all laws and regulations (e.g., certain algorithms cannot be used with HIPAA protected data). In addition to algorithms and codes, information can be anonymized, most often for reporting purposes. The information can be generalized (grouped by common values), suppressed (PII deleted), or replaced with averages. For instance, when reporting information on emergency responders' health behaviors, the results can be displayed aggregated by zip code or age brackets. By combining individuals into similar but significantly large groups, no single person can be identified.

4.4 Communicating with Interoperable IT Systems

A national database of emergency responders' information is not necessary to manage an effective emergency response; however, with multiple agencies collecting and managing responders' information pre-, during, and post-deployment, there will often be a need to communicate and share data across IT systems. Hence, it is crucial that agencies communicate pre-deployment to establish common policies and procedures to maintain security of their data systems. This communication plan can then be executed and maintained throughout deployment to provide timely access to responder information while maintaining acceptable levels of confidentiality.

Agencies will often collect information in a variety of formats, and manage this data with a variety of hardware and software. IT specialists (often the ISO) across agencies should communicate these differences pre-deployment and ensure mutual levels of security standards. Furthermore, ownership of assets where management will overlap should be discussed. Documenting these features can allow the IT specialists to prepare their systems for interoperability during and post-deployment to facilitate a faster response.

Deployment Phase

5. On-site Responder In-processing

Practical Summary

1. **What information and data is needed for this section?**

Information that needs to be collected includes any pertinent data, based on the guidance below, which contains material relevant to the basic employment data, site-specific training received, and personal protective equipment issued for those responders involved in a given response. See On-site In-processing Tools.

2. **Who will collect and maintain this data in the pre-deployment period?**

This data will typically be collected by members of the Logistics Section within the ICS structure.

3. **Where and in what form will this information be stored?**

This information should be stored in the personnel records kept on file by the Logistics Section at ICS command, either in paper or electronic format, and may be supplemented by training and equipment data maintained by the Safety Section.

4. **When in the response period should this information be gathered?**

This information should be obtained as responders check in and report for duty at the ICS command, and should be updated periodically during the response to maintain its completeness and accuracy.

5.1 The On-site Responder Roster

The process of personnel identification, accountability, and tracking can be referred to as the responder roster. A roster of everyone who reports to the disaster and who is engaged in the response or remediation work should be identified at every disaster where the level of response requires more than the first tier of the local responder.

The logistics function is responsible for collecting this information into a comprehensive rostering system. But components of accountability also include parallel and linkable procedures conducted by Planning (example–demobilization) and by Command (safety officer).

The Incident Command structure may choose to centralize the roster process or may delegate this function to the employers of the response workers. A centralized approach is the most effective in collecting and maintaining a comprehensive listing of workers because it will collect information on any person who becomes authorized to enter into the disaster zone, including unpaid volunteers, paid workers, contractors, state and local workers, and federal (uniformed and non-uniformed) personnel. Secure recordkeeping systems should be maintained at all times to protect the privacy of the response and remediation workers.

Elements of a Centralized Worker Roster (Personnel Accountability) Program:

Pre-event

Before engaging in disaster response work, professional responders (e.g., fire, police, EMS, and search and rescue organization personnel) should be appropriately prepared. This includes being trained/licensed, equipped, and exercised. Responders are often placed into a comprehensive medical screening, vaccination, and health monitoring program, particularly if they are paid fulltime workers. Volunteer emergency response organizations should also maintain a program for medical monitoring and fitness for duty for their volunteers, as the expectation that they will respond during emergency events is well recognized. Mobilizing and transporting these workers rapidly into the disaster operations area proceeds with the least amount of delay. When adverse health

exposure follow-up is indicated, these professional workers are the easiest to locate and contact after a disaster, because a system of records and contact information is ongoing.

Event

Activation: As soon as a exclusion zone is established to protect the public or the environment, and dedicated entry and exit zones are located at the site, the ICS system should establish a system to roster all responders and direct Logistics to establish and oversee this critical function.

Location: Ideally, as soon as a perimeter control is established, a single location or limited number of specified locations should be established that arriving and departing response personnel must pass through, if possible. (Circumstances, including size and geographical distribution, of the event, may sometimes make this impractical.) At this rostering checkpoint worker identification verification and responder badging will be implemented, monitored, and linked with related activities that will follow (training, job assignment, PPE dispensing, injury surveillance, demobilization). If the response task allows for a daily work schedule, a "check-in and check-out" system should be implemented that accounts for everyone who enters and exits the controlled access zone during any 24-hour period. If the event involves the use of geographically dispersed deployment locations where workers are assembled and then deployed to distant work settings, a daily roster at each deployment location must be established for embarking and debarking operations whether by land, air, or waterway. With improving telecommunications and access to computers, the checking-in procedure can be modified to accommodate the use of these means to check-in and check-out remotely, if approved by the ICS structure and managed by the on-site safety team.

Operation: Before actual response work, demographic information about each worker should be systematically collected into a permanent electronic recordkeeping system. Ideally, basic worker information should be collected that links the worker to specific tasks and locations, by time and date. Optimally, this record system will contain demographic information about the worker (name, age, gender, address, contact information, unique identifying number, and employment status). The system will (1) validate current professional licenses and special trades certifications; (2) identify work assignment; (3) track site-specific training and retraining; and, (4) capture pre-event health assessment information (e.g., fitness for duty, allergies, medication history, respirator fit testing). If possible, a rostering system should be capable of categorizing workers into exposure groups as a way to make rapid effective changes in administrative or engineering controls or PPE practices as events change.

Integration: Rostering information should be collected within the same information system or linked to other information systems collecting responder-specific information during the response. A roster database ideally should be capable of linking related databases, including (1) demographic information, (2) badging, (3) training, (4) job assignment, (5) environmental exposure records, (6) industrial hygiene, (7) personnel monitoring records, (8) first aid/injury surveillance, (9) safety incidents, (10) PPE usage, and (11) service duration. Collecting information in the same or linked information system makes it quickly useable by the safety officer and his or her team to identify exposures, illness, or injury circumstances that may be preventable through administrative or engineering controls. If a roster with a centralized database is not achievable, then the need for continual data calls to gather information from separate databases will be necessary.

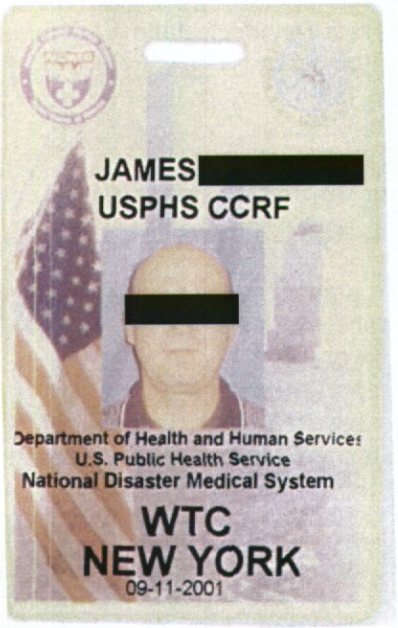
Post-event

Recordkeeping: Another reason to conduct a complete roster of all workers is that, in some events, adverse health consequences may occur. A roster can be used as the baseline contact mechanism to create a registry of affected workers if this level of legal or medical follow-up is indicated.

If the system is linked primarily to the entry authority badge system, an effort must also be made to maintain a roster of workers who were not actually employed during the emergency. This record will also facilitate analyses of potential health effects by acting as a way to compare exposed individuals to control populations in the event that concerns about health symptoms arise.

Demobilization: Demobilization is the opposite of in-processing at the beginning of an event. As each worker leaves the event (temporarily or permanently), their date of service completion is also part of the roster record. In addition to capturing the start and end dates of service, the demobilization process is also a good time to provide an exit de-briefing, and it is an opportunity collect a health exit survey (see Incident Personnel Out-Processing Assessment section).

Security: State-of-the-art information technology safeguards should be implemented to prevent unauthorized access to personal identifying information. A post-event disposition plan should be determined for the secure transfer, long-term storage, and future retrieval of the roster records.



5.2 Site Specific Training (SST)

Site Specific Training (SST) is necessary to provide training orientation to hazards and protection measures unique to that site as opposed to traditional job preparation training. SST does not negate the need for comprehensive preparedness training, but is additional training which can be tailored to the specific job site.

SST can be written, prerecorded, or provided orally as a briefing. Much of the material can and should be prepared ahead of time as much as possible as "toolkits" with easy to reference materials that contain specific information on many topics relevant to the disaster. Materials should be provided to meet the language and comprehension levels of the response workers. Methods not requiring electricity may need to be used in case of power outages during a disaster.

SST received by responders should be documented, which is commonly a task assigned to the Safety office function within the Incident Command System (ICS). If such training is conducted before deployment, there should be an opportunity for training data to be collected within the rostering system process being conducted on scene.

Relevant training to ensure basic on-site health, safety, and resilience skills may include the following:

- Orientation to worker identification/ badging and worker rostering
- Site-specific safety and health training
- Work schedule and work rest practices
- Site-specific risk management and communication practices
- Site-specific information on first aid and other medical or mental health services
- Psychological support resources
- Infection control practices
- Disaster buddy training
- Medical (injury or illness) follow-up procedures
- Knowledge on how to obtain PPE supplies
- Knowledge on how to obtain environmental testing equipment & resupply
- PPE equipment selection, use, maintenance, and disposal awareness training

- Respirator fit testing
- Personal exposure monitoring and equipment
- Decontamination practices

Demobilization training:

Relevant training before demobilization could include the following:

- Employee assistance/behavioral and mental health assistance programs
- Responsible party points of contact
- After-action report procedures
- After-action research program information
- Research, roster, and registry privacy rules
- Workers' compensation claim procedures

5.3 PPE Dispensing and Documentation

A variety of PPE will be needed by response workers and volunteers. For many workers, this equipment will be issued or dispensed to them during their site specific training or as they arrive at the response scene and are placed on the response roster. This central function or location for issuing PPE to responders serves as an opportunity for recording (1) the amount, type, and condition of the PPE that is issued; (2) checking if the responder has received appropriate training and fit-testing for the issued equipment; and (3) allowing, within the ERHMS system, for documentation of these data and appropriate change schedules for the equipment.

6. Health Monitoring and Surveillance During Response Operations

Practical Summary

1. **What information and data is needed for this section?**

Information that needs to be collected includes any pertinent data regarding the current health status of responders, exposures, work activities, PPE use, and other pertinent information that arises during the course of an emergency response. This information may allow for prompt recognition of risks that are amenable to intervention, understanding the health effects of ongoing or new exposures, setting up medical surveillance, or provide information used for follow-up related to work at an incident. See Health Monitoring and Surveillance during Response Operations Tools.

2. **Who will collect and maintain this data in the pre-deployment period?**

This data will typically be collected by members of the Medical and Safety sections within the ICS structure.

3. **Where and in what form will this information be stored?**

This information should be stored in the medical and safety records kept on file by the Medical and Safety sections at ICS command, either in paper or electronic format.

4. **When in the response period should this information be gathered?**

This information should be obtained as responders check in and report for duty at the ICS command, and should be updated periodically during the response to maintain its completeness and accuracy.

This section is intended to provide guidance for monitoring response personnel to document the condition of their health, injury, and illness status during emergency operations in response to natural or man-made disasters and novel emergent events. This guidance is primarily directed to those involved in the coordination of the safety officer and medical unit within the Incident Medical Plan. In the Incident Command Structure, the medical unit is responsible for the effective and efficient provision of medical services to incident personnel, and it reports directly to the Logistics Section chief.

This section assumes there is: 1) an established baseline fitness for duty examination for incident personnel; 2) a pre-placement screening examination, which addresses any pre-existing physical, psychiatric, or psychological condition that could affect a responder's ability to perform safely and effectively in an emergent situation; 3) rostering and credentialing of incident personnel (see the preceding, pre-deployment sections). This section also assumes that the incident personnel have had the proper documentation, training, and certification to perform their assigned jobs safely and that methods for documenting exposure, environmental sampling, training, PPE use, and safety compliance are in place. As mentioned previously, capturing this sort of information at the beginning is essential during a response because it is unlikely that comprehensive information of this nature can be obtained in a timely manner due to competing priorities at an event. If baseline information has not been obtained before the event, then the reader should refer to the pre-deployment section of this document for baseline fitness for duty and pre-placement screening. This chapter does not address acute medical assessment and treatment for recognized illnesses or injuries nor emergency incident rehabilitation (emergency incident rehabilitation refers

to the processes of providing medical evaluation, rest, rehydration, and nourishment to responders who are actively involved in extreme incident scene operations). Those seeking this type of advice should consult, for example, NFPA 1584, the Standard on the Rehabilitation Process for Members During Emergency Operations and Training Exercises 2008. This standard establishes the minimum criteria for developing and implementing a rehabilitation process for fire department members at incident scene operations and training exercises.

Health monitoring and surveillance are two different but complementary methods to protect the health and safety of incident responders during an emergency operation. Monitoring refers to the ongoing and systematic collection, analysis, interpretation, and dissemination of data related to an *individual* incident responder's medical injury and illness status. This allows for the evaluation of the occurrence of an exposure, determination of the level of exposure an individual responder might experience during his or her duties, and assessment of how that exposure is affecting the individual responder. Surveillance refers to the ongoing and systematic collection, analysis, interpretation, and dissemination of illness and injury data related to an event's emergency responder *population as a whole*. This allows for the tracking of emergency responder health (illness and injury) trends within the defined population during response. A mechanism to allow tracking should be an integral part of the response to any event.

The guidelines in this chapter draw on information from several existing documents, including the OSHA Medical Screening and Surveillance website, [OSHA 2007]. NIOSH's guide on Medical Pre-Placement Evaluation for Workers Engaged in the Deepwater Horizon Response [NIOSH 2010b], and the U.S. Coast Guard Medical Manual Occupational Medical Surveillance and Evaluation Program [U.S. Coast Guard 2009].

6.1 Health (Injury and illness) Monitoring

Monitoring and documenting the illness and injury status of incident personnel during an event is important because it may allow for prompt recognition of risks that may be amenable to intervention. It may also gather information that can be used for understanding the health effects of ongoing or new exposures occurring during emergent events. Information obtained during an event may be valuable for setting up medical surveillance post-deployment. It may also provide information used for follow-up of adverse medical and mental health consequences related to work at an incident.

An injury and illness monitoring and/or medical surveillance program during an event should be carried out under the supervision of qualified medical and/or health and safety professionals familiar with occupational safety and health and toxicological principles. Monitoring may provide insight on up-to-date protection, including immunizations, against illnesses and injuries that might occur during an incident. It can also provide information on unsafe conditions or work practices possibly indicating a lack of adequate training. Summary information obtained from monitoring activities should be disseminated to all necessary incident parties, including workers, unions, employers, government agencies and the

public. This information can be used when educating responders about the health issues and risks related to working at the incident, including personnel with special concerns (e.g., those with physical limitations, compromised immunity, or current pregnancy).

Those engaged in health and safety monitoring must determine whether pre-event health information is available and provides an adequate baseline, or whether additional testing or data collection is needed. Monitoring activities should be designed with regard to activities, working conditions, and current and potential exposures for each worker or subgroup sharing such risk. Therefore, some incident personnel may need to be enrolled into a targeted monitoring program, while others may not.

Consider what monitoring or surveillance information needs to be collected, such as information regarding health symptoms, the elements of the assigned taskds and present safety climate, availability and proper use of PPE or safety knowledge, and compliance with site-specific health and safety plans. Next, consider whether desired data are already being collected, and identify the source(s), procedures for access, and how best to utilize them. Examples include infirmary logs, local clinic and emergency room records, workplace injury and illness logs, on-site employee badging systems, and training records.

6.2 Who Needs to Be Monitored During an Incident

Health monitoring should be considered for incident personnel who are deployed to specific areas suspected to be hazardous, particularly where quantitative incident-site sampling measurements or observational assessment indicate hazard levels or unsafe conditions. If industrial hygiene sampling is limited or unable to be performed, decisions to conduct health and safety monitoring on specific incident personnel should be based on several considerations. Among the things to consider are whether (1) exposures are at levels that are suspected to result in adverse health effects; (2) exposures are complex or mixed; (3) work conditions may result in adverse outcomes; (4) there are hazardous activities or adequate control measures in place or missing. Other considerations for monitoring include whether personnel associated with the emergency may be experiencing similar symptoms, and whether there are increases in frequency, severity, or communicability of adverse health effects. One may be called to do health monitoring to fulfill public health interest or political interest in an exposure or health effect. Decisions to conduct health monitoring should be made consulting the expertise of medical health and health and safety professionals.

Workers in certain occupations or with certain exposures may require injury and illness monitoring by federal statutes, OSHA requirements (such as Illness and Injury Recordkeeping), and DOT regulations. For example, if incident personnel are required to handle hazardous material, then the examination should adhere to the OSHA Hazardous Waste Operations and Emergency Response standard (HAZWOPER).

Health monitoring, described in OSHA standards as "medical surveillance," is required by OSHA for workers exposed to certain hazardous substances. A guide to OSHA standards that require medical surveillance can be found in the 2009 OSHA pamphlet, Screening and Surveillance: A Guide to OSHA Standards.

6.3 Timing of Injury and Illness Monitoring Activities

If not completed before deployment, baseline fitness for duty examination should be conducted upon entry to field operations. Inclusion of personnel on roster and credentialing lists can be done at this time as well. Consideration should also be given to whether further examinations or additional monitoring during the deployment may be advisable under certain circumstances. For example, when new exposures, hazardous activities, or adverse health outcomes are identified, appropriately timed assessments (e.g., documentation of presence or absence of symptoms, exposures, training, biological monitoring etc.) should be done to assess status or to monitor change. Incident personnel assigned to perform their usual work and currently enrolled in a work-related medical screening or surveillance program may not require additional health monitoring. However, event-specific monitoring may have additional benefits. This requires that a system be set up for health and safety personnel to meet regularly to receive updates concerning the event, and changes in exposure activity and health status of workers.

At the time of demobilization, an out-processing assessment should be conducted, as well as consid-

eration for post-event tracking of responder health and function. See the post-deployment section of this report for more information.

Additional Information that Can Be Used for Health Monitoring

Be aware of existing information and records that may be available within the command structure at the incident and within the Incident Medical Plan. Exposure monitoring records, purchasing and production records, training records, health and safety-related policies, and operating procedures may help to determine the exposures of most concern. Employee rosters, staffing lists, employee turnover rates, and mapping plans may provide useful information. Reviewing these documents before deciding on the need for health monitoring help provide a better understanding of the potential of hazardous exposures and the procedures the Incident Command has in place to respond to hazardous situations. An on-site visit will help to determine if these materials are likely to be helpful.

Material Safety Data Sheets (MSDS) for hazardous substances used at the site may be another source of information. Some emergency responses will not have MSDS available; however, containers of hazardous substances may have hazard warning labels, which will provide some general information about toxicity of the products used.

Information to Be Obtained for Injury and Illness Monitoring

Personal information, particularly personal medical information collected during the incident, should be maintained consistent with The Health Insurance Portability and Accountability Act of 1996 (HIPAA) Privacy and Security Rules. Ideally, the following information should be collected for injury and illness monitoring purposes, if it is not readily available from other records:

1. Personal Information

- Identification and Contact Information
  - Name, address, telephone numbers (work, personal), e-mail addresses (work, personal)
  - Age, date of birth, birthplace, gender,
  - Unique identifier (e.g., Social Security Number or uniquely assigned number; must be consistent with unique identifier from pre-deployment phase)
  - Contact information for someone who will know where the incident personnel is in 6 months after leaving response work
  - Union affiliation: name and local number
  - Response organization:
    - Employer vs. volunteer organization (indicate which)
    - Name and address
    - Contact person's name and telephone number
- Usual work
  - Industry, occupation, job tasks, number of years
- Special needs
  - Primary language
  - Any special assistance required (interpreters, scribes)

2. Response-related Information

This information should be provided by the incident personnel's agency, organization, or employer, if

available. If not, inform the incident personnel that this information should be available to him or her.

- Deployment location(s) (as specific as possible)
- Tasks and circumstances under which tasks have been performed
- Date of deployment
- Duration of deployment
- Training provided
- Known or suspected hazardous agents or conditions
- Work shift schedules: hours per day, days per week, rotation schedules
- Use and type of Personal Protective Equipment; fit-testing and medical authorization as applicable

3. Medical Information

Medical information should include the current health status. It should also address all of the medical information that is required by the appropriate OSHA standards. Much of this information should be available from the basic screening exam and the preplacement fitness for duty examination. All of the following information should be included if it has not been collected previously in a manner that is easily accessible to the individual conducting the evaluation.

Current health status

- Pre-existing medical and mental health conditions
- Relevant lifestyle factors (e.g., tobacco use [smoking or chewing], , drug and alcohol use)
- Medications, and related issues (e.g., storage needs such as refrigeration)
- Immunization status (see pre-deployment section of this report)
- Pregnancy status
- Current symptoms

Targeted medical evaluation

Focused history, physical examination, and medical testing as needed, based on the exposure or health concerns during the event. Information collected could include the following:

- When and where the injury/illness occurred
- Symptoms, severity, and duration of illness/type and body location of injury
- What job function was being performed performing when it happened
- What PPE was the individual using

4. Additional Health Monitoring Needs

Some responders may need more extensive or frequent health monitoring because they are working in hazardous conditions, working with hazards that are covered by specific OSHA standards, or have pre-existing medical conditions (including mental health conditions). Monitoring for potential mental health needs is important. Response-related challenges include uncertainty about the impact of the disaster, threats to livelihood and diminished quality of life, fatigue, and other stressors. Stressors can increase substance use, which in turn can worsen a variety of health outcomes—forexample,alcoholandamphetamineuse are potentially lethal when combined with heat stress.

5. Biological Monitoring

Biological monitoring for specific compounds other than those required by OSHA, or for emergent health conditions (e.g., carboxyhemoglobin to check for overexposure to carbon monoxide) is rarely recommended for clinical assessment, but may be important for surveillance purposes or to assist in exposure assessment. Depending on the test characteristics and the exposure(s) being evaluated, results of biological monitoring often cannot answer important issues such as the relationship between work exposure and reported symptoms, specific illnesses, or the risk for development of future health problems.

When exposures to specific chemical agents can be predicted, actions to minimize or prevent exposure should be taken regardless of whether biological monitoring is conducted and should not be delayed until results of biological monitoring are available.

Additionally, health professionals conducting biological monitoring among workers must be prepared to explain what the results of the tests mean and will need to be prepared to help individuals make sense of their results.

6.4 Medical Removal of Incident Personnel Using Injury and Illness Monitoring Information

Through injury and illness monitoring, the finding of an incident-related illness or injury, which could be further exacerbated by continued exposure to a hazardous exposure or condition, may require further (including immediate) evaluation to determine whether the response personnel must be temporarily or permanently removed from further exposure. A recommendation to remove incident personnel should be made with coordination of the medical unit within the Incident Medical Plan, or those having the authority and jurisdiction over the incident personnel's disposition.

6.5 Injury and Illness Surveillance

Injury and illness monitoring during an event is important to protect individuals and to identify injury, illness, safety, and training deficiencies that might be immediately amenable to intervention. The use of this type of monitoring information can also be valuable for tracking these factors over time. Injury and illness surveillance involves the systematic and ongoing collection of different types of information, including medical, exposure, work history and activities, PPE, and training. Through this surveillance, it may also be possible to measure the health impact at the population level, determine scope of injury and illness, and plan for the next event.

6.6 Those to Be Included in Health and Injury Surveillance During an Event

Incident personnel should be considered for illness and injury surveillance based on the type of work being performed at an incident response, including consideration of factors such as the duration of the task, the materials being used, and the potential for exposure. Certain exposures will require medical surveillance by law. A roster of incident personnel, discussed in the pre-deployment section, would be a useful tool for these purposes

6.7 What Are Potential Sources for Surveillance Data?

In smaller responses, there might not be a dedicated system set up nor personnel dedicated to initiating an active surveillance system. In these cases, the use of a passive surveillance system, using existing records, data sources, and other sources of information may be useful. Knowing what data may be available to you and potential sources of those data ahead of time are key to establishing an effective system in a timely manner.

Data that may be available include the following:

- OSHA logs and other existing records. Requests should be made to obtain logs of injuries and illnesses, (these are employer-based not incident-based so there may be multiple). These records can yield information about the frequency and nature of the injuries and illnesses, as can insurance claims and absentee records. If workers in certain operations have more health problems than others, especially if they exhibit the same type of injuries or illnesses, this would suggest some immediate areas for further investigation of possible exposures or deficiencies in protective measures. Jobs with elevated rates of certain types of symptoms often also have higher risks for acute injuries due to other safety hazards.
- Healthcare facilities (e.g., first aid stations, EMT, urgent care, emergency departments, and hospitals).

  Evaluations of suspected work-related problems should also try to include examination of infirmary, first-aid, and medical records to understand the magnitude and seriousness of such problems. The Health Insurance Portability and Accountability Act (HIPPA) may come into play in these investigations, as it requires specific medical release authorization from individual workers, and it also requires that employers and on-site health care providers comply with certain requirements to protect individual health data. Excepted from HIPPA are certain public health authorities who are authorized by law to have access to individual health information for the purpose of preventing or control-

ling disease, injury, or disability (including investigations and interventions). Examination of employee first aid and health records may offer leads to operations that may cause or contribute to other work-related problems.

6.8 How to Acquire Surveillance Data

All or some these forms of data acquisition may be available during an emergency response, depending on the size of the event and resources available for surveillance:

- Electronic transfer systems
  - Unless there is already a transfer system in place, it would be unlikely that there would be enough time and resources to establish a system in an efficient and effective manner. However, many states and large cities already have these systems in place for collecting laboratory or emergency room encounter data.
- Records review
  - Records review is commonly used, because records are required to be generated for every responder with an illness or injury that is severe enough to be seen by a medical professional or requires documentation on an OSHA log, and these records contain much of the information that a surveillance system of this kind would need (see below).
  - Records review requires staff that is already trained and efficient in the process of medical records review, along with staff for data entry.
- Surveys (paper or preferably electronic)
  - A survey may be a useful tool, especially if the information you desire is not already included in the aforementioned sources of data.
  - A pre-prepared "shell" survey with standardized questions that are customized to the current event can facilitate the implementation of a survey. See the Tools section of this report for examples.
  - This data acquisition tool can be resource-intensive regarding both funding and staffing especially during data acquisition, data entry (if forms are paper), and data analysis.

6.9 What Type of Worker-Related Data Should Be Obtained for Injury and Illness Surveillance?

- Denominator (size and composition of population under surveillance)
- Demographics
- Age
- Sex
- Race/ethnicity
- Primary language
- Duration of employment
- Usual or previously longest-held occupation

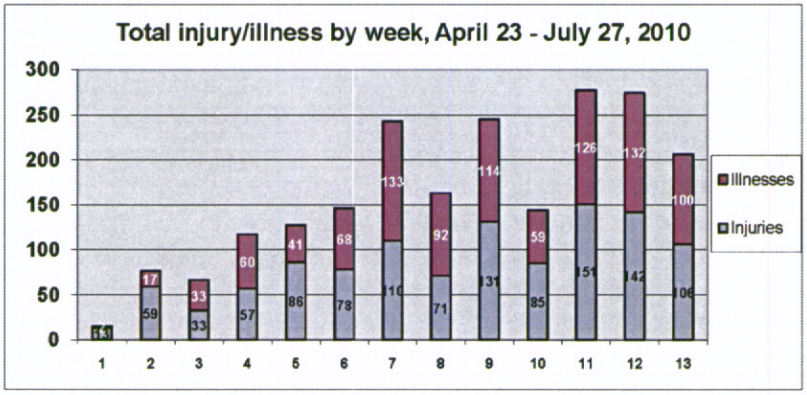
- Category of worker (e.g., federal, state, contractor, volunteer)
- Level of training
- Injury or illness
  - When
  - Where
  - What job function was being performed performing when it happened
  - Symptoms and duration of illness/type and body location of injury
  - What PPE was being using when it happened
  - Severity (level of medical treatment required and amount of missed or restricted duty)
  - Whether it was an OSHA recordable injury of illness

6.10 What to Do with Data after They Are Collected?

Once data are collected, they should be evaluated for quality, coded, analyzed, and interpreted. Data should be disseminated in concise and easily understood reports, which should provide information that can serve to reduce the risk of future injuries and illness among response workers. Information should be disseminated to all incident personnel involved, other workers, union groups, employers, government agencies, state and local health authorities, and the public. In the case of an ongoing or prolonged response, surveillance findings should be communicated to stakeholders as close to real-time as possible. This will promote public health through enhanced awareness of the risks associated with a response. It will also point to patterns of injury and/or illness. Surveillance can assist in identifying targets for training, intervention, and other prevention activities.

Response workers and volunteers may be exposed to many different chemical and environmental hazards in the course of their work. The specific agents and concentrations will vary depending on the location of the work relative to the agent, length of time of exposure, type and stage of response, materials used during the response, climate conditions, use of personal protective equipment (PPE), and the workers' specific tasks. Obtaining accurate and useful worker exposure information is a crucial element in ensuring exposures are correctly characterized, risk is communicated appropriately, and sufficient information is available for making evidence-based decisions (e.g., PPE and work practice controls) to protect the health and safety of response workers.

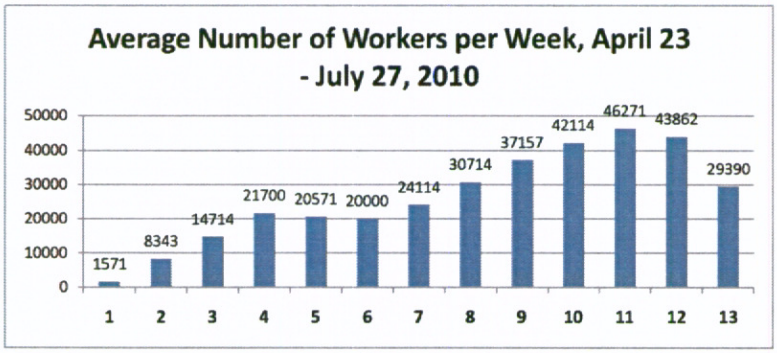
Graph 1a



Notes:

- Week 1 is defined as Monday April 26 -Sunday May 2, 2010. Each subsequent week begins on the following Monday.
- Week 14 is not included in this graph, because it contained less than 7 days of data (31 cases total).

Graphs 1b



7. Integration of Exposure Assessment, Responder Activity Documentation, and Controls into ERHMS

Practical Summary

1. **What information and data is needed for this section?**

Information that needs to be collected includes any pertinent data, based on the guidance below, which contains material relevant to exposure assessments, responder activities during the response, and controls employed for responder safety and health. See Exposure Assessment Tools.

2. **Who will collect and maintain this data in the pre-deployment period?**

This data will typically be collected by members of the Safety and Logistics sections within the ICS structure.

3. **Where and in what form will this information be stored?**

This information should be stored in the safety records kept on file by the Safety Section at ICS command, either in paper or electronic format, and may be supplemented by responder activity data maintained by the section of ICS responsible for personnel accountability.

4. **When in the response period should this information be gathered?**

This information should be obtained throughout the response, and should be updated periodically during the response to maintain its completeness and accuracy.

This section and corresponding Appendix B provide information and guidance for establishing successful exposure (industrial hygiene) assessment plans. If hazardous exposures are identified or anticipated, appropriate control strategies can then be recommended to reduce exposures to acceptable levels to protect the health of responders. This exposure assessment must be performed early in an incident response and sustained throughout the incident response and recovery phases. This prompt assessment is necessary in order to link future illness or deaths to possible hazards at an incident. Without the assessment, it is impossible to establish links scientifically or legally, for the purposes of medical and public health intervention, compliance, or liability actions. Exposure assessments and the hazard risks may change as an incident transitions from response to recovery, which can involve new equipment, new operations and processes, and new personnel.

Emergency response operations usually involve extremely dynamic and very fast-paced environments. Safety officers, industrial hygienists, or public health professionals may need to characterize exposures to chemical, biological and/or physical agent hazards. This task can be challenging when one identifies the myriad tasks involved either directly or in support of the operations (see Figure 2). Rapidly changing events, coupled with the desire to respond quickly, can create additional challenges in conducting exposure assessments.

Exposure assessment and management is the process of identifying, characterizing, estimating, and evaluating workplace exposures, and judging the acceptability of workplace exposures to environmental agents encountered in an incident response. This assessment forms the basis for determining the appropriate actions necessary to prevent or minimize hazardous exposures, and it should occur within the context of an operational risk management program integrated into the overall incident management.

Not all exposure assessments require collection of quantitative data, but most assessments include some element of environmental monitoring. In many small-scale incidents involving local fire or

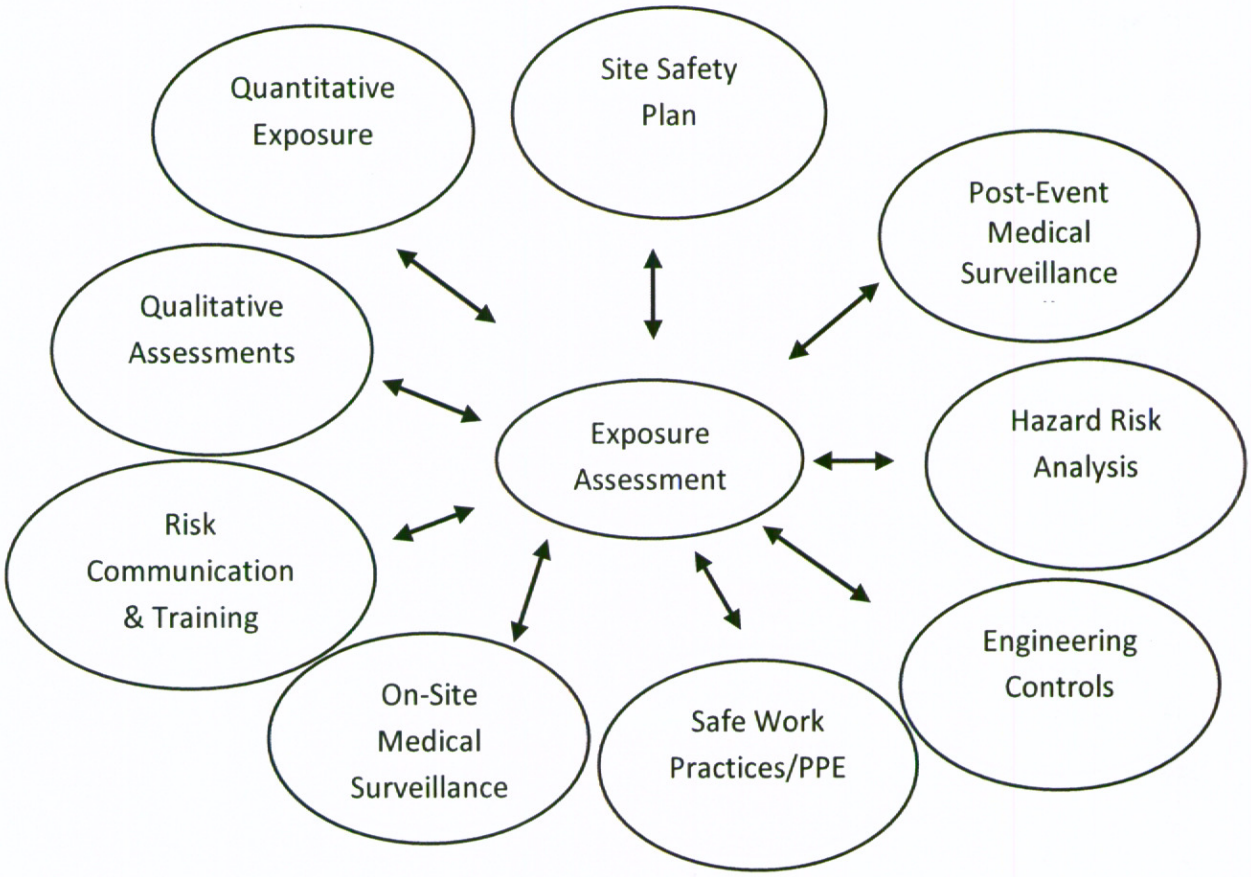


Figure 2: Central Role of Assessing Exposures [Bullock 2007]

emergency medical services (EMS), monitoring of hazardous exposures is often not performed in a systematic fashion, and it may only be initiated when affected individuals begin to exhibit signs or symptoms of illness. Minor or traumatic injuries are typically documented, both because of the obvious cause and location of those injuries as well as the OSHA injury reporting requirement. However, worker exposures to hazardous substances may often go undocumented and unreported. Documenting and assessing exposures is a crucial step in any efforts to ensure and promote responders' safety and health. This information can be utilized both in real-time during the response, as well as post-event as the exposure data are analyzed for evidence of hazardous exposures.

The exposure assessment methodologies described in this section have been developed by professionals from the American Industrial Hygiene Association (AIHA), an organization comprised of industrial hygiene practitioners. It is recommended that exposure assessments should be conducted at the outset of an emergency response, with follow-up reassessments conducted on a periodic basis or as circumstances require, such as when new hazards are discovered. Use of this methodology will allow an employer to assess the hazards potentially encountered in a given emergency response and design appropriate mitigation efforts to prevent or minimize similar exposures to hazards.

Although the focus here is on exposure to chemical and physical hazards, it is also worth noting so-called "psychological toxins." These include sights and smells of death, exposure to the wounded, and risk of becoming a casualty. In addition, when personnel are concerned about their physical exposure during stessful situations, they may experience feelins of being overwhelmed, and translate their distress into somatic symptoms.

Additionally, command infrastructure, communication, coordination and leadership style all affect job stress during disaster response.

Because this chapter focuses on the integration of exposure assessment into ERHMS, the reader

should refer to the appendix for a detailed explanation on how exposure assessment would be implemented in an incident response, and then, refer back to this chapter on the integration aspects.

7.1 Sampling Strategy Considerations

Important parameters of the sampling strategy include the scope of the sampling (e.g., which occupations or tasks, how workers are chosen), the comprehensiveness of the sampling (screening esti-

mates or individual level monitoring), the number, timing, and frequency of the sampling, and the methods used (air samples, dermal assessment, biomonitoring, etc.).

The following factors must be assessed:

- The job requirements and tasks, in order to identify activities of highest potential exposure
- Existing engineering and administrative (management) controls
- PPE requirements, standard operating procedures, and worker training
- Potential hazards involved in collecting and shipping the samples

The following factors must be also be considered:

- Additive/synergistic effects from simultaneous exposure to mixtures of substances with similar toxicological endpoints
- Appropriate adjustments for nontraditional work shifts (e.g., 10- or 12-hour shifts)
- Appropriate Reference Values and Occupational Exposure Limits (OELs) for evaluating results, including Short-Term Exposure Limits (STEL), Ceiling Limits, and Time-Weighted- Averages (TWA)
- Reported health problems and concerns of workers
- Other stressors (e.g., heat, fatigue, noise, ionizing radiation) that may be present
- All routes of exposure (e.g., dermal, ingestion, inhalation).
- Obtaining representative samples using appropriate sample strategy approaches (randomized or worst-case sampling strategies, depending upon sampling objectives)

One sampling strategy will likely not satisfy every scenario, and multiple strategies are often necessary. There are contexts in which the goal is to provide data for developing a "worst-case" or "highest potential exposure" scenario. For instance, limited data may be sufficient to inform judgments about particular exposure situations, help with prioritization for more in-depth evaluations, or identify appropriate PPE. When a more limited sampling approach is used to evaluate a worst-case scenario, one must be explicit about the assumptions inherent in the choices about where and when to sample so that decision makers are aware of the uncertainty associated with conclusions they might draw from the analysis.

For many study purposes, determination of time-averaged air concentrations is an appropriate monitoring goal, and there are many chemical agents and study approaches for which quantitative integrated personal samples are needed. Conversely, some circumstances require instantaneous or near-real-time measurements to quickly assess hazards on the site so that the response can proceed. It is critical to understand the advantages, disadvantages, and limitations of the sampling methodology used. For example, although passive monitors are less burdensome in field conditions, they are not recommended for ceiling or short-term exposure sampling or for collecting unknown organic vapors.

For the purpose of determining short-term peak exposures or for rapid determination of approximate air concentrations, direct-reading instrumentation is useful. Many direct-reading methods cross-respond to multiple chemical agents or other airborne material (e.g., water vapor) and are not agent-specific or quantitative. Direct reading instrumentation is often

used to conduct semi-quantitative area monitoring, or to assess unknown atmospheres for a wide variety of potential contaminants. Information from direct-reading instruments can identify contaminants requiring a more in-depth characterization, target specific job tasks or activities for assessment, and provide trend information regarding contaminant concentrations.

Depending on the purpose of the investigation, it may be necessary to conduct more in-depth sampling and analysis to identify potential chemical interferences that can affect the performance of direct-reading instrumentation. The limitations of these approaches when interpreting results. For example, unless used in a continuous monitoring mode, this type of monitoring only provides a "snapshot" of conditions. Additionally, depending on the direct-reading instrument (e.g., non-specific photo-ionization detector), data interpretation such as specific chemical identity, or interpreting the health consequences of exposure can be difficult or impossible (e.g., mixtures).

Skin contact can be a significant route of exposure that should not be overlooked. Depending on the purpose of the investigation, air sampling may not provide a sufficiently comprehensive characterization of exposure. Skin contact can occur directly or through secondary contact with contaminated tools, work surfaces, or PPE. Methods for evaluating potential dermal exposure typically incorporate both qualitative and quantitative approaches. Qualitative approaches for assessing exposure include observing work tasks/activities, determining protective clothing worn, assessing potential for contact even while wearing PPE, and evaluating decontamination protocols. Quantitative information related to the chemical and physical properties and dermal absorption characteristics of the compounds encountered can also contribute to evaluating potential dermal exposures. Biological monitoring (e.g., analysis of blood or urine samples or exhaled breadth) is available for some compounds for which dermal contact is the major route of exposure. Biological monitoring provides information on the total dose, including inhalation, dermal, and ingestion. Unfortunately, validated biological monitoring methods and applicable biological exposure limits are available only for relatively few agents. Skin exposure assessments through monitoring to assess the amount of contaminant deposited on the skin can be useful for evaluating potential exposure, the efficacy of PPE, and the need for additional controls or changes in

work practices. A number of techniques are available for evaluating skin exposure via dermal sampling. These include wipe sampling, absorbent pad and clothing sampling, and glove/hand wash sampling. Additional information on dermal exposure effects and assessment, including references for additional information, can be found at: http://www.cdc.gov/niosh/topics/skin/. Interpretation of dermal exposure assessments and biological monitoring can be difficult, and it is critical to have a well-developed plan with standardized assessment approaches. Selection of the method of assessment should be consistent with the purpose of the investigation.

7.2 Integration into ERHMS—Types of Exposure Assessment Determinations

Assuming understanding of the basic methodology described in the Appendix B, exposure assessment should be integrated into ERHMS. There are three decisions, as described in the Appendix B, that safety officers, industrial hygienists and other public health professionals ascertain from the assessment process: (1) acceptability of exposures, (2) unacceptability of exposures, and (3) uncertainty of exposures (which requires further information gathering).

7.3 Acceptability of Exposures

Exposures are acceptable when either quantitative or qualitative assessment methods deem a job or task as having exposures below a pre-determined occupational exposure limit (OEL). Although professionals should continue to assess exposures as

they may change, usually no additional controls to reduce exposures such as engineering controls (e.g., ventilation), safe work practices, or PPE are necessary. Continuous assessment of exposure hazards to determine if additional environmental sampling is needed is important because conditions in any incident response may change. New hazards may be discovered or more complex operations may introduce higher potential exposures than in early operational periods.

7.4 Unacceptable Exposures

Unacceptable exposures are those exposures that exceed or will exceed (if a job or task continues) predetermined OELs. Unacceptable exposures imply an added health risk to the affected responders, and therefore, some control measures are required to reduce responders' exposures to acceptable levels. Ideally, hazards identified in an incident response should be eliminated or minimized immediately, but often, the hazards are an inherent characteristic of the response (e.g., continuous smoke plumes from the World Trade Center smoldering weeks after the 9/11 tragedy). Under these circumstances engineering controls, administrative controls, and personal protective equipment (PPE) are often utilized to minimize exposures.

7.5 Uncertain Exposures

Uncertainty surrounding the exposure assessment occurs when not enough information is available to make a judgment about health risk. Often, complex or mixed exposures fall into this category. Although individual exposure constituents may not exceed OELs, the complex mixture may pose a threat. Exposure assessments deemed uncertain may also result when the toxicity of the hazard is unknown or when safe limits for exposure have not been established. This determination does not mean that there is no existing or future hazard, but rather it means that additional information gathering, including additional exposure monitoring, medical monitoring, or biological monitoring, is warranted before a determination about the exposure can be made.

There may be opportunities to perform dose reconstruction based on limited field quantitative data. This effort requires a more in-depth analysis involving the kinds of techniques in designing exposure reconstruction models.

A holistic approach to investigating and understanding the impact of exposures on responder health should be adopted—one that does not rely on environmental results alone to determine risk. Information must be gathered from a variety of sources, discussed in other sections of this document, to determine if exposures occurred, who may have been exposed, and who needs medical treatment (See Post-event Tracking Section for discussion on the decision making process.)

7.6 Documenting Responder Activities

Depending on the type of response, no IH sampling may have been completed or multiple groups, including contractors, members of the private sector, or federal agencies, may all conduct industrial hygiene sampling. If IH sampling is conducted to assess responder exposures, at a minimum the following information should be collected and documented in a systematic fashion and included in external, investigative reports:

- Date, time, location (e.g., GPS coordinates), photos (if feasible), name and contact information of individual collecting the sample
- Background readings, locations, and number of samples taken
- The activity/task being evaluated (e.g., designated category, consistency with a "normal" work day), number of workers exposed, job description of worker being monitored, length of task, length of shift
- For direct-reading or area samples, location of sample
- Chemicals monitored, volumes/concentrations in use, other hazards present
- Controls in place, including engineering, administrative and/or PPE used
- Frequency and duration of activity
- Environmental conditions (wind, temperature, humidity)
- Sampling details (calibration, flow rate, sample duration, media, lot number, sample type [area, personal], sample and lab numbers, blanks submitted, qualitative, quantitative, direc-treading, etc.)
- Quality Assurance/Quality Control
- Record of all personnel sampling devices and readings
- Data, which must be converted to the same units of measurement
- Analytical method reference number

- Reference OEL (TWA, STEL, or Ceiling)

In recent years, it has been common practice for groups that have conducted environmental sampling to post their results on public websites. There is generally no group that oversees and consolidates the sampling results. Therefore, sharing sampling results in a public forum is particularly helpful during large responses when multiple groups conduct sampling. Examples of both NIOSH and OSHA sampling results from the Deepwater Horizon response can be viewed at http://www.osha.gov/oilspills/index_sampling.html and http://www.cdc.gov/niosh/topics/oilspillresponse/gulfspillhhe.html. Ideally, these raw data should be linked to a more detailed public-access sampling report, which can provide more detail regarding work activities, field observations, and measures implemented to protect responders.

It is generally cost-prohibitive to sample all workers, therefore, responders can be categorized into similar exposure groups (SEGs—described the Appendix). SEG's are usually defined observationally and assume similar exposure profiles for the contaminants because of the similarity and frequency of worker tasks and performance methods, materials, and processes. Data about jobs, processes, tasks, control equipment, and materials used are considered when dividing workers into SEGs. Identifying and assigning responders to a SEG is also a helpful tool to better understand responder activities and to help identify trends of injury or illness among specific SEGs.

In addition to exposure data, other types of information may be collected during a response that can help contribute to understanding specific responder activities. Response workers can be assigned daily work tasks via the use of job tickets or a mission assignment. These job tickets or mission assignments may document personnel assigned to the task and can be reviewed and used to identify what work activities were completed. Daily log-in sheets and/or a badging system can be used to confirm where responders worked and what they did during their shift. Additional documents that are developed as part of the response effort, including hazard and risk analysis documents, Incident Action Plans for each operational period, and site safety plans, should be reviewed and factored into the post-event surveillance to determine anticipated health effects associated with known response exposures that may occur among the event responders. For historical purposes, retaining documents such as the Incident Action Plans, Hazard Risk Analysis and Site Safety and Health Plans are good in order to link surveillance data to past incident tasks.

7.7 Measures to Control Exposure, Including Personal Protective Equipment (PPE)

Due to the unpredictable nature of emergency responses and difficulties in implementing other types of controls, PPE is often the most utilized control measure. However, appropriate PPE may not be worn in the initial phases of the response because it is unavailable or was not known to be needed. PPE, particularly respiratory protection, is burdensome to wear, may not be easily accessible, aggravate other hazards (e.g., heat stress), and can interfere with communications. This can result in poor adherence to PPE wear by responders. Therefore, it is important to verify that the PPE recommended is consistently and correctly worn by responders, and change schedules for recommended PPE are clear and appropriate.

First, PPE recommendations must be determined. These recommendations can be found in the health and safety plan (HASP) or site safety plan (SSP) that is developed by the IC (See Box 1 on page 37). During the 2010 Deepwater Horizon response, a PPE matrix was developed that provided specific recommendations by work task. The next step is to understand if PPE was issued and consistently worn by responders. Logistics records can be reviewed to identify the types of PPE, including make and models of respirators, and how much PPE was ordered. Evaluating the quantity of PPE ordered and the frequency of re-ordering can help in informing how much PPE is consumed. Equipment check-out lists can also be used to determine who received PPE.

In addition to PPE, other types of controls may also be implemented. Policy memorandums or safety and health bulletins can be reviewed to determine what types of administrative and engineering controls were recommended. As the event progresses, new controls may be recommended as hazards are identified. It is important to note when such controls were implemented, as it affects the responder's entire exposure profile. Review of event and response activity timelines, often developed by the Operations Section, can also contribute to controls monitoring.

Another important tool for verifying use of controls is through direct observation in the field. The site

Box 1. Health and Safety Plan (HASP)

The HASP is a document that provides overarching requirements for an emergency response and sets a baseline for worker safety and health protection. Individual agencies and contractors are responsible for developing HASPs specific to their operation for the protection of their own employees.

The HASP is developed using basic risk management principles to provide for the greatest level of protection for the greatest number of workers at risk. Specific operations or locations that contain actual or potential hazards not considered in the basic plan may require greater levels of protection. It is incumbent on each agency or contractor to have a competent person conduct a job hazard analysis (JHA) prior to commencing work. It is also incumbent upon each agency to review their HASP on an ongoing basis to be sure that it reflects the latest information available regarding workplace hazards. The ERHMS system can serve as a mechanism for collecting the type of data that can provide feedback for updating the HASP, such as ongoing exposure assessments, health monitoring of responder groups, and trends found in injury and illness surveillance.

This HASP follows the basic principles outlined in OSHA's Safety and Health Program Management Voluntary Guidelines, which are as follows:

- Management Leadership
- Worksite analysis
- Hazard prevention and control
- Safety and health training

safety officer or contractors may conduct site health and safety audits to determine if proper protocols are followed. Written reports from these site audits may be generated and could be reviewed, if available. Alternatively, simple site checklists may more often be used given the time constraints associated with writing a report. Review of checklists that describe workplace information, job tasks, PPE, and work hours would also help describe work activities. Two checklists (provided in the Tools section) were developed by NIOSH during the Deepwater Horizon response and served as a quick method for describing the staging areas that were visited by NIOSH personnel.

A careful review of the check-in, check-out, and training records of the specific event can provide additional documentation on the work activities of the responders. Information about the responders' work activities, taskings, or assignment may be collected during the check-in or badging process. Additional information regarding work activities, taskings, assignments, PPE usage, and other control measures may be incorporated into a formal demobilization process. Special training may be required before certain job tasks are performed. As a result, training records may also provide details on responders' activities.

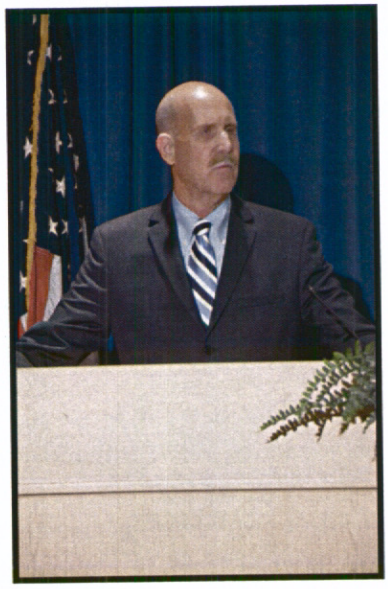
8. Communications of Exposure and Health Monitoring and Surveillance Data During an Emergency Response

Practical Summary

What is the purpose of this section?

This section of ERHMS guidance focuses on the challenges involved in maintaining smooth and open lines of communication between the ICS command, federal/state/local authorities, the emergency responders and volunteers involved in the response, the media, and the public.

Communication is critical throughout the course of an emergency response. This section focuses on the communication of health monitoring information and surveillance data. Many parties are involved in the response effort, from local and state governments to multiple federal agencies with differing missions—protection of worker health and safety, protection of the environment, protection of volunteers, and protection of the publics' health. Fire, police, and other response organizations add to the scope of this complex of responding entities, along with the media who document the activities for reporting to the general population. The scope of communications in an emergency response has many facets, including psychology (phase-dependent), messages (content, timing), audiences, and spokespersons. This type of information is described elsewhere and is not the focus of this section (See Communications Tools Section). Although it is common/typical for organizations to track and report data they are collecting within their own operational structures, the need for tracking and communicating more broadly than a single organization is key to informing responders (e.g. workers, contractors, volunteers) about pro-active steps they can take to protect themselves from hazardous exposures while attempting to protect the environment, identify survivors, or recover those who have died.



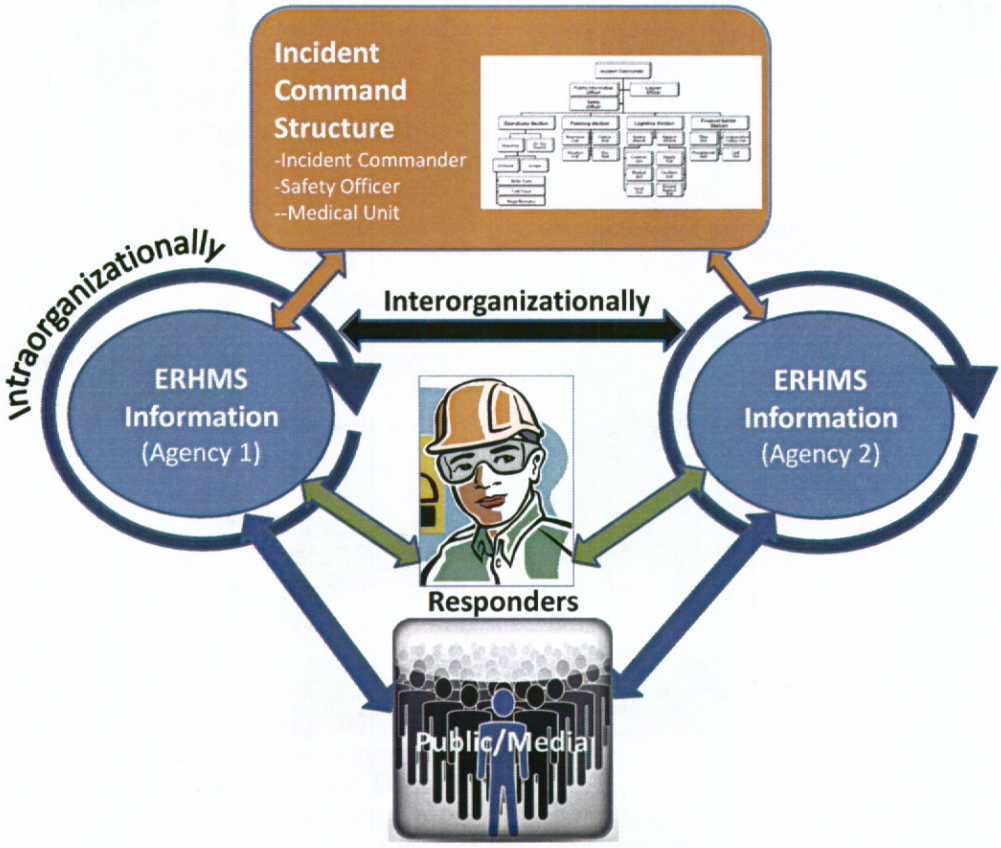
Dr. John Howard, NIOSH Director, communicating to stakeholders

The collection of environmental exposure data and individual health and safety monitoring data, along with aggregate surveillance data are relevant to protecting all the responders involved in an event, both in the short-term and long-term, but it is not an end unto itself. This information must be communicated to workers, intra-organizationally, inter-organizationally, and within and outside the ICS structure. The schematic in Figure 1 depicts the flow of communication to responders, intra-organizationally, inter-organizationally, within the ICS structure, and to the public and media. Lines of communication should be developed internally within different groups or divisions within organizations, as well as across agencies whose missions span the scope of the emergency.

8.1 Communication to "Workers" (includes volunteers, contractors, emergency responders, and skilled support personnel)

- Data use disclosure forms: When directly surveying workers or collecting biological samples from them, be sure to hand out something that explains what is being done, what the data will be used for, how data will be protected, and contact information (see tools for sample data use disclosure form). Often, data are reported publicly in de-identified, aggregate information.
- Consent forms: These may be needed in some situations, depending on the types of proce-

Figure 3. Communication Flow



dures performed. An organization's attorney can provide more information.

- Personal exposure or monitoring results: Results of any personal exposure sampling or medical monitoring should be provided directly to the worker along with an interpretation of what the results mean and whether a referral for additional testing is necessary, along with contact information.

8.2 Intra-agency/Organizational Communication

Environmental, biological, and exposure data are frequently collected and stored within the divisions or groups within agencies (local, state, federal) or organizations that collected them and are not likely to be stored in a centralized database. However, guidance on the need to communicate information about environmental sampling, exposures monitoring, and tracking of injuries and illnesses should include common elements:

- Disseminate timely, accurate information to industrial hygiene (IH), medical and surveillance personnel, and organizational decision makers involved in the response effort.

- Use periodic meetings, phone calls, or internal Web pages to share information on a periodic/real-time basis with relevant internal groups (IH, medical, and surveillance). This will connect all the parties involved in the response effort by providing current up-to-date information on findings and recommendations related to the safety and health of responders.

- Designate a safety and health officer who will communicate this information to the field as well as up the management structure of the organization for decision makers.

- Require that a contact/distribution list for all critical local, state, and federal public health authorities along with medical, law enforcement, and emergency management personnel be developed, distributed as necessary, and verified at least monthly/weekly.

- Include provisions to disseminate information rapidly about industrial hygiene data and worker health within the organization and to the safety officer designated within the ICS structure.
- An Emergency Communications Plan must cover internal and external communications, therefore it should accomplish the following:
- Describe the organizations capability to alert and communicate with its emergency response personnel.
- Identify, by title, the person and alternates authorized to communicate and receive emergency response information.
- Develop communication plans that contain procedures for periodic testing of primary and back-up emergency communications links within the organization so that any issues pertaining to worker protection are maintained with back-up support.

8.3 Inter-Agency Communication

In large events where multiple agencies are involved, inter-agency communication is particularly important. Here are several principles to keep in mind when communicating across agencies:

- Send a unified message. Ideally to accomplish this, it is good to have a central website or source where all information from different organizations can be posted on a topic. However, this is not always an option. When possible, put as much information in one place for your users to access it. Having multiple websites on one topic can be confusing and cumbersome to maintain.
    - In recent years, it has been common practice for groups that have conducted environmental sampling to post their results on their own public websites. There is generally no group that oversees and consolidates the sampling results. Therefore, sharing sampling results in a public forum is particularly helpful during large responses when multiple groups conduct sampling.
    - Examples of both NIOSH and OSHA sampling results from the Deepwater Horizon response can be viewed at http://www.osha.gov/oilspills/index_sampling.html and http://www.cdc.gov/niosh/topics/oilspillresponse/gulfspillhhe.html.
    - Ideally, this raw data should be linked to a more detailed public-access sampling report, which can provide more detail regarding work activities, field observations, and measures implemented to protect responders.
    - When appropriate, these reports should indicate that this is preliminary interpretation of available data and to note important limitations in the available data.
- Write clearly and avoid any internal jargon or acronyms. Because other organizations may also use your information, the clearer your information is the less room for error there is.
- Keep information organized and secure. If you are collecting information, it is important to keep that information organized and secure (if working with sensitive information). Often emergency response sites are not secure locations. Identify in your emergency response plan a system for where to keep that information and who should keep it.
- Meet deadlines. Especially in emergency response, it is important to meet deadlines set by the agency/organization, or chain of command. Thus, when submitting information, do so by the designated date and or time. Also remember any additional clearance channels and account for that in the timeline when working under a deadline.

8.4 Public/Media Communication

During emergency events, personnel who do not usually do so have to field media calls and questions from the public. Several key points should be kept in mind:

- Identify media contacts and/or instructions for responding to media requests. Relevant data collection may be conducted by more than one agency. Agency public affairs/press officers should communicate regarding the availability of data and reports by their respective agencies.

- In addition to those in the chain of command, it is good to know the communication contact.

- The CDC Emergency Response Team Handbook lists the following steps for media contacts:

    - Determine media needs and coordinate with media representative
    - Answer media questions and calls
    - Refer media to other contacts/information
    - Direct media to staging area
    - Escort media to scene if appropriate
    - Document media calls

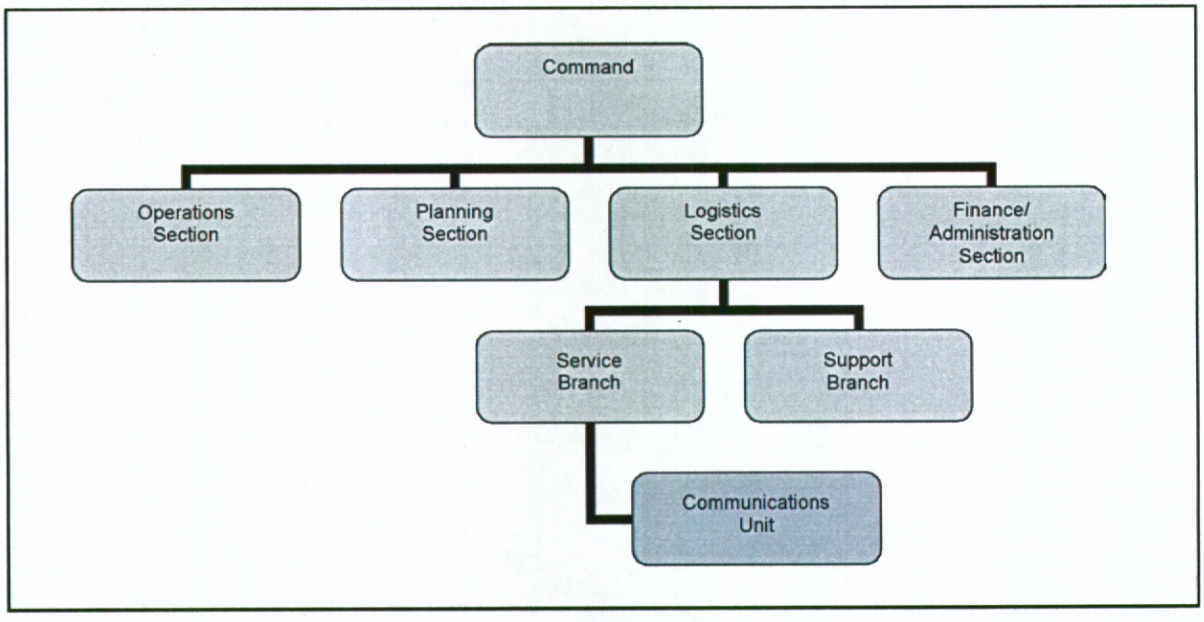
8.5 Communications Within the Incident Command System

The Incident Command System has evolved to serve domestic emergency response needs, including communications. Communications within the Incident Command System follow basic principles, practical tools and a definitive structure for supporting communications needs during an emergency response (see Issue Brief tool).

Ideally, each organization should have a designated safety and health official who shares the exposure and health monitoring and surveillance data with the Safety Officer in the ICS. The value of this communication serves to provide up-to-date information on the health status of the emergency response workforce to the Incident Commander overseeing all aspects of the response and helps pinpoint situations where imminent dangers or excessive exposures may warrant changes in personal protection, removal of workers, or collection of additional information. The ICS establishes the ability of responders to work together across agencies during emergency incidents of all types. Those communications must follow an organized command structure that establishes roles and responsibilities and well-understood mechanisms for managing the complexity of a multiagency response. Communications interoperability means more than just the technical capacity for emergency responders to talk to one another.

The key to good communications is integration of operations with supporting systems comprising people, procedures, and technologies, all of which need to be communicated within the ICS, throughout and across responding organizations. Well used, communications provides a necessary means of support of emergency response throughout the duration of the response.

Figure 4: Location of the Communications Unit in the ICS Organization [U.S. Department of Justice, Community Oriented Policing Services (COPS) 2007].



Post-Deployment Phase

9. Incident Personnel Out-Processing Assessment

Practical Summary

1. **What information and data is needed for this section?**

   Information that needs to be collected includes any pertinent data, based on the guidance below, which describes the general post-event status of incident personnel (Verify identity and contact information, usual work, and special needs. Collect response related work, known hazardous exposures/conditions, qualitative questions, injuries, and current health complaints). See Out-processing Tools section.

2. **Who will collect and maintain this data in the post-deployment period?**

   Data collection will typically be overseen by those managing the safety of personnel during an incident (within ICS, it is under the purview of the Documentation Unit leader and is coordinated with demobilization through the Logistics Section). A designated custodian of the data should maintain the database once the ICS structure is disbanded. This custodian could exist either in the form of a central repository for all personnel involved in the response (designated by the ICS prior to disbanding), or may be a de-centralized activity such that each responder organization serves as the custodian for the out-processing data for their personnel.

3. **Where and in what form will this information be stored?**

   This information will be stored by the designated custodian of the data. It will be contained in questionnaires (paper or electronic) that were administered to incident personnel through the Safety Section.

4. **When in the post-deployment period should this information be gathered?**

   This information should be obtained from incident personnel shortly before, during, or shortly after demobilization.

5. **What is the intended use of this data/for what purpose is this data collected?**

   Information obtained during the out-processing assessment is intended to help determine the extent, if any, to which individual responders have been adversely affected by their work and to assess trends within the population of workers for the purpose of identifying potential risks to others. See the Post-event Health Tracking section for more information regarding the role that out-processing data plays in the decision regarding the appropriate form of post-event health tracking that may be conducted following an emergency response.

This section has been created to provide guidance and general principles surrounding the concept of an out-processing assessment, along with some examples. Out-processing in this context is defined as the process by which responders formally complete their duties and are allowed to return to their place of home. Out-processing assessments are conducted to document incident personnel status at the conclusion of their response duties and determine the extent, if any, to which individual responders have been adversely affected by their work. This will enable one to identify health trends within the population of workers and help assess and identify potential risks to others.

When conducted, out-processing assessment would be overseen by the person managing the safety of personnel during an incident (within the Incident

Command System structure this would be under the purview of the Safety Section and coordinated with demobilization through the Logistics Section). Out-processing is scalable and could involve collecting more or less information than shown here depending on the size, duration, resources, and health concerns of a specific response. Information collected could also be affected by the type and amount of information already collected for the pre- and during-deployment phases of a response (see previous sections). If information from all phases of a response could be merged together and used in its entirety to address post-deployment concerns, duplicate information would not need to be collected. However, to match each responder with previously collected information, a minimum number of matching variables across databases would be required for each responder.

Conditions encountered by incident personnel may involve complex, uncontrolled environments possibly involving multiple or mixed chemical exposures, hazardous substances, microbial agents, temperature extremes, long work shifts, or stressful experiences. Therefore, all incident personnel should receive an out-processing assessment as part of the demobilization process, or as soon as possible after demobilization. Ideally, the out-processing assessment would be a face-to-face interview in the field as incident personnel are preparing to depart back to their routine duty station. However, most often resources and the strong desire of personnel to return home without delay make this an impractical format. Other good options would be different formats (paper, website, or phone interview) or conducting the assessment 1 to 2 weeks before or after demobilization. Regardless, the out-processing assessment is a chance to provide closure from a psychological perspective and lessons learned from an operational standpoint. This process protects worker health by assisting in the timely identification of work-related conditions in workers that might benefit from preventive measures (monitoring or surveillance) or need medical or psychological care. During demobilization is also an appropriate time to disseminate any informational documents regarding self monitoring for future health concerns (including emotional and behavioral health) related to the specific incident response or to incident response in general (see Tools Section T9—Welcome Home Letter).

The out-processing assessment is the minimum post-deployment evaluation that should be conducted for incident personnel. Some incident personnel, because of their regular employment, will already be part of a more comprehensive post-deployment evaluation program (monitoring or surveillance). Also, those incident personnel who were most likely exposed to hazardous agents or conditions or reported outbreaks of similar adverse health outcomes during deployment are often predetermined to need a more comprehensive post-deployment evaluation program [OSHA 2009]. The out-processing assessment will serve as a brief assessment for those with no or minimal work-related problems and as a mechanism to assist in identifying those who might need more comprehensive post-deployment evaluation.

NIOSH staff person, CDR Jennifer Hornsby-Myers, speaking to a worker during the Deepwater Horizon Response

Out-processing assessment is a mechanism for those managing an incident to evaluate post-deployment physical and mental health status of incident personnel and should be simple, concise, and standardized. It is an opportunity to verify the accuracy of already captured information and to collect additional information to define assigned task or role, dates and location of work, whether injury or illness occurred during deployment, current health complaints, and contact information for the next 6 to 9 months. The key issue is to capture information that will enable appropriate assignment to a tracking

option (ssee Section 10—Post-event Tracking of Emergency Responder Health and Function). This information is used in conjunction with pre- and during-deployment data to detect possible adverse mental or physical health effects related to work or exposure, identify those who need further medical evaluation or medical treatment, and monitor developing trends and patterns of illness or sequelae to injury or exposure among incident personnel. Follow-on health surveillance or epidemiological studies can be conducted afterward, as needed.

9.1 Suggested Information to Gather During Out-Processing Assessment (if not already obtained)

Personal Information [NIOSH 2010a]

Verify identifying and contact information

- Name
- Address
- Phone number(s) (work, home, cell)
- E-mail address(es) (work, personal)
- Age, date of birth
- Sex
- Unique identification number (e.g., Social Security Number or uniquely assigned number; must be consistent with unique identifier used before and during deployment)
- Contact information for someone who will know where the worker resides 6 months after demobilization (if not previously obtained elsewhere)
- Response organization
  - Indicate employer or volunteer organization
  - Name and address
  - Contact person's name, phone, and e-mail

Verify (if data available) usual work

- Industry
- Occupation
- Job tasks
- Number of years

Verify special needs

- Primary language

Response-related information

Response/recovery work

- Type of response/recovery work performed
- Circumstances under which work was performed
  - Geographic location
  - Dates and times (at least shifts worked) work was performed

Known hazardous exposures or conditions

- Type of exposure or conditions (if known)
- Work practices
- Measures used by incident personnel to protect themselves from dangers of any kind (e.g., personal protective equipment listed so it could be checked off by the person being assessed)

Qualitative questions

- Did you have adequate training on safety and health issues relating to your work?
- What were the most positive aspects of this deployment for you?
- What were the most difficult aspects of this deployment for you?
- Do you have any suggestions for things your organization could do differently for future deployments?
- Do you have any concerns about your own well being as you leave?

Injuries sustained or illness symptoms experienced during response/recovery work

- Goal: use the correct number and type of questions to raise clinical suspicion for referral rather than render an accurate diagnosis
- Injuries
  - Description of injury
  - Complete resolution vs. still present
- Health complaints
  - Current health complaints
    - Use standardized list by general body system including emotional and behavioral health (anxiety, mood, altered behavior, sleep problems, substance abuse, PTSD, and depression)
    - Use only as trigger questions for follow-up
    - Include query about urgency to evaluate the need for more immediate health evaluation referral
    - Potential sources of questions: Deepwater Horizon Response Survey, Army's Post-Deployment Health Assessment (See Out-processing Tools section)

- New vs. exacerbation of preexisting condition

9.2 Management of the Out-processing Assessment

Many factors should be considered before launching an out-processing assessment. Before creating an assessment tool, you should have clearly stated objectives; this will ensure that your assessment collects the appropriate data to address the questions you want answered. Additionally, make sure there is adequate funding and personnel to facilitate the analysis, interpretation, and reporting of results of the assessment [NIOSH 2010a].

Confidentiality of the data is a significant concern. Policies and procedures for the monitoring of privacy, confidentiality, and data security should be established beforehand. There should be a program administrator and a designated custodian of the data collected, and it should be clear who is allowed access to the data and what the procedure is for granting access to de-identified data to outside parties (e.g., public health, academia, media, labor unions, and attorneys). Training in accurate data collection, privacy, and confidentiality policies should be conducted for the medical or public health personnel who will be conducting the assessment, and the location where the assessments are conducted should have enough space for privacy.

In the interest of the workers, data collection should be done during or as close as possible to demobilization or as soon as possible after demobilization, and the data collection location should be convenient for the workers to access. Finally, provisions should be made for prompt and effective referral for more definitive evaluation and possible treatment of workers identified with emergent problems.

10. Post-Event Tracking of Emergency Responder Health and Function

Practical Summary

1. **What information and data is needed for this section?**

   Information that needs to be collected includes any pertinent data (pre-, during-, and post-deployment), based on the guidance below, which describes the detailed post-event health status of incident personnel or categories of incident personnel. See Post-event Tracking Tools section.

2. **Who will collect and maintain this data in the post-deployment period?**

   Data is collected, updated, and maintained by the appropriate members of the ICS command and the entity charged with the health tracking mission.

3. **Where and in what form will this information be stored?**

   This information will be stored in paper or electronic formats by the entity charged with the health tracking mission. Information could be found in medical records, questionnaires, hazard evaluations, evaluation of control strategies, and epidemiologic studies of injury and health complaints.

4. **When in the post-deployment period should this information be gathered?**

   Post-deployment data should be obtained from incident personnel as close to demobilization as possible then repeated as prescribed by the post-event tracking system established.

5. **What is the intended use of this data/for what purpose is this data collected?**

   Provide the information necessary to determine whether further health tracking is warranted after incident personnel complete their work, and if so, what type of tracking would be most appropriate.

Because of potential health and safety risks inherent in emergency response work, post-event tracking of responder health may often be appropriate. The goal is to identify adverse health or functional consequences potentially associated with response work (i.e., exposure, illness, injury, or disability—including emotional trauma) and to intervene early to maximize the chances for recovery and to stop further exposure (e.g., through exposure control or medical treatment) for workers remaining on-scene. A critical function of the ERHMS system is to provide the data necessary to determine whether further responder health tracking is warranted after responders complete their response work, and if so, what type of tracking would be most appropriate. The decision to opt for further tracking should be based on a wide variety of factors, including (1) information regarding responder's hazardous work exposures, (2) hazardous work activities, (3) concerns expressed by the responder or safety and health personnel, (4) the adequacy of control measures (and appropriate adherence), and (5) injuries and illnesses incurred during the deployment. Such information should be viewed in the context of the workers' prior physical and mental health status, and the extent of their prior knowledge and experience with disaster work. Much of this information should be available through the various facets of the ERHMS system if they

were maintained and utilized both pre- and during-deployment, and this information should be available to appropriate members of the ICS command (e.g., the safety officer or medical unit). This information should also be verified (or "confirmed") and supplemented during the out processing for all responders as they complete their deployment activities (see previous section—Out-Processing Assessment). Post-event tracking of health may be difficult or costly to perform on a case-by-case basis, and it is often more suitable for such decisions to be made for categories of responders with similar exposure histories. High-priority worker groups for post-event health tracking would include those most likely to have exposures to hazardous agents or conditions and those reporting outbreaks of similar adverse health outcomes. Public health criteria, such as frequency or likelihood of adverse health effects; their severity, preventability, or communicability; public interest; and cost effectiveness, are often useful for setting health tracking priorities.

Figure 5 illustrates the decision process regarding post-event tracking of health within the context of the ERHMS system. The central facet of this decision process is the blue diamond labeled "Exposure and Health Analysis." This is a function that should be assigned to a component of the ICS command that contains professionals with backgrounds in disciplines such as occupational medicine, mental health, epidemiology, and industrial hygiene (for example, medical unit and/or safety officer). Utilizing an array of data from various components of the pre- and during- deployment portions of the ERHMS system, the exposure and health analysis is the crucial step that determines whether there is a need for post-event tracking of responder health, or whether more information is needed to make this decision.

Exposure and health analysis is aprocess which attempst to identify groups of responders (subpopulation level) that share common exposures or proxies of potential exposure (like job tasks or specific site location/time) in order to determine which groups of workers would benefit from post event health surveillance. As more exposure information is gathered during the response, responder groups identified for post event surveillance may be altered or new subgroups may be determined as responders cycle in and out of the incident operation. Therefore, the exposure and health analysis process is not typically a one-time event, but rather an ongoing process. The analysis may be influenced by factors such as event duration, cycling of the response workforce, and stakeholder/political considerations. Every response event is not likely to require active post-event health tracking, or it may only involve a small number of response workers; however, this ought to be determined by a systematic and deliberate synthesis of available information. It is much more difficult and costly to try to reconstruct this information well after the fact, and equally difficult to identify and locate the specific sub-population of response workers who may share the same risk.

The first step in the decision process is to obtain a complete roster of all those responders who have deployed to a response, including all contractors, sub-contractors, and volunteers. The members of this roster should all be included and accounted for within the various Incident monitoring and surveillance systems conducted during incident operations. These data should include (1) medical monitoring data; (2) injury and illness surveillance data; (3) exposure assessment data; (4) environmental sampling data; (5) records of responder work assignments during the event; (6) training; (7) PPE use; and (8) other indicators of responder safety and health obtained during the response, such as documentation of safety compliance.Final elements to be included in the tracking option decision are the data obtained from responders when they are leaving this assignment (i.e., during their out-processing), which should include information obtained by interview or survey (See Out-processing Assessment section).

Once collected, the data from the pre- and during-event portions of ERHMS can be organized into three basic areas of analysis to assist the post-event tracking decision, as defined in the following outline:

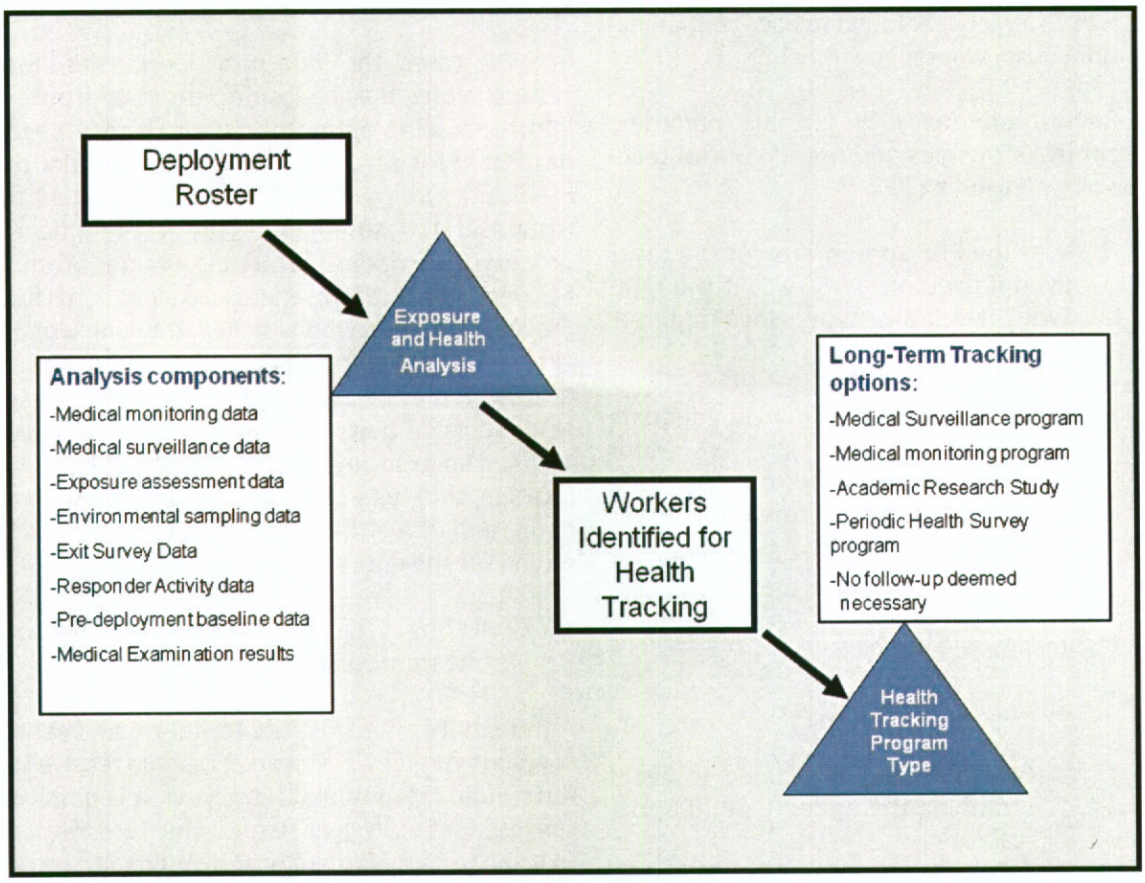
I. Evaluations of hazardous exposures, incidents, and activities

   a. Review toxicity of identified hazards (Note the seriousness and acuity of health consequences, including radiation dose rates.)

   b. Review environmental and occupational sampling data (Note the level of potential exposure, including radiation dosimetry.)

   c. Review available guidelines on exposure limits (OSHA requirements, NIOSH criteria documents, ACGIH recommendations, NRC and EPA criteria for radiation, and interna-

Figure 5: Flow of information leading to decision options and initiation of post-event health monitoring and surveillance. (Pathways leading to definitive medical care are not depicted)



Key: blue diamond = decision point; black box = information about responders

tional criteria from WHO, Health Canada, or other similar agencies)

d. Review available reports and check with key informants for evidence of job stress issues and performance problems
   i. Workload, shift schedules, and work-rest cycles (fatigue, burnout)
   ii. Control over workload, work pace, job design, or scheduling
   iii. Clarity and simplicity of lines of authority, supervision, and reporting
   iv. Adequacy of resources to get the job done
   v. Psychologically traumatic exposures (e.g., witness death or serious injury of coworker, serious injury to self, mass mutilation—especially to children)
   vi. Degree of alignment between a worker's training and experience and the assigned task or role (i.e., forced to perform tasks or take on roles without adequate training or experience, such as having to manage distraught residents or family of victims)
   vii. Safety climate (i.e., degree to which workers perceive that job safety is valued by line supervisors and managers; may be gauged at all levels of an organization and across worker groups)

e. Review of clinical and scientific literature (epidemiologic reports, clinical case series and reports, animal studies for dose-response relationships)

II. Evaluation of adequacy of control strategies

a. Known control technology failures?

b. Decontamination issues (e.g., for radiation—was a worker ever found to have contamination? If so, where, how much?)

c. Review adequacy of training regarding control strategies and use of control technology, including PPE

i. Was the PPE appropriate for the task? Even if used properly, was it the right type? (respirator type, glove material, etc.)

ii. Were administrative controls adequate—especially things like respirator cartridges without end-of-service life indicators, glove permeation times versus wear times, etc.?

d. Review responder adherence to control technology and strategy

i. Adequate supply and access?

1. Was PPE clearly labeled to avoid grabbing the wrong type (if applicable)?

ii. Known breaches of PPE or problems with adherence to safety protocols?

III. Epidemiologic review of injuries, illnesses, and mental health or performance problems among responders during the event.

a. Sentinel events—a single event spurs further investigation about uncontrolled hazards (e.g., elevated blood lead level, asphyxiation in a confined space)

b. Troubling trends/patterns

c. Notable deviations of responder health status from their pre-event baseline (obtained from pre-event databases).

d. Uncontrolled hazardous or psychologically traumatic exposures which may have caused a subgroup to experience sub-acute, latent, or long-term health or functional consequences. The subgroup would be defined by a common exposure or work history.

10.1 Medical Screening Exams

In some cases, the data provided by the ERHMS system, alone, may be insufficient to appropriately inform tracking option decisions. It may become necessary for certain groups of responders to be medically screened after they have finished their response work to augment the tracking decision process. The medical screening evaluation should be conducted by an experienced occupational health provider (i.e., one who is skilled at taking work and exposure histories in addition to medical/psychiatric history). It may be helpful to examine key individual responders who may represent a group of workers with similar exposures or work histories (e.g., timing, location, and type of work/tasks at a defined incident); and utilize these findings to select a tracking option for the entire responder subgroup.

10.2 Potential Triggers for Post-event Tracking of Responder Health

Although it is not possible to define all events or conditions under which workers should receive some form of post-event health tracking, it is possible to suggest a set of "trigger" issues which are most likely to activate some form of post-event health tracking. These triggers can be arranged into three broad categories:

1. Triggers that can be anticipated before an event, including those hazardous events or exposures that are common to emergency disaster response;

- Established or suspected hazardous exposures with known sub-acute, latent or long-term health effects (see Box 1)

- Responder groups that typically require medical monitoring during a response due to the hazardous nature of their activities, or due to OSHA, USCG or DOT regulations.

- Responder groups with preexisting vulnerabilities that put them at increased risk for adverse health outcome (such as language difficulties or other cultural differences).

2. Unforeseen triggers that arise or are identified during the event

- Patterns of injury, illness, or performance during deployment that raise concerns about subacute or latent health consequences (i.e., those that may be related to response work and emerge weeks, months or years after the incident is over).

3. Triggers arising from academic/research areas of interest

- Example: National Occupational Research Agenda (NORA) Emergency response research priority areas (to fill gaps in scientific knowledge) [NIOSH updated 2009]

4. Triggers arising from socio-political considerations (e.g., beliefs about harm or resource disparities)

As the tracking-option decision process determines that post-event tracking is warranted for certain responders or responder subgroups, these responders are then placed into a centralized listing that is labeled as the "Ongoing Tracking Group" in Figure 5. This list is maintained and updated by the appropriate members of the ICS command and the entity charged with the health tracking mission. Those identified for inclusion in the "ongoing tracking" group form a cohort of workers that will be invited to participate in either health surveillance or monitoring activities for a defined period of time.

Post-event health monitoring and surveillance are two different but complementary methods that can be used when ongoing health tracking (including symptoms, defined medical, or mental/behavioral health conditions and injuries) is advisable after an emergency responder concludes his or her incident work. Health monitoring refers to ongoing and systematic clinical evaluation of an *individual* responder's health status. The medical monitoring process involves a professional medical and/or mental health evaluation that addresses current and past medical and exposure history, pertinent clinical examination, and testing. The focus is on assessing the individual worker for changes in health status or emergence of conditions that could be attributed to his or her deployment exposures or experiences. Once a baseline health status has been established, participants in such a program

Box 1. Factors in Assigning an Employee to a High-Risk Group for Medical Monitoring

- Type(s) of exposure
- Dose or level of exposure
- Duration of exposure*
- Likelihood of exposure
- Consequences of exposure
- Anticipated frequency of exposure

*Short-term, high-level exposure may result in different clinical outcomes than long-term, low-level exposure.

are periodically re-examined for changes in health status. The monitoring function is sometimes initiated during incident operations based on responder vulnerabilities and risk of hazardous exposure, and needs to be tailored to protect the responder and the operation (see Deployment section). However, continuation of monitoring or initiation after the responder completes his or her incident work usually involves a different protocol and focuses on evolving or latent health effects from suspected incident exposures.

Surveillance refers to the ongoing and systematic collection, analysis, interpretation, and dissemination of illness and injury data related to an event's emergency responder population as a whole. This allows for the tracking of emergency responder health (illness and injury) trends within the defined population following a response. However, if incident activities are still in operation with new responders, then aggregate or sentinel findings from demobilized responders should be reported back to the incident safety officer to inform preventive action for those still deployed at the incident location. A mechanism to allow tracking should be an integral part of the response to any event.

10.3 Program Considerations

Health surveillance and medical monitoring programs should be carried out under the supervision of qualified health and scientific professionals familiar with occupational and psychological health, toxicological

principles, injury/disability, surveillance methods, and data management and analysis techniques. Development and direction of such programs ought to consider input from key stakeholders, representing the interests of the affected workers (e.g., labor union or trade association), and other interested parties. In constructing a program, the following issues should be considered up front:

10.4 Who to Include in the Post-event Monitoring or Surveillance Program?

Certain considerations must be recognized before initiating a monitoring or surveillance program. Language, cultural, or geographic diversity may need to be addressed in terms of survey content (i.e., what questions and how they are asked) and how a program needs to be implemented. Employer and union affiliations or other stakeholders also will need to be engaged.

Other considerations are as follows:

- What information should be collected and how (content and protocol)?
  - Standardized and validated questionnaires about the health condition(s) of concern
  - Comprehensive or targeted physical and mental status examination
  - Laboratory tests, radiographic imaging, spirometry, or other medical testing
  - Must the protocol be conducted under the auspices of an Institution Review Board for protection of human research subjects (informed consent about protocol and use of data)?

- How will the program be implemented?
  - Data sharing agreements and informed consent (responder organizational culture)?
  - Discussion about the intended use of the data and the manner in which it might be shared needs to be incorporated into an informed consent process, with review by an Institutional Review Board to ensure protection.
  - What other services should be included?
    - Provider discussion about findings and treatment referral
    - Social benefits counseling, including workers' compensation
    - Occupational health and preventive medicine counseling
  - Will definitive medical care or treatment services be provided within the same visit or within the same program?
    - Doctor-patient relationship and client expectations are different, which can influence surveillance efforts.
  - What facilities are required?
    - Is there a need for access to clinical care, blood draw, Pulmonary Function Testing, or medical tests?
  - What are the data management needs?
    - Will database software have relational tables and connectivity with electronic medical records; data integrity and quality assurance plans; privacy protection; and record preservation procedures.
  - What administrative and supervisory support is needed?
    - Consider licensed and specialized medical providers, medical testing quality assurance procedures, data management and analytic expertise.

If epidemiologic studies are contemplated to evaluate effects of exposure, a suitable comparison or reference population must be identified or defined; such a population could be drawn from response workers not subjected to the exposure(s) in question or not demonstrating the health condition to be studied. Planning for specific studies depends on scientific gaps in knowledge about exposure-health outcome relationships, the kind of data available about exposure, and constraints regarding available resources.

- Case–control study: cases are ascertained as defined by a standardized symptom cluster or health condition and compared to controls (i.e., controls need to be as similar as possible to the cases, except for having the symptom cluster or health condition under study).
- Cohort study: cohorts are defined by exposure level, looking for the latent health effect over time (dose-response relationships).

10.5 Constructing a Medical Monitoring or Surveillance Protocol

Construction of a post-event medical monitoring protocol whose data are intended to be used for post-event health surveillance purposes requires a balancing of the rigors of data quality and integrity with the nuances and practice standards of clinical

care. This is shown in Figure 6 and further explained in Table 1. A periodic medical monitoring protocol should be designed to do the following:

- Conduct early intervention by identifying individuals suspected of having any one of a number of incident-related conditions, monitor their progress, and refer them as needed for timely clinical follow-up.
- Identify unique constellations of symptoms and/or signs that may be related to incident exposures and disseminate this information to improve clinical detection.
- Scientifically describe disease rates, trends, and exposure-health outcome relationships within the incident responder population, in comparison to a reference population.
- Inform future emergency preparedness and response activities.

The size and scope of the monitoring protocol will depend on the number of hazards of concern, the number of organ systems potentially affected, whether multiple clinical sites are involved, and stakeholder sensitivities. Most OSHA-mandated medical surveillance programs are directed at a single anticipated hazard, such as asbestos, lead, or beryllium. Emergency response however is an environment which is likely to involve multiple exposures, many of which may be poorly characterized, such as during the 2001 World Trade Center response [OSHA 2007]. Depending on the content and implementation of the protocol, screening techniques may emphasize one goal of the program at the expense of the other (see Table 1).

An optimal medical monitoring protocol should adequately address access to care, quality of care, patient confidentiality, and data quality and integrity. The content, length, and complexity of the survey instruments utilized to obtain patient data selected are likely to influence the quality of care delivered, the quality of surveillance information collected, and the time required to complete each workers exam. Both the content of the protocol, as well as its implementation may affect the goals of a medical monitoring and surveillance program.

10.6 Content of the Post-Event Monitoring and Surveillance Protocol

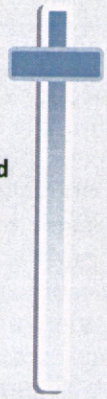
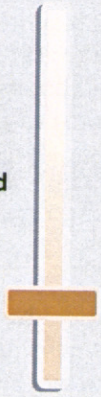
The monitoring protocol includes a medical encounter that obtains relevant clinical and exposure histories (i.e., medical, psychiatric and occupational), performs the appropriate clinical exam(s) and medical tests, and provides the worker with an explanation of findings and appropriate referrals when there is a need for treatment or follow-up (see Table 2). Much of the medical history about pertinent organ systems can be obtained through structured screening instruments administered either as self-reported or through personal interview. Further refinements in the history are made by the clinician when synthesizing the clinical information for monitoring and health communication purposes. Physical and mental status examinations are performed by appropriately licensed clinicians, as needed. However, the mental status exam may differ in accordance with the training and discipline of the responsible clinician. Structured mental health screening instruments assist non-mental health professionals in rendering a reasonable provisional assessment and appropriately referring for more specialized care, as needed. Medical tests provide measures of targeted organ system function, such as blood and urine chemistries, spirometry and radiography.

Finally, the clinical synthesis phase evaluates all the available information to render an assessment of pertinent health effects, perform a triage function (urgency of follow-up, if any), and appropriately refer the participating responder for further medical (including mental health) care, if needed. Discussing the findings, interpretations and recommendations with the client is critical to ensure understanding, compliance and continued participation.

10.7 Case Finding and Competent Triage and Referral

The monitoring component is designed to identify either early disease or organ dysfunction that is highly suggestive of a work-related medical condition—broadly defined as a "case" (i.e., a case of something that ought to be further evaluated and treated). As shown in Figure 7, medical monitoring (i.e., screening instruments, clinical evaluations, and medical tests) can be used to help identify general "caseness"—such as a skin reaction, mental health condition, or a respiratory problem needing further attention. Consistent with standard medical practice, case identification should attempt to render as specific an assessment as practicable (preferably a provisional diagnosis) to facilitate competent triage, referral, and/or medical treatment. In the case of complex and poorly characterized exposure, greater

Table 1.

When emphasis is placed entirely on Responder Health Surveillance 	• Systematic collection of highly standardized data to ensure high quality and data integrity. • Capture all relevant health conditions. • Enables timely population-level reporting on incidence, prevalence, and trends.	• Information quality may lead to redundant data collection and longer exams (decreasing system capacity). • May have a "research feel"—which can influence patient-provider rapport. • Training and quality assurance procedures are needed.
Optimizing Medical Monitoring 	• Standardize case definitions to optimize clinical indices of suspicion for multiple conditions simultaneously (case-finding). • Ensure optimal patient flow through the clinic and throughput capacity. • Capture potential latent conditions that are plausibly associated with event exposures	• Ensure data quality for analyzing and reporting on rates and trends. • Enable sub-groups to be identified for further clinical and scientific invest-igation.
When emphasis is placed entirely on Clinical Care 	• Clinical synthesis depends on index of suspicion and thoroughness of assessment • Inadvertent care disparities can emerge from different indices of clinical suspicion. • Focus is on assessment of the individual (patient).	• Difficult to construct information about populations or to identify subpopulations for further investigation. • Subject to clinical practice standards, medical ethics, and privacy laws. • Expected to assess any reported health problems that may pose imminent threat, then appropriately triages, treats or refers.

emphasis ought to be placed on a case-finding based on likely exposure pathways (e.g., breathing, skin contact, gastrointestinal absorption) to help identify emerging health effects and trends. From a scientific standpoint, health complaint information should be systematically assessed using validated survey instruments for target organs or systems (e.g., airway, lung, gut, brain, skin, immune function) whenever possible (REF: WTC papers). Content may need to be adjusted over time to account for latency regarding expression of potential adverse effects such as immune system dysfunction, adverse reproductive effects, and various types of cancer.

10.8 Implementation of the Post-Event Monitoring and Surveillance Protocol

The implementation of a monitoring and surveillance protocol is closely tied with information management. Additionally, computerization of clinical data enables real-time data entry and timely analysis for

aggregated and de-identified reporting. This can be done using a variety of different software platforms integrated with electronic medical recordkeeping, provided interoperability between systems used for data collection, storage, and analysis. Data must move through different pathways to support a number of interrelated aspects for program efficiency. Mismanagement of information or information systems can dramatically affect program functions, as outlined below:

- **Clinical monitoring and assessment**—clinician assessment/feedback, coordination of testing/referral, and client health communications.
- **Administrative support**—scheduling, staffing, cost accounting, facilities, referral networks, pharmacy relations, cost accounting, IRB/HIPAA, grievance and appeals, and grants management.
- **Health surveillance of the incident responder population**—calculation of population rates, trends, exposure-health effect relationships, risk factor analysis, and emerging issues.

A licensed clinician is needed to oversee the screening instruments, with triage support available in case of more urgent need for medical/psychiatric support. Training and continual quality assurance procedures will be required. It would be optimal for both the social benefits counseling and the mental health evaluation to be done at the same time by the same professional, to enhance rapport and the likelihood that patients will seek appropriate mental health care. Appropriate help lines also need to be set up as part of the system that supports the providers and clients.

Data management must conform to recognized standards of acceptability, reproducibility, calibration and technician certification. For example, spirometry should be performed in accordance with the American Thoracic Society's criteria for acceptability and reproducibility, and testing should be done by personnel who have taken an instructional course approved by the National Institute for Occupational Health and Safety. Audiometry should be performed by technicians with training from the Council on Accreditation of Occupational Hearing Conservation, and laboratories that analyze biologic samples should have certification from the American College of Pathologists.

10.9 Duration of Health Tracking

An important issue to consider during implementation planning is how long responder health should be tracked. Surveillance does not need to go on indefinitely, and it should be made explicitly clear that there is a well-defined endpoint to the program. The key factor underlying the appropriate duration of surveillance is the latency period of the illnesses of primary concern. Some illnesses may be likely to appear in responders within days to weeks of their exposure, while other illness endpoints may take years before they manifest. It should be made clear at the outset which illnesses are the primary targets for a given surveillance program, and a clear ending date that is suitable for the expected latency period of these illnesses should be identified. In some cases it may be possible that a surveillance program will come to an end at the appropriate time based on

Figure 6. Medical monitoring protocols must balance information standardization and quality with the nuances, ethics, and satisfaction of patient with clinical care.

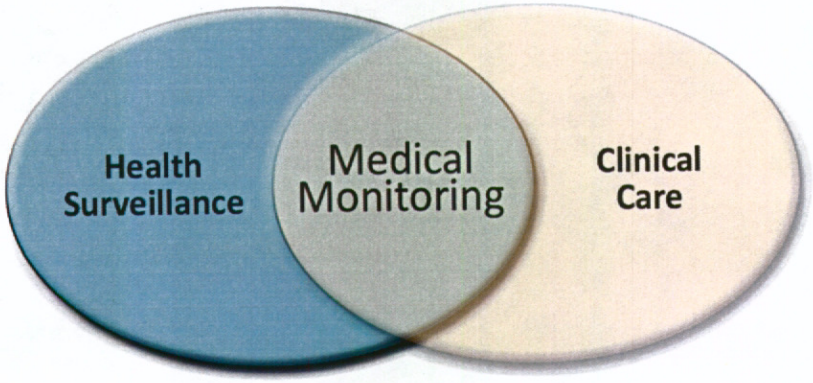
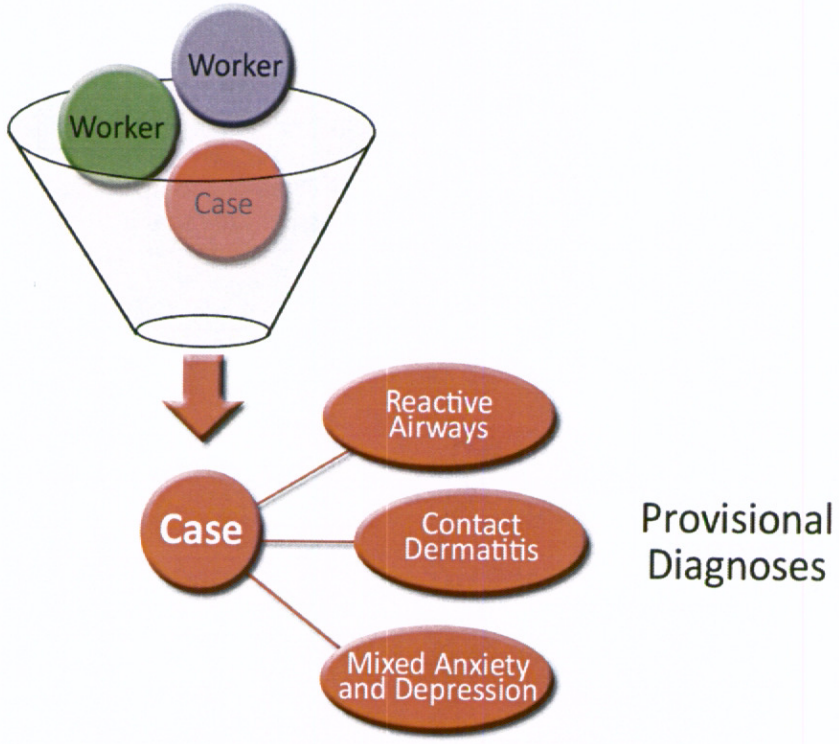


Table 2. Periodic Monitoring Components

Medical, Mental Health, and Exposure History (screening instruments, clinical interview)
Clinical Examination (physical and mental health)
Clinical Synthesis and Triage (acuity and urgency of need for care)
Health Risk Communication to Participant Worker

illness latency, but that a less intensive program of follow-up surveys will be administered for longer periods. This might serve to address any concerns that the proposed latency period was insufficient or unclear. Even in such cases, the duration of time that follow-up surveys will be administered should be made clear, to dispel any concerns that the program is unending.

Figure 7. Case-finding through a clinical screening process leading to provisional diagnoses



11. Lessons-learned and After-action Assessments

Practical Summary

What is the purpose of this section?

This section of ERHMS guidance focuses on the challenges involved in assessing and compiling the lessons that are learned after any emergency response, and how these lessons should be integrated into preparations for the next response during its pre-deployment phase.

At the conclusion of an event, there is a need to assess how the emergency response has been conducted through the pre-deployment, deployment, and post-deployment phases and try to identify ways to improve during each of these periods. This ensures that the best-possible practices are used and that mistakes are identified and measures taken so that they are not repeated the next time. Often this is accomplished through a document called an "After Action Report." This report provides an opportunity for emergency response organizations to identify areas that are in need of improvement, make recommendations to resolve them, and capture what are called key "lessons learned." Both military and other government organizations use these reports. This document provides a built-in outlet for which assessment of the emergency responder health monitoring and surveillance program can be implemented.

It is from these reports that the focus for research and advancement is identified. In an after-action report for Arlington County, VA after the September 11 terrorist attacks response it was found that different organizations reporting to an event can be equipped differently or not at all [NIOSH 2010b]. Also, many of these organizations did not report or integrate through the incident command system [Moline et al. 2008]. As a result, recommendations were made to identify the organizations beforehand, assess their resources, register them with the incident command system (ICS) and educate them about the ICS. As mentioned in previous sections, emergency support organizations in response to Hurricane Andrew received 2,400 tractor-trailers of goods, but they ordered supplies through contractors rather than trying to sort out what supplies had arrived [U.S. Coast Guard 2009]. It is this type of waste and gaps in organization and leadership that can be improved for future events. By forcing organizations to face both their inadequacies and triumphs, advances can be integrated into the system. This is both advantageous from an efficiency standpoint and a legal liability standpoint for the organizations involved. These reports can also be used for drills and training to assess those actions and solve potential problems before an actual event occurs.

It is essential that the Emergency Responder Health Monitoring and Surveillance (ERHMS) program be included in the general after-action report or similar document. Identifying deficiencies in communications of safety protocols, examining when and where there were exposures, noting when rostering was ineffective, etc., all help organizers increase the safety environment and protect emergency responder health during an emergency. In this type of report, personal interviews with key personnel can be completed to identify methods of observations, each employee could be asked to complete a survey during out-processing, and project managers can be asked to prepare reports. [Arlington County, Virginia 2002]

This program should touch on all three phases of the emergency response (pre-deployment, deployment, and post-deployment) and somehow assess the health of the emergency responders. Also, it makes an assessment more robust and insightful with little extra effort (using information already gathered) in functions such as rostering, exposure assessment,

responder health assessment and disposition function, out-processing assessment, and long-term surveillance. The after-action assessment, whether part of an official after-action report or part of an evaluation developed by an individual organization, should have the specific goals listed below to help solve problems with the response and protect those who are aiding in an emergency event. In many ways this evaluation is what allows the safety management cycle to provide feedback, making all other aspects of the program even more relevant and valuable for future emergency responders. Just as the Responder Health Assessment and Disposition Function allows information from all modules to be used to make informed health decisions for emergency responders, following up with an after-action assessment allows information from all modules to be used to prevent health problems in future responders by identifying and addressing weaknesses in the system.

Functions for After Action Report in Regard to ERHMS:

1. Identify Problems During the Event
2. Examine Those Problems and Characterize Them
3. Make Suggestions on How to Correct Those Problems in the Future
4. ImplementThese Changes in Current Policy and Preparedness Plans

Identify Problems during the Event

There are many techniques to allow for identifying problems within the emergency response system. During out-processing, organizations can give out surveys directed at safety and health concerns and later send follow-up surveys dealing with more long-term issues. Fortunately, the evaluations completed in the responder health assessment and disposition function, out-processing assessment, long-term health surveillance, and other modules can provide a huge amount of ready-made data about the event and its effects on responder health. This information should be evaluated to identify issues that were encountered or that developed during the emergency response.

Hypothetical example:

During a flood a large number of responders were working in a particular zone (documented by the responder activity and controls monitoring) and all were identified with increased incidence of lead exposure (via the exposure assessment). This indicates that lead exposure was a problem with this group and allows for an investigation of the exposure's nature to be launched.

A panel of members from the incident command structure can be designated to gather this information and assess its seriousness. The members of this team should ideally have been involved in the initial surveys or have more information because they were directly involved with the potential problem. Once again, information from other modules can filter in and help decipher the root of problem, indicating where efforts should be focused in order to fix the issue.

Hypothetical example:

The panel might decide to do more extensive environmental testing to identify the source and characterize the exposure. After investigation, the lead could be linked to the area containing a small regional airport where aviation fuel had leaked into the flood waters and was absorbed on exposed skin at that specific site.

Make Suggestions on to How Correct Those Problems in the Future

This panel can discuss past research on the problem, possible ways to alleviate it, and how other organizations have solved it previously. By involving health professionals, safety officers, incident command management, and emergency responders themselves, solutions can be developed that are both effective, but also practical, for emergency response. By using input from all invested parties, solutions have a higher likelihood of working and those involved in the process are more likely to buy-in.

Hypothetical example:

Recommendations could include more effective skin protection, screening for aviation fuel sources in rescue areas, and developing plans for containment of this product.

Implement these Changes in Current Policy and Preparedness Plans

The suggestions made should then be translated to literature, policy papers, and systems, such as the

national response framework, so they are put into operation and available for the next emergency. Even if something is not employed until the next emergency, having it documented and spreading awareness of the problem can help prevent future problems. It is this final phase that completes the cycle of safety management from gathering information, analyzing options, and making a decision, and taking action referenced in Protecting Emergency Responders: Volume 3 [OSHA 2008]. This macrocosm interpretation of this cycle shows each emergency response should feed into the next, contributing to the guidelines and actions taken in the future.

Hypothetical example:

This could involve requiring skin protection, increasing decontamination/washing procedures, educational programs on working in fuel contaminated areas, and implementing screening and containment protocols for airports.

Tools Section

Pre-deployment

1T. Rostering and Credentialing of Emergency Response and Recovery Workers

Rostering and credentialing tools can range from simple to complex. This diversity can be addressed by categorizing the tools into basic, enhanced, and comprehensive. Basic rostering and credentialing tools consist of primarily self-reported information by the responders. Enhanced tools incorporate some sort of verification step for one or more pieces of information, such as conducting background checks or verifying a professional license. Essential information has been identified that can be captured in a basic or enhanced system, and this can be done on paper using another low-tech system. Comprehensive rostering and credentialing tools are most likely electronic data systems. Rather than listing all possible rostering and credentialing data elements in the comprehensive section, here, briefly, are three electronic rostering and credentialing systems others have used to meet this need for their organizations.

Contents:

Basic Rostering and Credentialing Example

Data Type	Category	Data Element
Rostering Information		
	Name	Prefix
		First Name
		Middle Initial
		Last Name
		Suffix
		Alias
	Residence	Legal Residence Line 1
		Legal Residence Line 2
		City
		State
		Zip Code
	E-mail	Primary E-mail
	Telephone	Primary Telephone Number
	Personal Attributes	Birth Date
		Gender
		Height
		Weight
		Languages Spoken Fluently
	Name of Contact who will know where you are in 6 months	Prefix
		First Name
		Middle Initial
		Last Name
		Suffix
		Alias
	Contact's Residence	Legal Residence Line 1
		Legal Residence Line 2
		City
		State
		Zip Code
	Unique ID Number	Unique ID Number
	Travel Documents	Passport Number
Response Organization	Organization Details	Employer vs. Volunteer Organization (Indicate Which)
		Name and Address

		Contact Person's Name and Telephone Number
Data Type	**Category**	**Data Element**
Credentialing Information		
	Professional Licenses and Certification	List of licenses and certifications with application to emergency response
	Professional Training	List of training courses with application to emergency response (may be obtained from prior ERHMS section on training)
	Professional Education	List of educational courses with application to emergency response (may be obtained from prior ERHMS section on training)
	Relevant Work Experience	Industry
		Occupation
		Job Task
		Number of Years
Assigned Credential Level	Assigned Credential Level	The credential level assigned by the administrator after verification of the relevant information. (Example: Verified vs. Un-verified)

Enhanced Rostering and Credentialing Example

Data Type	Category	Data Element
Added Elements for "Enhanced" Rostering and Credentialing Tool		
Consent	Consent to Use Information	Did applicant consent to collecting, using, and maintaining the applicant's personal information? Options: Yes | No
	Correct Information Pledged	Did applicant pledge to submit only correct information into the credentialing database? Options: Yes | No
	Applicant Consent Date	Date applicant pledged to provide correct information and consented to the collection, use, and maintenance of the applicant's personal information.
Background Check	Consent to Background Check	Did applicant consent to allow the state to perform background checks? Options: Yes | No
	Date Consented to Background Check	Date applicant consented to allow reference and background checks. Options Yes or No
Deployment Preferences	Deployment Preferences	Geographical Deployment Preference
		Travel Distance
		Deployment Time
		Incident Type

Comprehensive Rostering and Credentialing Principles with Three Examples

Software packages are commercially available that could be used for rostering and credentialing, but the following three organizations chose to develop their own customized electronic system to meet their needs—Preparedness Workforce Management System by the Centers for Disease Control and Prevention (CDC), Engineer's Link by the U.S. Army Corps of Engineers (USACE), and the Emergency System for Advance Registration of Volunteer Health Professionals owned and operated by each state and administered by the Office of the Assistant Secretary for Preparedness and Response (ASPR) at the U.S. Department of Health and Human Services (HHS).

Preparedness Workforce Management System (PWMS)

The Preparedness Workforce Management System (PWMS) is currently used by the CDC Emergency Operations Center (EOC) to manage response efforts and prepare for future public health events. It is a powerful tool that provides the ability to collect information on the current location of all CDC personnel. Current location is defined to include current work location, home location, and travel location.

Web-based application provides CDC emergency response personnel the ability to efficiently and accurately perform these tasks:

- Manage deployments (personnel sent in response to a public health emergency/event)
- Manage teams (assignment to internal teams for event response needs)
- Locate personnel (identify personnel based on travel, assignment, and work locations or geographical area)
- Identify personnel (based on knowledge, skills, and abilities)
- Notify personnel (send telephonic and/or text alerts to personnel by team or individual)

The PWMS application is Web-based, built using ASP.NET and AJAX, with application and SQL database servers hosted on a redundant architecture using VERITAS clustering. Google Earth is used to provide 2D mapping services; Microsoft SQL Server provides reporting services. PWMS receives self-identified data from CDC Neighborhood, such as skills and abilities, personal contact information, and participation preferences.

The comprehensive view of response efforts provided by PWMS helps to address the issues of multiple deployment rosters, over-allocation of resources, and duplication of coordination efforts, resulting in more efficient response and operations. In addition, the PWMS application allows users to collect information on the degrees, specialties, subspecialties, languages, skills, training, professions, licenses, employment status, agency information, current and previous work assignments, and current and previous deployments. It is available others have used for all CDC personnel.

Engineer's Link (ENGLink Interactive)

Engineer's Link (ENGLink Interactive) is a robust, Web-based, three-tier architecture using Oracle 10g Enterprise (which offers enterprise-class performance, scalability, and reliability on clustered and single-server configurations) as the database engine; the Oracle Application Server for web hosting; and the users' Web browser as the means of entry. The USACE Information Technology (ACE-IT) Office manages all of the software and architecture for ENGLink. ENGLink has transformed the way USACE responds to emergencies by providing the framework for processing information and performing command and control of USACE elements. ENGLink represents "ground truth" reporting and allows deployed personnel real-time access to critical information. The system represents a single data entry point that standardizes and integrates methods of collecting, analyzing, forecasting, and presenting information for decision makers. The Deployment Module tracks personnel and mission requirements from the beginning to the end of a USACE response. Once personnel are deployed in ENGLink, they are tracked from the beginning to the end of their deployment resulting in increased management and accountability of personnel. ENGLink reports, viewable by all command elements, allow access to just-in-time, critical information. Deployment Module reports provide answers to staffing needs, logistical concerns, and the management of personnel.

Safety Reporting in ENGLink: The Accident Reporting System (ARS) is a tool developed to be used for the input of accident report data for USACE personnel and property, as well as non-USACE personnel who are on USACE property. The system places reports meeting specific criteria into an organization's safety log for reporting accident information to local USACE Command and OSHA.

ENGLink is used by USACE as its tool for Military Contingency and Civil Emergency Deployments. It has the ability to contain the following information on every USACE team member: emergency experience, certifications, languages, immunizations, Medical screening, emergency Phone numbers, training, licenses, passport, PPE items, deployed, redeployed, signed statement of understanding for deployment, deployed duty description, home station information.

Emergency System for Advance Registration of Volunteer Professionals (ESAR-VHP)

Before a public health emergency or medical disaster, advance coordination and communication regarding the credentials and qualifications of healthcare personnel is critical. The Emergency System for Advance Registration of Volunteer Health Professionals (ESAR-VHP) addresses this need by developing a national network of state-owned and operated systems that register volunteer health professionals who offer to fill capabilities during an emergency. States verify the identity, credentials, licenses, certifications, hospital privileges, and relevant training of registered volunteer health professionals in advance of an emergency. This critical network facilitates the deployment of willing, needed, and qualified health professional volunteers at the national, state, territorial, tribal, and local levels. The Office of the Assistant Secretary for Preparedness and Response (ASPR) at the U.S. Department of Health and Human Services (HHS) administers ESAR-VHP and maintains this interoperable network of systems or verification network.

Each state's ESAR-VHP system is built to a common set of standards designed to allow swift and simple exchange of health professionals with other states. ESAR-VHP ensures that state, local, and tribal health departments can access the verification network electronically and establishes and requires the application of compliance and compliance with measures to ensure effective security of, integrity of, and access to the data in the network.

Clinical privileges are granted by a requesting entity, such as a hospital, not by ESAR-VHP. The function of the ESAR-VHP system is to provide accurate and reliable credential and other information to facilitate the granting of privileges on-site. Many of the credentials verification organizations consult with the Joint Commission and other National accrediting organizations. The information maintained in the ESAR-VHP system does not infer health professional volunteer competency to perform health services. The range of privileges given and the need for supervision remain under appropriate authority and control.[1]

1 *ESAR-VHP Interim Technical and Policy Guidelines, Standards, and Definitions,* U.S. Department of Health and Human Services, June 2005.

2T. Pre-deployment Health Screening for Emergency Responders

Contents:

Basic Pre-deployment Evaluation (to be completed by the Emergency Responder)

Date: _____

Name: _____

Date of Birth: _____

Job Title: _____

Employer: _____

Job Location: _____

Please answer each of the questions to the best of your knowledge:

1. What will be your job or your responsibilities while deployed (if unknown, state UNK):

_____

2. Would you say your health in general is:

a. Excellent	b. Very Good	c. Good	d. Fair	e. Poor

3. Do you have any medical or dental problems or are you currently under the care of a physician?

YES / NO

If Yes, please explain: _____

4. Do you have any allergies which might impair your ability to respond in an emergency, such as an environmental allergy, or an allergy to vaccines?

YES / NO / Don't Know

5. Do you have any physical limitations which may affect your ability to respond in an emergency, be transported to an emergency, or which may impair your ability to wear personal protective equipment?
YES / NO

If Yes, please explain: _____

5. How would you rate your current physical fitness level?

a. Excellent	b. Very Good	c. Good	d. Fair	e. Poor

6. What is your current:

Weight (lbs): _____

Height (inches): _____

7. (Females Only) Are you pregnant? YES / NO / Don't Know

8. Do you have, or could you easily obtain prior to responding to an emergency, at least a 90 day supply of your prescription medicine? YES / NO

9. If you require prescription glasses or contact lenses, do you have backup prescription glasses or contact lenses easily available?

10. Do you require any personal medical equipment that may be difficult to obtain or replenish during a long-term deployment (i.e., greater than one week)? YES / NO

11. Do you currently have any concerns or questions about your health or ability to be deployed on an emergency? YES / NO

12. Have you received the following vaccinations?

Vaccination	Date last vaccination received (or date of final vaccination in series)
For all responders	
Tetanus	
Hepatitis B	
Influenza	
Pandemic Influenza	
For selected responders	
Pneumococcal Vaccine	
Hepatitis A	
Measles/Mumps/Rubella	
Polio	
Varicella	
Rabies	
Anthrax	
Smallpox	

Please list your concerns: _____

_____

Enhanced Pre-deployment Evaluation (to be completed by the Emergency Responder)

Date: _____

Name: _____

Date of Birth: _____

Job Title: _____

Employer: _____

Job Location: _____

Please answer each of the questions to the best of your knowledge:

1. Health Status (pre-deployment)

    a. Pre-existing medical and mental health conditions: _____

    _____

    b. Past surgeries/dates:_____

    _____

2. Any Medical and/or Fitness concerns that you would like to be addressed

    _____

    _____

    _____

    _____

3. Medications you presently take:

    _____

    _____

    _____

    _____

4. Allergies (food, medicine, environmental):

    _____

    _____

    _____

    _____

5. Substances:

    a. Alcohol Use (Amount per day): _____

    b. Smoking (number of cigarettes per day): _____

    c. Other drugs or substances (amount per day): _____

6. Fitness Level:

   a. Height: _____ inches

   b. Weight: _____

   c. BMI (to be determined by health care provider): _____

   d. Conditions that may impair your activities of daily living: _____
   _____

   e. Conditions that may limit your ability to perform strenuous activity: _____
   _____

   f. Score on most recent physical fitness test (if applicable):

      Score of _____ out of a possible _____

7. Job-specific Risk Factors:

   a. Do your emergency response activities potentially require you to wear respiratory protection? Yes / No / Don't know

   b. Have you been fit-tested for an N95 respirator or other respiratory protection? Yes / No / Don't know

   c. Do your emergency response responsibilities involve the potential or exposure to hazardous substances? If yes, please describe: _____

   _____

8. Vision corrected _____ and uncorrected: _____

9. How is your hearing: Excellent / Good / Fair / Poor

10. Do you have a history of:

    a. Chest pain? Yes / No

    b. Syncope? Yes / No

    c. Abdominal pain? Yes / No

    d. Other medical / dental / or psychological conditions? Yes / No

       If yes, please describe: _____

       _____

11. Have you received the following vaccinations?

Vaccination	Date last vaccination received (or date of final vaccination in series)
For all responders	
Tetanus	
Hepatitis B	
Influenza	
Pandemic Influenza	
For selected responders	
Pneumococcal Vaccine	
Hepatitis A	
Measles/Mumps/Rubella	
Polio	
Varicella	
Rabies	
Anthrax	
Smallpox	

To be completed by Agency / Organization / or Employer:

1. Exposure Anticipation:

   a. Anticipated deployment location (as specific as possible):

   _____

   _____

   b. Anticipated tasks to be performed (as specific as possible):

   _____

   _____

   c. Anticipated circumstances under which tasks will be performed (i.e., list of disaster types):

   _____

   _____

d. Characteristics of expected work locations and relationship to known or suspected CBRN agents or conditions:

_____

_____

2. Anticipated date of deployment: _____

3. Anticipated duration of deployment: _____

4. Control anticipation:

a. Anticipated need for PPE? Yes / No

b. Anticipated type of PPE needed: _____

_____

c. Adequacy of pre-incident training for tasks? Yes / No

d. Anticipated shift schedules:

_____

Comprehensive Pre-deployment Evaluation Principles

The design of a comprehensive health screening tool for emergency responders is a challenging task that requires a customized risk assessment of the duties and responsibilities of the responder. It must take into consideration the specific anticipated work activities, working conditions, and work settings in which a responder is expected to perform. For this reason, it is not practical to design a comprehensive screening tool that is appropriate for a wide range of emergency personnel. Instead, this document provides a list of the general issues that should be addressed when determining the need for comprehensive screening of an emergency responder. It then provides examples of comprehensive evaluation questionnaires that are currently used by certain high-risk emergency responder groups.

Comprehensive medical screening should include a complete medical history and review of systems, a physical examination, and, in some instances, laboratory testing, as indicated by clinical judgment and good occupational medical practice. Pre-deployment biological monitoring for exposure to hazardous chemicals is not generally recommended. Such monitoring is not practical for unanticipated exposures to hazardous chemicals. When exposures to specific chemical agents are predictable, workers should be adequately protected. However, there may be some limited instances in which obtaining baseline clinical specimens before deployment for work in environments with predictable exposures may be helpful in subsequently assessing whether the protections used during this work are adequate and performing as intended.

The following are examples of the types of issues that should be considered when determining the need for comprehensive medical screening.

1. Response Settings and Conditions

- Austere settings (temperature stress and few services/supplies)
- Disaster zone settings (physical hazards, contaminated floodwaters, infectious vectors)
- Hazardous materials release or uncharacterized and complex exposure zones (industrial explosions, major structural collapses, commercial transportation crash)
- Radiation or nuclear contamination settings
- Long work hours
- Inconsistent opportunities for rest and nutrition

2. Response Tasks

- Heavy lifting or physical exertion
- Hazardous duty requiring use of heavy or cumbersome protective equipment
- Respiratory protection requirements

3. Personal Risk Factors

- Chronic illness, degree of medical control, and ability to maintain that control in the field setting; degree of vulnerability or risk of exacerbation given field settings and resources
- Drug allergies, particularly to medications used for post-exposure prophylaxis for bio-terror agents
- Recent injury and likelihood of repeat injury or undue fatigue
- Care, maintenance, and mobility requirements for durable medical equipment or assistance animals; ability to evacuate

An example of a well-established comprehensive evaluation can be found in the USCG Medical Manual CIM 6000.1C at: http://www.uscg.mil/directives/listing_cim.asp?id=6000-6999

Another example is from the National Fire Protection Association (NFPA): NFPA 1582: Standard on Comprehensive Occupational Medical Program for Fire Departments, 2007, Edition http://www.nfpa.org/catalog/product.asp?pid=158207

Additional source of information regarding vaccines: CDC's Epidemiology and Prevention of Vaccine-Preventable Diseases http://www.cdc.gov/vaccines/pubs/pinkbook/default.htm

Examples of Pre-deployment Screening Tools Used by Selected Emergency Response Units

Basic Evaluation

Interim Guidance for Pre-exposure Medical Screening of Workers Deployed for Hurricane Disaster Work

http://www.cdc.gov/niosh/topics/emres/preexposure.html

This document provides interim guidance on medical screening for workers before deployment to disaster response activities.

ROTC

http://college.vfmac.edu/LinkClick.aspx?fileticket=mll8NoG3Z5c%3d&tabid=180

Very basic set of questions for a ROTC program.

Center for Domestic Preparedness Responder Screening Tool

http://www.emd.wa.gov/training/documents/Medical_Screening_FormCDP.pdf

Tool is used for responders under consideration for attendance at the Center for Domestic Preparedness, WMD Technical Emergency Response Training Course (TERT), WMD HAZMAT Technician Training Course (HT), WMD Hands-On Training Course (HOT), WMD Emergency Medical Services Course (EMS), WMD Emergency Responder Hazardous Materials Technician Course (ER HM), Agricultural Emergency Response Training, and the MCATI courses (CSM, HEC, BASIC, and PD).

Department of Defense Deployment Health Clinical Center - Form DD 2795

http://www.pdhealth.mil/dcs/pre_deploy.asp

The ***Pre-deployment Health Assessment Form (DD 2795)*** is a required form that allows military personnel to record information about their general health and share any concerns they have before deployment. It also helps healthcare providers identify issues and provide medical care before, during, and after deployment.

- DD 2795 is mandatory for deploying military personnel from every service, including reserve component personnel
- DD 2795 is to be completed and validated within the 30 days before deployment.

Enhanced Evaluation

Coast Guard Auxiliary Air Crew Screening Form

http://forms.cgaux.org/archive/a7042f.pdf

It may also be considered a Basic form, but it does go into disqualifying specific medical conditions, it has been placed in this section as an example of an Enhanced Form.

CDC Emergency Response Team Medical Clearance Guidelines
(Hard copy is below)

This document was formulated to establish general guidelines for use in the medical evaluation and the fitness-for-duty clearance of applicants who volunteer to participate on the CDC-wide Emergency Response Team. It can represent an "enhanced" set of screening criteria used for those with responder duties that put them at moderate risk of injury and illness.

CDC Responder Readiness Medical Clearance

Name: _____ Date: _____

Social Security Number: _____

The information you provide in this clearance exam is private and confidential.

Past Medical and Surgical History (List any past or current medical complaints, diseases, symptoms, surgeries, procedures or other conditions)

Date Condition Current Status

_____

_____

_____

_____

Family History (List any medical conditions of blood relatives including high blood pressure, heart or kidney disease, diabetes, cancer, alcoholism, psychiatric illness or others)

_____

_____

_____

_____

Social History

Do you use tobacco in any form? No Yes

Do you drink alcohol in any form? No Yes

Do you use illegal drugs or misuse other drugs? No Yes

Explain any "yes" answers. _____

_____

Assessment of Physical Activity Level (Describe type, amount and frequency of physical activity that you complete on a regular basis.) _____

_____

_____

Current Medications (Include prescription, over-the-counter, vitamins, supplements, herbals, others)

_____

_____

_____

_____

Allergies (List and describe medication, food, insect or other allergic reaction or adverse event)

_____

_____

_____

_____

_____

Name: _____ **Date:** _____

Immunization History (Give month and year when immunization(s) last completed if known)

Tetanus/Diphtheria _____

Hepatitis A _____

Hepatitis B _____

Measles/Mumps/Rubella _____

Varicella (if unknown, must titer) _____

Anthrax _____

Smallpox _____

TB Skin Testing _____

Review of Symptoms in Major Body Systems HAVE YOU EVER HAD:					
	YES	NO		YES	NO
1. Frequent or severe headaches?			26. Kidney or prostate disease?		
2. Dizzy spells, fainting or blackouts?			27. Diabetes?		
3. Epilepsy or seizures?			28. Thyroid disease?		
4. Eye trouble or vision problems?			29. Other endocrine disease?		
5. Ear problems or difficulty hearing?			30. Heavy menstrual bleeding?		
6. Hay fever or other allergies?			31. Anemia/hematological disorder?		
7. Dental problems?			32. Easy bruising or bleeding?		
8. Other ear, nose or throat problems?			33. Blood clots?		
9. Wheezing or asthma?			34. Arthritis/joint pains/swelling?		
10. Shortness of breath on exertion?			35. Other connective tissue disease?		
11. Chronic cough?			36. Joint or bone deformity/fracture?		
12. Coughing up blood?			37. Back pain; wear a back brace?		
13. Tuberculosis or (+) Tb skin test?			38. Difficulty walking?		

	YES	NO		YES	NO
14. Pain or pressure in your chest?			39. Eczema or atopic dermatitis?		
15. Palpitations or pounding heart?			40. Other rashes?		
16. Heart murmur?			41. Any other skin diseases?		
17. Other heart problems?			42. Cancer?		
18. High or low blood pressure?			43. Any immune system disorder?		
19. Frequent indigestion/heartburn?			44. Chronic steroid treatment?		
20. Stomach or intestinal problems?			45. Other immunosuppressive drugs?		
21. Hepatitis or liver disease?			46. Nerve injury or paralysis?		
22. Rupture or hernia?			47. A sleep disorder?		
23. Rectal bleeding or discharge?			48. Easy fatigability?		
24. Frequent urination?			49. Depression or crying spells?		
25. Kidney stones?			50. Other psychiatric problems?		

Give details of any "yes" answers above and comment on the current status of symptoms.

_____

_____

_____

List and describe any other medical problem, symptom or concern not addressed above. _____

_____

_____

_____

For women only: Are you currently pregnant? **No Yes** Date of last menstrual period: _____

Name: _____ **Date:**_____

Please read and sign the following statement. If you feel you need additional information or have any questions regarding the medical risks of deployment or questions regarding the medical clearance process, please ask the CDC Occupational Health Clinic medical staff.

Deployment on a CDC/ATSDR emergency response team could involve physical and emotional stressors and hazards, including but not limited to:

- rapid deployment to any location upon short notice
- deployment lengths lasting weeks to months
- separation from family and friends
- personal security issues
- sleep deprivation, time zone changes, and irregular sleep schedules
- irregular quality, availability, and variety of meals
- exposures to extremes of climate and altitude
- limited availability of immediate medical care
- lack of refrigeration or electricity for medications, medical supplies, or equipment
- increased physical demands related to prolonged standing, walking, or exertion
- routine use of personal protective equipment such as respirators and protective clothing
- possible exposure to infectious organisms, chemical, or radiologic agents
- risk related to allergy, adverse events or side effects from medications, vaccines, or other required pharmaceutical interventions
- for pregnant women, possible risk to a developing fetus

I have read the above medical questionnaire and statements. I have answered all questions accurately and to the best of my knowledge. I realize that further information or testing may be needed from my private physician or other sources to clarify my fitness for this duty. I know of no condition which would impair my ability to function fully on a CDC emergency response team now or for the following two years.

Signature_____ **Date**_____

You may STOP here. The clinic staff and physician will complete the remainder of this form

Name:_____ **Date:**_____ TO BE COMPLETED BY PHYSICIAN:				
Height_____	Weight_____	Pulse_____	BP_____	Distant vision: R 20/___ L 20/___ Corrected? Y N
CLINICAL EVALUATION Check each item as indicated. Enter 'NE' if not evaluated	Normal	Abnormal	Notes or Other Comments	
1. Skin				
2. Head and neck (thyroid)				
3. Ear, nose, and throat				
4. Lymph nodes				
5. Eyes (include fundoscopic)				
6. Lungs				
7. Breast				
8. Heart				
9. Abdomen				
10. Genitalia (if indicated)				
11. Rectal exam (if indicated)				
12. Vascular system				
13. Extremities and spine				
14. Neurological				
15. Psychiatric (specify any significant cognitive, mood or behavioral observations)				

Comprehensive Evaluation

NFPA 1582 Chapter 6 Medical Evaluations of Candidates

http://www.nfpa.org/aboutthecodes/list_of_codes_and_standards.asp?cookie%5Ftest=1
http://www.cortlandcountyfire.org/NFPA%201582.pdf

This document provides a detailed list of the medical conditions that could impact the ability of a fireman to safely perform essential job tasks. It can be used as an example of the type of "comprehensive" questions that could be used for a screening exam for those responders who face serious hazards and risks when responding to emergencies, such as those faced by firefighters.

USCG Medical Manual CIM 6000.1C

http://www.uscg.mil/directives/listing_cim.asp?id=6000-6999

This is a very comprehensive program aimed to cover all operations of USCG Personnel, ranging from air crewmen and marine vessel inspectors to pollution and emergency responders. There is a basic form that all personnel fill out, and then, for each specific hazards to which the member may be exposed, there is a form geared specifically for those hazards (e.g., asbestos, benzene, noise).

Department of Defense Deployment Health Clinical Center - Form DD 2795

http://www.pdhealth.mil/dcs/pre_deploy.asp

The ***Pre-deployment Health Assessment Form (DD 2795)*** is a required form that allows military personnel to record information about their general health and share any concerns they have before deployment. It also helps healthcare providers identify issues and provide medical care before, during, and after deployment.

- DD 2795 is mandatory for deploying military personnel from every Service, including Reserve Component personnel, and
- DD 2795 is to be completed and validated within the 30 days prior to deployment.

American Red Cross

These documents are used by the American Red Cross to assess their volunteer's health status before deployment. (Not available online; hard copies are attached below.)

- **Health Status Record**: Self assessment of physical abilities, medical issues, and medications filled out by the volunteer and updated yearly
- **Health Status Record Review Summary Sheet**: Administrative assessment completed by the RN or MD from the unit after reviewing the Health Status Record from the volunteer
- **Pre-assignment Health Questionnaire**: Checklist filled out by the unit deploying the volunteer including several health questions asked to the volunteer immediately prior to deployment to assess if there has been a change in health status since the completion of the Health Status Record
- **Physical Capacity Grid**: Matrix that lists the potential disaster deployment roles and the physical requirements for each

American Red Cross

Health Status Record

CONFIDENTIAL

To be completed and signed by the individual. Please print all information

☐ **New** ☐ **Annual Update** ☐ **Change in Health Status**

If this is an Annual Update, is there a change in:

☐ **Health Status** ☐ **Address** ☐ **Phone No.** ☐ **E-mail Address** ☐ **Contact Information**

Name: _____ DSHR # _____
Last First MI

Address: _____
Street City State ZIP

Phone: _____
Home Cell Work

E-mail Address: _____

Emergency Contact: _____
Name Phone Relationship

Unit of Affiliation: _____
Chapter Name Phone Chapter Code

Group/Activity/Position: _____ _____ _____
First Second Third

Mark *Yes* if you are able and *No* if not able and *explain* any limitations under "Limitation Explanations" below (all accommodations must be requested in writing with supporting medical documentation):

☐ yes ☐ no	Lift and carry 20 lbs multiple times per shift	☐ yes ☐ no	Speak clearly on phone and in person
☐ yes ☐ no	Lift and carry 50 lbs multiple times per shift	☐ yes ☐ no	Read small print for extended periods
☐ yes ☐ no	Stand for two-hour periods	☐ yes ☐ no	Work for long periods on a computer
☐ yes ☐ no	Sit for two-hour periods	☐ yes ☐ no	Climb two or more flights of stairs
☐ yes ☐ no	Walk on uneven terrain	☐ yes ☐ no	Drive in daytime and at night
☐ yes ☐ no	Walk two miles during a shift	☐ yes ☐ no	Work/live in areas with mold/mildew
☐ yes ☐ no	Bend or stoop multiple times during a shift	☐ yes ☐ no	Work/live in areas with smoke/poor air
☐ yes ☐ no	Crawl on floor or ground	☐ yes ☐ no	Work/live with little or no privacy
☐ yes ☐ no	Work outdoors in inclement weather	☐ yes ☐ no	Sleep on the floor or a cot
☐ yes ☐ no	Work in extreme heat and/or humidity	☐ yes ☐ no	Travel by any type of transportation
☐ yes ☐ no	Work in extreme cold	☐ yes ☐ no	Work 12 hr shifts/nights/weekends
☐ yes ☐ no	Able to step up/down 18 inches	☐ yes ☐ no	Work productively during change/stress
☐ yes ☐ no	Spend hours writing		
Mark Below Yes if Required or No if Not Required			
☐ yes ☐ no	Electricity for medical devices/meds	☐ yes ☐ no	Assistance with health monitoring
☐ yes ☐ no	Special food or timing of meals	☐ yes ☐ no	Air conditioning for health reasons
☐ yes ☐ no	Access to specialized medical care		

Limitation(s) Explanations:

_____

Date of last Tetanus shot (Within 10 years is considered up to date): _____

Height: _____ **Weight:** _____ **DOB:** _____

Allergies (food, medication, insect, dust, latex, etc.) What happens? What do you do? Explanations:

_____

In the last 12 months, have you been diagnosed with/continued treatment for any of the following?

☐ yes ☐ no	Heart attack/heart disease	☐ yes ☐ no	Bleeding disorders/anticoagulation therapy
☐ yes ☐ no	High blood pressure	☐ yes ☐ no	Stroke/CVA/TIA
☐ yes ☐ no	Migraines/frequent headaches	☐ yes ☐ no	Mental Health (Anxiety/PTSD/Bipolar)
☐ yes ☐ no	Skin problems/breaks in skin/lesions	☐ yes ☐ no	Seizures/nervous system/neurological
☐ yes ☐ no	Stomach/intestine/hernia	☐ yes ☐ no	Sleep apnea/sleep disorders
☐ yes ☐ no	Urinary problems	☐ yes ☐ no	Problems walking, moving
☐ yes ☐ no	Asthma/COPD/emphysema	☐ yes ☐ no	Back/joint/bone problems
☐ yes ☐ no	Vision problems (Not corrected)	☐ yes ☐ no	Immune system problems
☐ yes ☐ no	Hearing problems/hearing aids	☐ yes ☐ no	Infectious disease
☐ yes ☐ no	Diabetes	Other:	

Explain '**yes**' items above:

_____

Any ER visits, hospitalizations, surgeries or ongoing therapy during the last 12 months? ☐ yes ☐ no
If yes, explain and include dates:

_____

Please list all prescription and over-the-counter medications, and reason for taking:

MEDICATIONS	HOW OFTEN	REASON FOR TAKING

List all medical equipment or assistive devices used (crutches, canes, nebulizer, CPAP, oxygen, braces (arm/leg), wheelchair, service animals, etc.):

_____

I have reviewed the physical requirements for my group and activity in *Connection 2006-028, Deploying a Healthy Workforce* and the *DSHR System Handbook* (with addendums) with my unit of affiliation. I understand the physical requirements for being a disaster worker and hereby state that I am able to fulfill those requirements. I understand that if my health status changes, I am responsible for updating this form immediately and submitting to my unit of affiliation.

I understand that while health insurance is NOT required, I will be financially responsible for my health care expenses.

In signing below, I give permission for the Red Cross Staff Health Reviewer to contact my health care provider for information concerning my current health status. I will be notified before contact with my health care provider is made. I understand that refusal to sign may limit deployment.

My typed signature/date is verification that information on this form is correct. Please sign form if faxing.

Signature of DSHR Member: _____ **Date:** _____

Signature of Health Reviewer: _____ **Date:** _____

Codes-Hardship/Restriction: _____

HSR Review Summary Sheet	**ARC Use Only**
Place in the following DSHR Member's personnel health file	
Name:	
DSHR Number:	
Date HSR Completed: *{Must be completed yearly}*	
Reviewed By:	
Title:	
Date Reviewed:	

ARC Hardship Codes; Check all that apply:

☐ **None**	☐ **C7 Working Conditions**
☐ **C1 Water Disruption**	☐ **C8 Limited Health Care**
☐ **C2 Power Outage**	☐ **C9 Extreme Emotional Stress**
☐ **C3 Limited Food Availability**	☐ **C10 Travel Conditions**
☐ **C4 Extreme Heat and/or Humidity Limitation**	☐ **C11 Transportation**
☐ **C5 Extreme Cold**	☐ **C12 Air Quality**
☐ **C6 Housing Shortages**	☐ **C13 Lifting Limitation**

Place the Hardship Code information in the DSHR System database under "Restriction Information".

☐ **RH Restricted Hardship, note codes checked above**
☐ **RM Restricted Medical**
☐ **TI Temporarily Inactive**

Comments:

Pre-Assignment Health Questionnaire

American Red Cross

This form is to be filled out by the person at the unit of affiliation that is responsible for DSHR deployment or their designee. If the unit should not have deployed the member based on their DSHR record, they may be charged for the member's travel.

Member Name _____DSHR# _____ Requested for DR# _____

1 Does the member have a current *Health Status Record* on file? Yes_____ No_____ **If no, have member complete Health Status Record before continuing.**
2 Does the member have a medical restriction (RM) on their DSHR profile? Yes_____ No____ **If yes, do not recruit. The RM needs to be resolved first.**
3 Verify any hardship codes associated with the relief operation. Does the member's DSHR record include any of the hardship codes associated with this relief operation? Yes___ No___ **If yes, do not recruit without clearance from the Chapter Health Reviewer. If the chapter does not have a Health Reviewer, the Division Health Consultant must be notified to review the information prior to assignment and deployment.**

Read the following statements to the member: "Do not give me any health information. Give me yes or no answers. If you fail to give accurate information and are not able to serve as recruited on the relief operation for health reasons, the Red Cross may request reimbursement for your travel."

1 Are there any requirements for your group/activity/position on the Physical Capacity Grid that you cannot meet? (Chapter recruiters may need to read the requirements to the member). Yes____ No____
2 Do you currently have any stitches or areas of broken skin? Yes___ No____
3 Do you currently have a cast, brace or other device that restricts movement? Yes__ No___
4 Do you currently use a cane or other device to assist you? Yes___ No____
5 Have you been hospitalized or seen in the ER in the past six months? Yes__ No___
6 In the past three days, have you had any symptoms of illness such as fever >100 degrees, cough, sore throat, diarrhea, headache, flu -like symptoms etc.? Yes___ No____
7 Has anyone in your immediate family had the flu or flu like symptoms (fever >100 degrees, cough, sore throat, diarrhea, headache within the past 7 days? Yes ____ No ___
8 Have you been around anyone with the flu or flu like symptoms (fever >100 degrees, cough, sore throat, diarrhea, headache in the past 7 days? Yes ___ No ___
9 Have you traveled outside of your normal commuting area in the past 10 days? Yes ___ Where? _____ No ___
10 Do you have any medical/laboratory tests scheduled within the next month? Yes___ No___
11 Have you started, changed or stopped any medications in the past 14 days? Yes___ No___
12 Will you need to refill any prescriptions during your assignment? Yes___ No___

If there are any "Yes" answers to these questions, the member must be approved by the Health Reviewer before deployment.

Name of person obtaining information _____Date _____
Name of Health Reviewer given the "yes" information above: _____

Retain this form in the member's DSHR file in case it is requested by Staff Health at national headquarters, the Division Staff Health Consultant or Staff Health on the relief operation.

Rev 4/09

DSHR Physical Capacity Grid

DSHR Group / Activity		Physical Requirements																	
		Lift / carry 20 lb Muliple times/shift	Lift / carry 50 lb Muliple times/shift	Stand for two-hour periods	Sit for 2 hours periods	Walk on uneven terrain	Walk for two miles during a shift	Bend or stoop multiple time a shift	Crawl on the floor or ground	Work outdoors in inclement weather	Work in extreme heat and/or humidity	Work in extreme cold	Able to step up/down 18 inches	Spend hours writing	Speak clearly on phone and in person	Read small print for extended periods	Work for long periods on computer	Climb two or more flights of stairs	Drive in day time and at night
Operations Management	OM																		
Director	Dir	●		●	●	●				●	●	●		●	●	●	●	●	●
Assistant Director	AD	●		●	●	●				●	●	●		●	●	●	●	●	●
Multi-Site Diector	MD	●		●	●	●				●	●	●		●	●	●	●	●	●
Site Diector	SD	●		●	●	●				●	●	●		●	●	●	●	●	●
Individual Client Services	CLS																		
Client Casework	CC				●	●	●				●	●		●	●		●	●	●
Recovery Planning & Assistance	RPA													●	●		●	●	●
Disaster Health Services	HS	●		●	●	●	●	●		●				●	●	●	●	●	●
Disaster Mental Health	DMH	●		●	●	●	●	●		●				●	●	●	●	●	●
Mass Care	MC																		
Sheltering	SH	●		●	●			●			●	●			●				●
Feeding	FF	●	●	●	●	●	●	●		●	●	●	●		●			●	●
Bulk Distribution	BD	●	●	●	●	●	●	●		●	●	●	●		●			●	●
Safe & Well Linking	SWL	●		●	●	●	●	●			●	●		●	●	●	●	●	
External Relations	ER																		
Government Operations	LG			●	●	●	●								●	●	●	●	●
Community Partners	CPS	●		●	●	●		●		●	●	●			●		●	●	●
Public Affairs	PA			●	●	●	●	●		●	●	●		●	●	●	●	●	●
Fund Raising	FR			●	●									●	●		●		●
Information and Planning	IMS																		
Disaster Assessment	DA	●			●	●				●	●	●			●				●
Information Dissemination	ID			●	●		●							●	●	●	●	●	●
Financial & Statistical Info Management	FSI	●			●			●			●	●		●	●	●	●	●	●
Finance	FIN	●			●			●			●	●		●	●	●	●	●	●
Logistics	LOG																		
Facilities	FAC			●	●	●		●		●			●	●	●	●	●	●	●
In-Kind Donation	IKD				●									●	●	●	●	●	●
Warehousing	WHS	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●
Transportation	TRA				●									●	●	●	●	●	●
Life, Safety and Asset Protection	LSAP	●		●	●	●	●			●	●	●			●		●	●	●
Procurement	PRO	●	●			●		●		●					●	●		●	●
Supply	SUP	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●
Staff Services	SS																		
Local Community Volunteers	LCV	●		●	●			●						●	●	●	●	●	●
Staff Planning and Support	SPS			●	●			●						●	●	●	●	●	●
Staff Relations	SR			●	●										●				●
Staff Wellness	SW	●		●	●	●	●	●		●	●	●		●	●	●	●	●	●
Training	TR			●											●		●	●	●
Disaster Services Technology	DST																		
Computer Operations	RCO	●	●	●	●	●	●	●	●	●			●		●		●	●	●
Communication	RCM	●	●	●	●	●	●	●	●	●	●	●	●		●		●	●	●
Network	RNT	●	●	●	●	●	●	●	●	●	●	●	●		●		●	●	●
Customer Service	RCS	●	●	●	●	●	●	●	●	●			●	●	●		●	●	●

Revised 7-10

3T. Health and Safety Training Tool

Table used to record the training a responder has received.

Responder Training Documentation form		
Category	**Topic**	**Training Received?**
SAFETY AWARENESS	Driving Hazard Awareness	
	Environmental Conditions	
	Personal Protective Equipment	
	Disaster Zone Safety	
COMMUNICATIONS	Hazard Communications	
	Incident Action Plan	
	Health and Safety Plan	
	Standard Operating Guide/Procedure	
	Situation Reports	
	Mobile Communications	
SELF CARE/BUDDY CARE	Physical	
	Emotional	
	Medical	
	Work schedule	
ORGANIZATION	Incident Command System	
	National Incident Management System	
DECONTAMINATION	Chemical/Biological decontamination	
	Gross decontamination	
	Equipment decontamination	
SITE OPERATIONS	Site Control	
	Credentialing	
	Accountability	
DISASTER CHARACTERIZATION	Specific Disaster Types	

4T. Data Management and Information Security

Data Management Checklist			
Type of Data	Database Available		Source/Location
	Yes	No	
Roster and Credentialing			
Roster			
Credentials			
Badges			
Pre-deployment Health Screening			
Health Screening Results			
Immunizations			
Training			
Training Data			
On-Site In-processing			
On-Site Roster			
Site Specific Training			
PPE Documentation			
Health Monitoring and Surveillance			
Injury and Illness (Individual)			
Injury and Illness (Poplulation)			
Biomonitoring Data			
Activity Documentation and Exposure Assessment			
Environmental Data			
Exposure Data			
Job Task Data			
Out-processing Assessment			
Out-processing Survey			
Post-event Tracking			
Medical Screening Exams			
Post-event Monitoring or Surveillance			

Deployment Phase

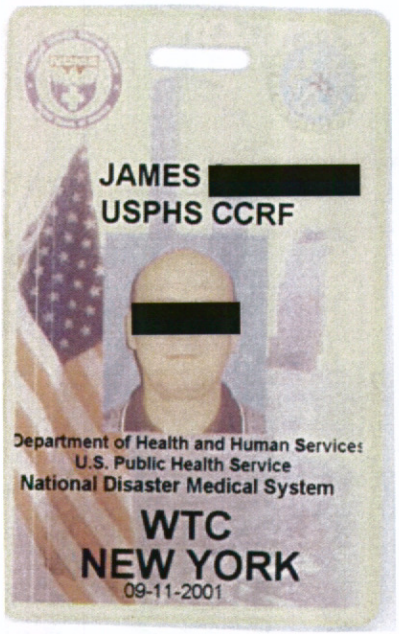
5T. On-site Responder In-processing

Contents:

1. In-processing (sample badges)
2. Site Specific Training (sample badges)
3. Out-processing (sample demobilization card)
4. NIOSH Deepwater Horizon Roster form

In-processing (Personnel Accountability)

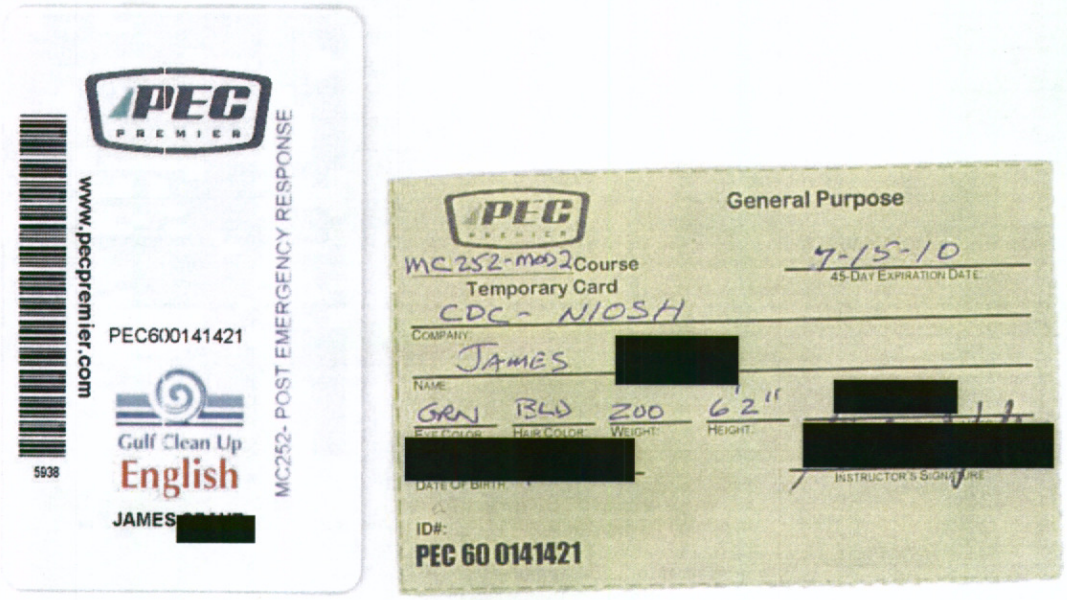
Responder ID Badge



Responder Site Entry Badge

Command Area Entry Badge

Site Specific Training Badge



Out-processing

Demobilization Card

MC252 Demobilization - Mobile
CHECK-IN WITHIN 24 HRS

Email: mc252demob@[redacted]
Phone: (251) 410-[redacted]

USGC members must also contact the Incident Command Post

Email: [redacted]

NIOSH Deepwater Horizon Roster Form

Form Approved
OMB No. 0920-0851
Exp. Date 08/31/2010

Date _____

Gulf Coast Oil Spill Initial Survey

Name (Last, First, MI)	Date of birth	Last four digits of social sec.	Gender	Race/Ethnicity
	/ /		☐ Male ☐ Female	☐ White ☐ Black ☐ Hispanic ☐ Asian ☐ Other

Cell phone (with area code)	Street address	City	State	ZIP	Email address

Name and number of contact who will know where you are in 6 months

Employer or volunteer organization on site

What has been your USUAL Job prior to the Spill?

How many years have you been working at your USUAL job?

On the Oil Spill, are you a: ☐ BP employee ☐ Contractor ☐ Government worker ☐ Volunteer ☐ Don't Know

Would you be willing to be contacted about participating in a possible post-event survey? ☐ Yes ☐ No

Response Work (please be as specific as possible)

What will be your job or responsibilities?

Will your job tasks involve the potential of exposure to oil or oily substances?
- ☐ Yes
- ☐ No
- ☐ Don't Know

If yes, please describe the tasks:

What are your expected deployment location(s)?

How long are you planning on working on the oil spill?
- ☐ less than 1 week to one week
- ☐ 1 week to 2 weeks
- ☐ more than 2 weeks to one month
- ☐ More than one month
- ☐ As long as the work is available
- ☐ I don't know

What training have you received? (Check all that apply)
- ☐ Module 1: BP HSE Basic Orientation
- ☐ Module 2: Contractor Expectations
- ☐ Module 3: Post-Emergency Spilled Oil Cleanup
- ☐ First Responder Awareness
  - ☐ Annual refresher
- ☐ First Responder Operations (8 hr)
  - ☐ Annual refresher
- ☐ Hazardous Materials Technician (24 hr)
  - ☐ Annual refresher
- ☐ HAZWOPER (24 hr)
  - ☐ Annual refresher
- ☐ HAZWOPER (40 hr+)
  - ☐ Annual refresher
- ☐ Other training, describe:

Are you expecting to use personal protective equipment to protect your skin?
- ☐ Yes
- ☐ No
- ☐ Don't Know

Are you expecting to use personal protective equipment to protect your eyes (goggles or eyewear)?
- ☐ Yes
- ☐ No
- ☐ Don't Know

Are you expecting to use respiratory protection?
- ☐ Yes
- ☐ No
- ☐ Don't Know

Have you been fit-tested for a respirator in the last year?
- ☐ Yes
- ☐ No
- ☐ Don't Know

Do you smoke?
- ☐ Yes, number of cigarettes per day: ☐
- ☐ No
- ☐ Prefer not to answer

CDC recommends that adults be vaccinated for tetanus every 10 years. Have you had a tetanus vaccine within the past 10 years?
- ☐ Yes
- ☐ No
- ☐ Don't Know

Do you have other issues or concerns?

I have read and understand the Data Use and Disclosure sheet about who is collecting this information and how it will be used and that my participation is voluntary.

Signature _____

6T. Health Monitoring and Surveillance During Response Operations

Deepwater Horizon Health Hazard Evaluation Survey

Form Approved
OMB No. 0920-0260
Expires January 31, 2012

Date _____ **NIOSH Health Hazard Evaluation on the Oil Spill**

Name	Age	☐ Male ☐ Female	Race/Ethnicity ☐ White ☐ Black ☐ Asian ☐ Hispanic ☐ Other

Are you a:
☐ BP employee ☐ Contractor employee
☐ Coast Guard ☐ Other_____

Name of Current Employer during this Oil Spill Event

List your Usual Job before this one.

Number of days working on the Oil Spill Activities:

Have you had exposure to:

	Not at All	A Few Days	Almost Every Day	Daily
Oil	☐	☐	☐	☐
Dispersant	☐	☐	☐	☐
Cleaners	☐	☐	☐	☐
Dust	☐	☐	☐	☐

Do you have any of the following symptoms? (Please put a checkmark next to all that apply)

☐ Scrapes or cuts
☐ Burns by fire
☐ Chemical burns
☐ Bad sunburn

☐ Headaches
☐ Dizziness
☐ Feeling faint
☐ Fatigue/exhaustion
☐ Weakness

☐ Itchy eyes
☐ Red or irritated eyes
☐ Nose irritation
☐ Nose bleed
☐ Sinus problems
☐ Sore throat
☐ Metallic taste

Any Other symptoms:

☐ Cough
☐ Trouble breathing
☐ Short of breath
☐ Chest tightness
☐ Wheezing

☐ Fast heart beat
☐ Chest pressure
☐ Nausea
☐ Vomiting
☐ Stomach cramps
☐ Diarrhea
☐ Itchy skin
☐ Red skin
☐ Rash
☐ Hot and dry skin

Do you smoke cigarettes?
☐ Yes
☐ No

Do you have any health problems ?
☐ Allergies
☐ Lung Problems
☐ High blood pressure
☐ Diabetes
☐ Dermatitis or skin rash

☐ Neck pain
☐ Shoulder pain
☐ Hand pain
☐ Back pain

☐ Feeling worried/stressed
☐ Feeling pressured
☐ Feeling depressed / hopeless
☐ Feeling short tempered
☐ Frequent changes in mood

Have you:
☐ Had skin contact with the oil
☐ Experienced disturbing odors

Check any training you have had for this event:
☐ No training yet
☐ 45 minutes of training
☐ 4 hours of training
☐ Haz-MatTraining
☐ Other

7T. Integration of Exposure Assessment, Responder Activity Documentation, and Controls Into ERHMS

Contents:

1. **OHSA Deepwater Horizon Personal Protective Equipment (PPE) Matrix**
2. **Incident Safety and Health Management Handbook**
3. **NIOSH Deepwater Horizon Staging Area Safety Information Checklist**
4. **NIOSH Health Hazard Evaluation Program Worker Observation Form (Exposure Assessment Data Collection Template)**
5. **NIOSH Deepwater Horizon On Shore Exposure Assessment Data Collection Form**

OHSA Deepwater Horizon Personal Protective Equipment Matrix

http://www.osha.gov/oilspills/gulf-operations-ppe-matrix.pdf

Matrix created for the Deepwater Horizon Response to quickly identify minimum PPE requirements and additional considerations for selected tasks both on- and off-shore

AIHA Incident Safety and Health Management Handbook

https://webportal.aiha.org/Purchase/ProductDetail.aspx?Product_code=2d99f67d-4778-de11-96b0-0050568361fd

This Handbook is available from the American Industrial Hygiene Association's (AIHA) website. It provides the following:

1. An immediate and field-expedient guide to incident safety officers or their staffs;
2. A structured safety and health planning and execution process in order to integrate safety functions into an established incident command structure;
3. Short technical reference information to incident safety officers or their staff on issues such as air monitoring, respiratory protection, and personal protective equipment selection, in order to develop good plans and actions.

Staging Area Information Check List

Staging Location: (Insert County/Parish, State)	
Date:	
NIOSH Personnel:	
Number of Workers:	
Type of Workers: VOO, On-shore, Off-shore	
Number of collected surveys:	
Describe Work Tasks:	
Workshift time/duration:	
Module Training required	
Personal Protective Equipment Required	
Safety Concerns observed:	
Top Safety Concerns observed by Safety Officer (Identify Safety Officers)	
Decon in Use	
Describe Medical Support	
Heat Stress Coordinator	

Staging Area Information Check List

Heat Stress Program Details (Shade provided, time on/off)	
Hot Zones	
Hot Zone Markings	
Safety Briefings (yes/no) when	
Specific Messages during briefing	
Hygiene Logistics (hand washing stations, etc)	
Consumables provided to workforce at staging area? (food, water, Gatorade, etc.)	
Workforce Organization (buddy system, etc.)	
Pre-employee medical screening	

Staging Area Information Check List

Issues Observed:	
Visit Text Description of Site	

NIOSH Health Hazard Evaluation Program Worker Observation Form (Exposure Assessment Data Collection Template)

WORKER OBSERVATION FORM

HETA # _____ Company name: _____
Date: _____ Completed by: _____
Sequence # _____

NIOSH
HE HealthHazard Evaluation Program

GENERAL INFORMATION

Name:	Job title:	
Process description:		Length of process:
Dept:	Line:	Location:
Specific tasks:		
Potential exposures:		
Sampling conducted: ☐ Air ☐ Noise ☐ Heat stress ☐ Dermal/surface ☐ Other: _____		

AIR SAMPLING INFORMATION
(Draw arrows to link samples for TWA calculation. Gray is required)

Sample #				
Sampling media				
Pump #				
Type	☐ PBZ ☐ Area	☐ PBZ ☐ Area	☐ PBZ ☐ Area	☐ PBZ ☐ Area
Agent(s)				
Task (if task based)				
Start time (military)				
Stop time (military)				
Pump time (min)				
Avg. flow (LPM)				
Conc.				
Averaging time (8hr, 15min, etc.)				

RESPIRATORY PROTECTION

Type (half-mask, etc.):	Mnf:	Model:
Type of cartridge or filter:		
Respirator use: ☐ Mandatory ☐ Voluntary	Is employee in a written respiratory protection program? ☐ Yes ☐ No ☐ Don't know	
Correct type of respirator for exposures? ☐ Yes ☐ No	Worn correctly? ☐ Yes ☐ No	
Respirator condition (valves, seal, cleanliness, etc.):		
Frequency of use:	Changeout frequency (for respirator or cartridge):	
Employee's judgment of effectiveness:		

Page 1 (See Back)

Pre-deployment | Deployment | Post-deployment

HEARING PROTECTION

Type:	☐ Plugs ☐ Muffs ☐ Both ☐ Available but not worn		
Mnf:	Model:	NRR:	
Use:	☐ Mandatory ☐ Voluntary	Worn correctly? ☐ Yes ☐ No	
Is employee in a written hearing conservation program? ☐ Yes ☐ No ☐ Don't know			

ENGINEERING CONTROLS

Task/Process			
Type (LEV, enclosure, etc)			
Mnf			
Model			
Description			
Judgment of effectiveness	☐ Effective ☐ Ineffective	☐ Effective ☐ Ineffective	☐ Effective ☐ Ineffective
If ineffective, why?			
Further evaluation needed?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

PROTECTIVE CLOTHING / GLOVES

Type (gloves, coveralls, etc)			
Mnf			
Model			
Material			
Available but not worn	☐	☐	☐
Changeout freq.			
Condition	☐ Good ☐ Fair ☐ Poor	☐ Good ☐ Fair ☐ Poor	☐ Good ☐ Fair ☐ Poor
Description			
Other PPE	☐ Glasses ☐ Hard hat ☐ Steel Toe Boots ☐ Other: _____		
Uncovered skin (Check all that apply)	☐ Arms ☐ Hands ☐ Wrist ☐ Neck ☐ Face ☐ Legs ☐ Other: _____		

NOTES

NIOSH Deepwater Horizon On Shore Exposure Assessment Data Collection Form

IH observer | Date (mm/dd/yy)

Worksite information

Time

State | County | Division

Command Center (Division Name)

Site Location

Nature of operation (check one)

☐ shoreline/marsh cleanup ☐ equipment decon ☐ wildlife decon ☐ waste mgmt

☐ other, specify

Date operation began (mm/dd/yy) | No. workers

Day or night operation? ☐ Day ☐ Night

Oil Contamination: ☐ Heavy ☐ Moderate ☐ light ☐ None Temp F | RH %

Job/task information

Describe

Does the task involve any of the following? Check all that apply

☐ heavy lifting ☐ high pressure water/cleaner ☐ power hand tools

☐ awkward postures ☐ repetitive motions ☐ diesel-powered equipment

Chemical hazards

Chemical		form solid liquid/pour liquid/spray Other	inhalation potential hi med low	Dermal Potential hi Med lo	duration (hrs/day)	if indoors, ventilation: none general local exhaust	Comments
Oil	☐						
Dispersant	☐						
Cleaner	☐						
other (Specify)							

Is there evidence of oil or chemicals on employees' work clothes? No Yes

Is there evidence of unprotected skin contact with chemicals or oil? No Yes

Is there evidence of unpleasant odors? No Yes

Personal protective equipment observed in use

PPE Type	In use?	Replacement Frequency	Type	Other Info	Provided by	Use is
Safety glasses	☐ No ☐ Yes	☐ As nec ☐ Daily ☐ Task ☐ Other			☐ Employer ☐ Employee	☐ Required ☐ Voluntary
Goggles	☐ No ☐ Yes	☐ As nec ☐ Daily ☐ Task ☐ Other			☐ Employer ☐ Employee	☐ Required ☐ Voluntary
Gloves	☐ No ☐ Yes	☐ As nec ☐ Daily ☐ Task ☐ Other		☐ Short ☐ Long	☐ Employer ☐ Employee	☐ Required ☐ Voluntary
Respirator	☐ No ☐ Yes	☐ As nec ☐ Daily ☐ Task ☐ Other			☐ Employer ☐ Employee	☐ Required ☐ Voluntary
Safety shoes	☐ No ☐ Yes	☐ As nec ☐ Daily ☐ Task ☐ Other			☐ Employer ☐ Employee	☐ Required ☐ Voluntary
Hard hat	☐ No ☐ Yes	☐ As nec ☐ Daily ☐ Task ☐ Other			☐ Employer ☐ Employee	☐ Required ☐ Voluntary
Hearing Protection	☐ No ☐ Yes	☐ As nec ☐ Daily ☐ Task ☐ Other			☐ Employer ☐ Employee	☐ Required ☐ Voluntary
Face Shield	☐ No ☐ Yes	☐ As nec ☐ Daily ☐ Task ☐ Other			☐ Employer ☐ Employee	☐ Required ☐ Voluntary
Tyvek or Tychem	☐ No ☐ Yes	☐ As nec ☐ Daily ☐ Task ☐ Other			☐ Employer ☐ Employee	☐ Required ☐ Voluntary
Rubber Boots	☐ No ☐ Yes	☐ As nec ☐ Daily ☐ Task ☐ Other			☐ Employer ☐ Employee	☐ Required ☐ Voluntary
Slicker Suit (rain)	☐ No ☐ Yes	☐ As nec ☐ Daily ☐ Task ☐ Other			☐ Employer ☐ Employee	☐ Required ☐ Voluntary
Other	☐ No ☐ Yes	☐ As nec ☐ Daily ☐ Task ☐ Other			☐ Employer ☐ Employee	☐ Required ☐ Voluntary

Clothing	No	Yes	Type	
Shirt	☐ No	☐ Yes	☐ Long sleeve	☐ Short sleeve
Pants	☐ No	☐ Yes	☐ Long	☐ Short
Head covering	☐ No	☐ Yes		
Protective sleeves	☐ No	☐ Yes		
Apron	☐ No	☐ Yes		
Waders	☐ No	☐ Yes		
Other				

Other preventive measures

Item	No	Yes	Comments
Shower facilities on site	☐	☐	
Handwash facilities onsite	☐	☐	
Emergency eyewash onsite	☐	☐	
Adequate sanitary facilities	☐	☐	
Access to air condition area for breaks	☐	☐	
Shaded work area	☐	☐	
Shaded break area	☐	☐	
Do workers eat, drink, or smoke in work area?	☐	☐	
Adequate water provided?	☐	☐	
MSDS readily available non-English, as needed	☐	☐	
Unlabelled chemical containers?	☐	☐	
Facilities for first aid?	☐	☐	
Procedures for medical emergencies?	☐	☐	
Decon of clothing	☐	☐	
Decon of tools?	☐	☐	

Other

What is the average number of hours worked per day?

What is the maximum number of hours worked per day?

Is there a work/rest regimen? ☐ No ☐ Yes _____ minutes on _____ minutes off

Check if any evidence of the following.

☐ snakes ☐ wild animals ☐ mosquitoes ☐ ticks ☐ alligators

Comments

8T. Communications of Exposure and Health Monitoring and Surveillance Data During an Emergency Response

Contents:

Forms Explaining Data Use and Disclosure and Privacy Act Statement

Given to responders before they have information collected, so they are aware how their information will be handled and protected.

NIOSH is part of the Centers for Disease Control and Prevention (CDC) in the Department of Health and Human Services. CDC/NIOSH is the federal agency that evaluates and makes recommendations for the prevention of work-related injury and illness.

DATA USE AND DISCLOSURE

Why is NIOSH here at the site of the Gulf Oil Spill?

- We would like to monitor potential health effects workers involved in cleanup of an oil spill may experience so we can help protect them in the future.
- We have experts who routinely conduct these surveys of employees and employers.

Why is this evaluation being done?

- We know that workers may be potentially exposed to things in an oil spill cleanup: such as oils, volatile organic compounds, polyaromatic hydrocarbons, diesel fumes, heat, noise, and heavy lifting.
- We know that training will help provide information to workers about these exposures, and we are interested in what training workers receive.
- We want to gather information from workers involved in cleanup, so that after cleanup is over, we can see if workers experienced any symptoms related to the oil spill work. Oil spill exposures may cause some workers to experience symptoms like skin rash, throat irritation and cough, and back pain. We do not know if these symptoms will occur or if they do, what will be the extent of these symptoms. We want to learn as much as we can in order to reduce symptoms now and in the future.
- Documenting symptoms in this incident may provide information that NIOSH can use to protect the health of workers in this clean up and in future clean-up efforts.

Which employees does NIOSH want to evaluate?

- NIOSH would like to evaluate ALL of the clean-up workers so that we can record any illness, injury, or stress that is occurring.

Will your answers be private?

- Although the questionnaires will ask for personal information, it will only be used so that we can follow up with you, but ONLY group data will be reported.
- Participation in this survey is voluntary. You will decide whether you want to provide us with this information. You are free to choose not to answer these questionnaires. It is up to you.
- With your permission, NIOSH is allowed to collect and keep information about you, including your results from this questionnaire, because of two laws passed by Congress. These laws are:
  1. The Public Health Service Act (42 U.S.C 241)
  2. The Occupational Safety and Health Act (29 U.S.C. 669)
- If the information we are collecting is maintained and retrieved by personal identifiers, such as your name, it will become part of the CDC record system, maintained under the federal Privacy Act, and we will protect it to the extent allowed by law. We are requesting the last four digits of your Social Security Number so we can make sure to differentiate you from others with similar names. Again you are free to choose not to provide this information.
- You should know, however, that there are limited conditions under the Privacy Act when we could be authorized to release this information to outside sources. These conditions under which we might release this information are listed on Page 2 (the Privacy Act).

What will be the result of this evaluation?

- NIOSH will provide a final written report through CDC to BP, its contractors, the workers, and federal and state government agencies. This report will not contain individual information and will be available to the public.

Contact: NIOSH, 404-498-GULF (4853), CDCNIOSHGULFWORKER@CDC.GOV

Privacy Act

The Information you provide will become part of the CDC Privacy Act System, 09-20-0147, "Occupational Health Epidemiological Studies and EEOICPA Program Records" and may be disclosed to

- Appropriate state or local health departments to report communicable diseases;
- A State Cancer Registry to report cases of cancer where the state has a legal reporting program providing for confidentiality;
- Private contractors assisting NIOSH;
- Collaborating researchers under certain circumstances to conduct further investigations;
- One or more potential sources of vital statistics to make determinations of death, health status or to find last known address;
- The Department of Justice or the Department of Labor in the event of litigation;
- Congressional offices assisting an individual in locating his or her records;

You may request an accounting of the disclosures made by NIOSH.

Except for these and other permissible disclosures authorized by the Privacy Act, or in limited circumstances required by the Freedom of Information Act, no other disclosures may be made without your prior written consent.

Privacy Act Statement: DHS's Use of Your Information

Principal Purposes:

Office of Health Affairs (OHA) has developed the Post-deployment Occupational Health and Exposure Survey to provide DHS components and offices with a standardized tool to collect occupational health and exposure data from employees returning from duty in hazardous locations. Employees' participation in this survey is strictly voluntary (employees may opt to provide all, some, or none of the information requested). Information collected using this survey will enable DHS to address occupational health concerns resulting from deployment of its employees to hazardous locations and will promote the health of its workforce by improving its occupational health services.

Routine Uses and Sharing:

In general, a component/office safety and health official will not use this information for any purpose other than the Principal Purposes, and will not share this information within or outside their component. Only statistical (aggregated) data extracted from survey results may be shared with other entities within the Department or outside of the Department. In addition, in certain circumstances DHS may share this information on a case-by-case basis as required by law or necessary for a specific purpose, as described in the OPM/GOVT-10 Employee Medical File System of Records Notice (71 FR 3536).

DHS Authority to Collect this Information:

DHS requests that personnel returning from deployment voluntarily submit this information under its following authorities: Subpart E of Title 5 of the Code of Federal Regulations, Employee Medical File System Records (2009).

Accessing and Correcting Information:

If for any reason you wish to access or correct the information provided in the post-deployment survey, you may go to your component or office's principal safety and health officer to request access to your Employee Medical File. If you are unable to access the information from the component or office principal safety and health officer, then you may direct your request in writing to the appropriate FOIA Officer, whose contact information can be found at http://www.dhs.gov/foia under "contacts." Additional instructions are available at that website and in the OPM/GOVT-10 System of Records Notice, referenced above.

Post-Deployment Phase

9T. Incident Personnel Out-processing Assessment

Contents:

Welcome Home Letter to be Distributed During Demobilization or Out-processing

(Place of Deployment) Post-Deployment Health Information for Incident Personnel

Welcome back and thank you for a job well done during your deployment! Please read the following document to familiarize yourself with illnesses that may be more common in individuals that have been to/involved in (Place of Deployment). Information in this material will help alert you to health complaints (injury, illness, and mental health) that may need further evaluation.

Things to tell your doctor:

- If you are experiencing symptoms such as fever, flu-like illness, chills, headache, joint/muscle aches
- If you were injured or have wounds that are not healing well while in/involved in (Place of Deployment)
- If you feel depressed, confused, have trouble sleeping, or have a hard time adjusting back into your home environment
- If you were bitten or scratched by an animal while in (Place of Deployment).
- If you believe you were exposed to hazards such as dust, pathogens, or chemicals and continue to have persistent health problems

What to watch for in the next few weeks:

If you experience symptoms or conditions discussed in this document or have other concerning symptoms not listed, please see your doctor as soon as possible.

[here make a list of the symptoms you would most likely see with the diseases of concern for the location or incidence personnel were involved in]

EXAMPLE

- increased stress, difficulty adjusting to routine, sleeplessness, persistent sadness, depression

Illnesses More Common in Individuals Who Have Been to/Involved in (Place of Deployment)

[List potential exposures, illnesses, injuries, or mental health issues common to the locale or incident. (examples: TB, Japanese encephalitis, dust/asbestos, mental health...) Here go into more detail about causes, latency periods, symptoms]

EXAMPLE

Psychological/Emotional Difficulties: As a responder or relief worker, you may have encountered extremely stressful situations, such as witnessing loss of life, injuries, separated families, and destruction. These experiences may cause psychological or emotional difficulties. Up to one-third of workers will experience depression shortly after returning home. A mental health professional can help you with psychological or emotional difficulties. [List contact info.]

Suggested Information to Gather During Out-processing Assessment

Verify personal information

Verify identifying and contact information

- Name
- Address
- Phone number(s) (work, home, cell)
- E-mail address(es) (work, personal)
- Age, date of birth
- Sex
- Social Security Number (last four digits) or unique identification number
- Contact information for someone who will know where the worker is 6 months after demobilization
- Response organization
    - Indicate employer or volunteer organization
    - Name and address
    - Contact person's name, phone, and email

Verify (if data available) usual work

- Industry
- Occupation
- Job tasks
- Number of years

Verify special needs

- Primary language

Response-related information

Response/recovery work

- Type of response/recovery work performed
- Circumstances under which work was performed
    - Geographic location
    - Dates and times (at least shifts worked) work was performed

Known hazardous exposures or conditions

- Type of exposure or conditions (if known)
- Work practices

- Protective measures used by incident personnel to protect themselves from dangers of any kind (e.g., personal protective equipment listed so it can be checked off by the person being assessed)

Qualitative questions

- Did you have adequate training on safety and health issues relating to your work?
- What were the most positive aspects of this deployment for you?
- What were the most difficult aspects of this deployment for you?
- Do you have any suggestions for things your organization could do differently for future deployments?
- Do you have any concerns about your own well-being as you leave?

Injuries sustained or illness symptoms experienced during response/recovery work

* Goal: use the correct number and type of questions to raise clinical suspicion for referral rather than render an accurate diagnosis
- Injuries
    - Description of injury
    - Complete resolution vs. still present
- Health complaints
    - Current health complaints
- Use standardized list by general body system, including emotional and behavioral health (anxiety, mood, altered behavior, sleep problems, substance abuse, PTSD, and depression)
- Use only as trigger questions for follow-up
- Include query about urgency to evaluate the need for more immediate health evaluation referral
- Potential sources of questions: Deepwater Horizon Response Survey, Army's Post-deployment Health Assessment (see toolbox)
    - New vs. exacerbation of preexisting condition

DEPARTMENT OF HOMELAND SECURITY

OFFICE OF HEALTH AFFAIRS

POST-DEPLOYMENT ASSESSMENT QUESTIONNAIRE DECLINATION

Print: First Name: _____ **MI:** _____ **Last Name:** _____

As a DHS Mission Critical and/or Emergency Essential employee returning from designated deployment assignment, and may have been exposed to biological or environmental hazards, you are eligible to participate in the DHS Post –Deployment Medical Assessment. Every work experience is unique and may reflect individual differences regarding exposures. Completion of this document is voluntary. If you do not wish to participate, you are required to complete this Declination form.

_____ **DECLINATION: (General):** I understand that due to my deployment work assignment and possible exposure to potential biological or environmental hazards, I may be at risk for illness. I have been given the opportunity to be evaluated; however, I decline the evaluation at this time. I understand that by declining this assessment, I could be at risk for illness secondary to possible exposures.

Signature: _____ Date: _____

DHS Form 5202 (3/10)

DEPARTMENT OF HOMELAND SECURITY

DHS Post Deployment Health Screening Questionnaire

INSTRUCTIONS: This document addresses deployment related exposures that you may have come in-contact with during your tour of duty. Every work experience is unique and may reflect individual differences regarding exposures. Completion of this document is voluntary. If you do not wish to participate, you are required to complete the attached Declination Form.

1. Complete each item based on your personal experience during your deployment and your best judgment of actual or suspected exposures. Additional hazards may be noted and commented upon in the spaces provided.
2. Sign the Authorization for Release of Information and return it along with this survey to your component medical reviewing physician or agency equivalent.

Today's Date _____

LAST NAME _____ FIRST (No nicknames) _____ MIDDLE _____

Sex: ☐ Male ☐ Female Age: _____ Job Title: _____

Component _____ DISTRICT/DIVISION ADDRESSES _____ YOUR WORK TELEPHONE NO. _____

Deployment Dates: From: _____ **To:** _____

What were your duties during deployment? (Please check that apply applies)

☐ Search, Rescue ☐ Law Enforcement/Security

☐ Safety/Health ☐ Recovery

☐ Immigration Enforcement duties

☐ Operations ☐ Other _____

☐ Peer Support/Critical Incident Stress Management ☐ Medical/Health Care

Worksite (Please check each check boxes that applies):

☐ Deployment sites: _____ Daily travel time to work site (if applicable): _____

☐ hrs/day ☐ days/week ☐ weeks/month ____ total months

Shift Work: (check one): _____ 8 hours _____ 12 hours _____ 16 hours _____ other(explain): _____

Total Hours per week (worked): _____

Rest Periods:

Average hours sleep per day/night: _____

Was sleep/rest period uninterrupted? _____

NIOSH Deepwater Horizon Worker Health Survey

This survey was created by NIOSH and approved by the Office of Management and Budget during the Deepwater Horizon Response, and it represents an example of an out-processing assessment.

CDC/NIOSH DEEPWATER HORIZON RESPONSE WORKER HEALTH SURVEY

[INTERVIEWER: READ THE FOLLOWING INTRODUCTION.]

Intro 1

Hello, I'm [*NAME*] from the Centers for Disease Control and Prevention, commonly referred to as CDC. Is this [*RESPONDENT'S NAME*]? We are surveying responders to the BP Gulf Oil Spill to ask about some exposures and health issues that may have been experienced by workers and volunteers in responding to the spill. This study is sponsored by the National Institute for Occupational Safety and Health which is part of CDC. Study results will be used to protect future workers. The survey takes about 25 minutes to complete. Your participation is voluntary, and all your answers will be kept private to the extent permitted by law. If you do not wish to participate, or do not want to answer particular questions, this will not result in any penalty or loss of benefits to you and your family. Your telephone number was provided through a roster of people who responded to the oil spill. If there are any questions that you don't feel you can answer, please let me know and we'll move to the next one. So, if I have your permission, I'll continue.

[IF YES, GO TO QUESTION SCRN 1]

[IF NO, READ INTRO 2]

Intro 2

I assure you that everything you tell us will be kept PRIVATE. This project will be used to identify health problems and patterns of injury faced by oil spill response workers. Your cooperation will benefit all oil spill response workers. Would you please consider helping us?

[IF YES, GO TO QUESTION SCRN 1]

[IF NO, READ THE FOLLOWING]

I'm sorry to have bothered you. Thank you for your time.

[END CALL]

NEVER, EVER OR CURRENT WORKER SCREEN

SCRN 1. Not counting days you spent in training, did you work at least three days on the oil spill response in any capacity?

Yes 1

No ..... 2 [GO TO QUESTION DEMO 1]

Refused ..... 99 [GO TO QUESTION DEMO 1]

SCRN 2. Are you currently working on the oil spill response?

Yes 1

No 2

Don't know 88

Refused 99

HEALTH SYMPTOMS

[INTERVIEWER: READ THE FOLLOWING PROMPT ONCE BEFORE ASKING QUESTIONS SYMP 1 TO SYMP 15]

I'm going to ask you some questions about your health DURING THE PAST 30 DAYS.

SYMP 1. In the past 30 days, how often did you have a cough?

All the time 1

Most of the time 2

Sometimes 3

[INTERVIEWER: DON'T READ]

Don't know 88

Rarely 4

Never 5

Refused 99

SYMP 2. In the past 30 days, how often did you have wheezing or whistling in your chest?

All the time 1

Most of the time 2

Sometimes 3

[INTERVIEWER: DON'T READ]

Don't know 88

Rarely 4

Never 5

Refused 99

SYMP 3. In the past 30 days, how often did you have tightness in your chest?

All the time 1

Most of the time 2

Sometimes 3

[INTERVIEWER: DON'T READ]

Don't know 88

Rarely 4

Never 5

Refused 99

SYMP 4. In the past 30 days, how often were you short of breath?

All the time 1
Most of the time..... 2
Sometimes..... 3
Rarely... 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

SYMP 5. In the past 30 days, how often did you have a stuffy, itchy or runny nose?

All the time 1
Most of the time..... 2
Sometimes..... 3
Rarely..... 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

SYMP 6. In the past 30 days, how often did you have watery or itchy eyes?

All the time 1
Most of the time..... 2
Sometimes..... 3
Rarely..... 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

SYMP 7. In the past 30 days, how often did you have burning eyes?

All the time 1
Most of the time..... 2
Sometimes..... 3
Rarely..... 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

SYMP 8. In the past 30 days, how often did you have burning in your nose, throat or lungs?

All the time 1
Most of the time 2
Sometimes 3
Rarely 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

SYMP 9. In the past 30 days, did you have a skin rash that lasted 2 or more days?

Yes 1
No ..... 2 [GO TO QUESTION SYMP 11]
Don't know ..... 88 [GO TO QUESTION SYMP 11]
Refused ..... 99 [GO TO QUESTION SYMP 11]

SYMP 10. Did you get the rash on a part of your body that touched or came into contact with any of these? [INTERVIEWER: READ LIST AND CODE ALL THAT APPLY]

Oil 1
Chemical dispersants 2
Your personal protective equipment (e.g., boots, gloves, coated Tyvek suit) 3
Sunscreen 4
Poison ivy or poison oak 5
Don't know 88
Refused 99

SYMP 11. In the past 30 days, how often did you have a severe headache or migraine?

All the time 1
Most of the time 2
Sometimes 3
Rarely 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

SYMP 12. In the past 30 days, how often did you have dizziness or lightheadedness?

All the time 1
Most of the time 2
Sometimes 3
Rarely 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

SYMP 13. In the past 30 days, how often did you have nausea or vomiting?

All the time 1
Most of the time..... 2
Sometimes..... 3
Rarely..... 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

SYMP 14. In the past 30 days, how often did you have diarrhea? [INTERVIEWER: DIARRHEA IS DEFINED AS AT LEAST THREE LOOSE OR WATERY STOOLS IN A 24 HOUR PERIOD.]

All the time 1
Most of the time..... 2
Sometimes..... 3
Rarely..... 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

SYMP 15. In the past 30 days, how often did you have blurred or distorted vision?

All the time 1
Most of the time..... 2
Sometimes..... 3
Rarely..... 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

SYMP 16. In the past 30 days, how often did you have lower back pain?

All the time 1
Most of the time..... 2
Sometimes..... 3
Rarely..... 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

SYMP 17. I'm going to read you a list of four types of symptoms. Please tell me whether, while working in hot conditions during the oil spill response, you experienced TWO OR MORE of these types of symptoms at the same time in the past 30 days?

1 – Headaches, dizziness, lightheadedness or fainting.

2 – Weakness and moist skin.

3 – Mood changes such as irritability or confusion.

4 – Upset stomach or vomiting.

Yes ..... 1 Don't know 88

No ..... 2 Refused 99

SYMP 18. While working in the heat during the oil response, not counting scheduled work breaks, did you ever have to stop working because of exhaustion or because you got too hot?

Yes ..... 1 Don't know 88

No ..... 2 Refused 99

SYMP 19. For any symptom or illness that began since the time you started working on the oil spill response, did you go for medical help? [INTERVIEWER: INCLUDE ANY SYMPTOM OR ILLNESS, EVEN THOSE NOT LISTED ABOVE BUT DO NOT INCLUDE INJURIES]

Yes ..... 1 Don't know ... 88 [GO TO QUESTION SYMP 23]

No ..... 2 [GO TO QUESTION SYMP 23] Refused ..... 99 [GO TO QUESTION SYMP 23]

SYMP 20. What (was/were) the symptom(s) or illness(es) that you went for medical help for?

Don't know ..... 88 Refused 99

SYMP 21. Where did you go for medical help? [INTERVIEWER: CODE ALL THAT APPLY]

Field or boat medical station ..... 1 Personal physician 4

Urgent care clinic ..... 2 Other 5

Emergency room 3

[INTERVIEWER: DON'T READ]

Don't know ..... 88 Refused 99

SYMP 22. Were you hospitalized for (this/these) symptom(s) or illness(es)? [INTERVIEWER: HOSPITALIZED MEANS ADMITTED AT LEAST OVERNIGHT.]

Yes 1
No 2
Don't know 88
Refused 99

SYMP 23. Would you say that in general your health is... [INTERVIEWER: READ LIST]

Excellent 1
Very good 2
Good 3
Fair 4
Poor 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

SYMP 24. Compared with twelve months ago, would you say your health is better, worse or about the same?

Better 1
Worse 2
About the same 3
Don't know 88
Refused 99

INJURY

INJR 1. While you were working on the oil spill response, were you ever injured on the job? This would be an injury that needed medical care beyond first aid, or an injury that caused you to lose at least 4 hours of work, or an injury that caused you to be assigned to different work duties for at least 4 hours.

Yes 1
No ..... 2 [GO TO QUESTION EXPO 1]
Don't know .. 88 [GO TO QUESTION EXPO 1]
Refused ..... 99 [GO TO QUESTION EXPO 1]

INJR 2. Now I would like you to describe in as much detail as possible how the injury occurred. Include where did the injury happen?, what were you doing at that time?, what equipment or tools were you using?, what materials were you handling?, what kind of injury was it – a cut, a broken bone, something else?, what part of your body was injured?, anything else you think might be important?

[INTERVIEWER: IF RESPONDENT HAD MORE THAN ONE INJURY MEETING THE CRITERIA IN I1, ASK ONLY ABOUT THE MOST RECENT ONE.]

Interviewer Checklist	
Location	
Specific Activity	
Equipment & Tools	
Materials Handled	
Type of Injury (laceration, fracture, etc.)	
Body Part Affected	NIOSH USE ONLY
Other Factors	_____ SOURCE _____ EVENT _____ 2ND SOURCE _____ E-CODE

Don't know ..... 88 Refused 99

INJR 3. Did this injury require medical care beyond first aid?

Yes ..... 1 Don't know 88

No ..... 2 [GO TO QUESTION EXPO 1] Refused 99

INJR 4. Were you hospitalized for this injury?

[INTERVIEWER: HOSPITALIZED MEANS ADMITTED AT LEAST OVERNIGHT.]

Yes ..... 1 Don't know 88

No ..... 2 Refused 99

EXPOSURES

[INTERVIEWER: READ THE FOLLOWING PROMPT ONCE BEFORE ASKING QUESTIONS EXPO 1 THROUGH EXPO 6.]

For the next set of questions, please answer: All the time, Most of the time, Sometimes, Rarely or Never.

EXPO 1. While working on the oil spill, how often did/do you have direct skin contact with the spilled crude oil? [INTERVIEWER: READ LIST]

All the time 1
Most of the time..... 2
Sometimes..... 3
Rarely..... 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

EXPO 2. While working on the oil spill, how often were/are you exposed directly to smoke from burning crude oil? [INTERVIEWER: READ LIST]

[INTERVIEWER: DIRECT EXPOSURE INCLUDES SMELLING, BREATHING OR COMING INTO CONTACT WITH THE SMOKE.]

All the time 1
Most of the time..... 2
Sometimes..... 3
Rarely..... 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

EXPO 3. While working on the oil spill, how often did/do you notice strong chemical or other unusual odors? [INTERVIEWER: READ LIST]

All the time 1
Most of the time..... 2
Sometimes..... 3
Rarely..... 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

EXPO 4. While working on the oil spill, how often did/do you smell or breathe in exhaust fumes from the engines of cars, trucks, boats, generators or other motorized equipment? [INTERVIEWER: READ LIST]

All the time..... 1
Most of the time..... 2
Sometimes..... 3
Rarely..... 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know..... 88
Refused..... 99

EXPO 5. How often did you handle or apply chemical dispersants such as COREXIT 9500 or COREXIT 9527? [INTERVIEWER: READ LIST]

[INTERVIEWER: CHEMICAL DISPERSANTS SUCH AS COREXIT 9500 AND COREXIT 9527 ARE SOLVENTS USED TO BREAK UP OIL SLICKS BY ACTING AS CHEMICAL DETERGENTS OR SURFACTANTS. THEY ARE USUALLY SPRAYED OR OTHERWISE APPLIED ON SURFACE OIL SLICKS, BUT HAVE BEEN INJECTED DIRECTLY INTO THE UNDERWATER STREAM OF CRUDE OIL SPILLING FROM THE WELLHEAD.]

All the time..... 1
Most of the time..... 2
Sometimes..... 3
Rarely..... 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know..... 88
Refused..... 99

EXPO 6. How often did you work in or near areas where chemical dispersants such as COREXIT 9500 or COREXIT 9527 were applied? [INTERVIEWER: READ LIST]

All the time..... 1
Most of the time..... 2
Sometimes..... 3
Rarely..... 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know..... 88
Refused..... 99

WORK ASSIGNMENT, LOCATION, AND ACTIVITIES

WORK 1. When did you begin working on the oil spill response? What was the date (approximately or as nearly as you can remember)? [INTERVIEWER: CODE THE FIRST DATE THE RESPONDENT BEGAN WORKING ON THE SPILL AFTER FINISHING THE INITIAL TRAINING, EVEN IF THERE WERE MULTIPLE STARTS AND STOPS.]

_____/_____/_____ [GO TO QUESTION WORK 3]

Don't know..... 88 [GO TO QUESTION WORK 2]

Refused..... 99 [GO TO QUESTION WORK 2]

WORK 2. Do you remember what month you began working on the oil spill response (approximately or as nearly as you can remember)? [INTERVIEWER: CODE MONTH AS JAN=01...DEC=12]

☐☐

Don't know..... 88 Refused..... 99

[INTERVIEWER: READ QUESTION WORK 3 ONLY IF QUESTION SCRN 2 DOES NOT=1. IF QUESTION SCRN 2=1, GO TO QUESTION WORK 5.]

WORK 3. When did you stop working on the oil spill response? What was the date (approximately or as nearly as you can remember)?

_____/_____/_____ [GO TO QUESTION WORK 5]

Don't know..... 88 [GO TO QUESTION WORK 4]

Refused..... 99 [GO TO QUESTION WORK 4]

WORK 4. Do you remember what month you stopped working on the oil spill response (approximately or as nearly as you can remember)? [INTERVIEWER: CODE MONTH AS JAN=01...DEC=12]

☐☐

Don't know..... 88 Refused..... 99

WORK 5. During the oil spill response, where (did/do) you usually report for work? If you reported for work at more than one place, please tell me the place you reported for work most often or for the longest period of time. [INTERVIEWER: READ LIST]

[INTERVIEWER: IF NECESSARY, EXPLAIN THAT A FIELD STAGING AREA IS THE CENTRALIZED LOCATION FROM WHICH SHORELINE CLEANUP AND OTHER ACTIVITIES IN A PARTICULAR AREA ARE COORDINATED. THEY NORMALLY INCLUDE RESPONDER DINING FACILITIES, EQUIPMENT STORAGE AND PREPARATION AREAS, AND ARE USUALLY WHERE THE DAILY SAFETY BRIEFINGS ARE GIVEN.]

[INTERVIEWER: IF RESPONDENT INITIALLY ANSWERS THAT HE OR SHE REPORTED TO A BEACH OR OTHER CLEANUP SITE, READ THE FOLLOWING PROBE:] Did you first report to a field staging area? A field staging area is the centralized location from which shoreline and other cleanup activities in a particular area are coordinated. They normally include responder dining facilities, equipment storage and preparation areas, and are usually where the daily safety briefings are given.

Field staging area
(including beaches, docks and decontamination areas)..... 1 [GO TO QUESTION WORK 7]

U.S. Coast Guard shore facility ..... 2 [GO TO QUESTION WORK 10]

U.S. Coast Guard cutter ..... 3 [GO TO QUESTION WORK 10]

Other ship or vessel..... 4 [GO TO QUESTION WORK 10]

Aviation operations facility..... 5 [GO TO QUESTION WORK 10]

Warehousing and distribution or other supplies facility ..... 6 [GO TO QUESTION WORK 10]

Unified Area Command Center, Robert, LA ..... 7 [GO TO QUESTION WORK 10]

Unified Command/Incident Command Center, Mobile, AL ..... 8 [GO TO QUESTION WORK 10]

Incident Command Center, Houma, LA ..... 9 [GO TO QUESTION WORK 10]

Other government facility or office ..... 10 [GO TO QUESTION WORK 10]

Other BP facility..... 11 [GO TO QUESTION WORK 10]

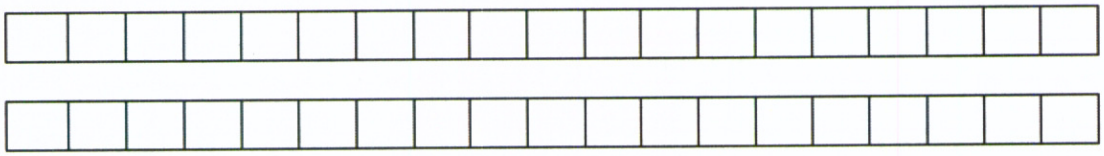
Other ..... 12 [GO TO QUESTION WORK 6]

[INTERVIEWER: DON'T READ]

Don't know ..... 88 [GO TO QUESTION WORK 6]

Refused..... 99 [GO TO QUESTION WORK 10]

WORK 6. Could you describe where you usually reported for work?



[GO TO QUESTION WORK 10]

Don't know..... 88 [GO TO QUESTION WORK 10] Refused ..... 99 [GO TO QUESTION WORK 10]

WORK 7. Which staging area did you work out of? If you worked out of more than one staging area, please tell me the one you worked out of for the longest time. [INTERVIEWER: READ LIST IF NECESSARY]

Dauphin Island, AL..... 1

Orange Beach, AL 2

Theodore, AL 3

Panama City, FL..... 4

Pensacola, FL 5

Port St. Joe, FL 6

St. Marks, FL 7

Amelia, LA..... 8

Cocodrie, LA 9

Grand Isle, LA..... 10

Shell Beach, LA..... 11

Slidell, LA 12

St. Mary, LA..... 13

Venice, LA 14

Biloxi, MS 15

Pascagoula, MS..... 16

Pass Christian, MS..... 17

Other 18

[INTERVIEWER: DON'T READ]

Don't know..... 88 [GO TO QUESTION WORK 10]

Refused..... 99 [GO TO QUESTION WORK 10]

WORK 8. Did you work out of any other staging area(s)?

Yes 1

No ..... 2 [GO TO QUESTION WORK 10]

Don't know ..... 88 [GO TO QUESTION WORK 10]

Refused ..... 99 [GO TO QUESTION WORK 10]

WORK 9. What other staging area(s) did you work out of? [INTERVIEWER: READ LIST IF NECESSARY. CODE ALL THAT APPLY.]

Dauphin Island, AL 1

Orange Beach, AL 2

Theodore, AL 3

Panama City, FL 4

Pensacola, FL 5

Port St. Joe, FL 6

St. Marks, FL 7

Amelia, LA 8

Cocodrie, LA 9

Grand Isle, LA 10

Shell Beach, LA 11

Slidell, LA 12

St. Mary, LA 13

Venice, LA 14

Biloxi, MS 15

Pascagoula, MS 16

Pass Christian, MS 17

Other 18

[INTERVIEWER: DON'T READ]

Don't know 88

Refused 99

WORK 10. Please tell me what kind of responder you are/were while working on the oil spill. If you worked as more than one kind of responder, tell me the kind you were for the longest period of time. (Are/were) you a...[INTERVIEWER: READ LIST.]

BP employee ..... 1 [GO TO QUESTION WORK 12]

Contractor 2

Local state or federal government worker 3

Volunteer 4

Or something else 5

[INTERVIEWER: DON'T READ]

Don't know 88

Refused ..... 99 [GO TO QUESTION WORK 12]

WORK 11. What was/is the name of your employer or agency while working on the oil spill?

[INTERVIEWER: IF RESPONDENT INITIALLY ANSWERS DON'T KNOW, PROBE BY READING THE FOLLOWING PROMPT.] Do you remember the name of the company (not the bank) that (issued/issues) your paycheck when working on the oil spill? For volunteers, what agency or organization did you volunteer with?

Don't know..... 88

Refused..... 99

WORK 12. While working on the oil spill response, how many days a week (did/do) you usually work?

Don't know..... 88

Refused..... 99

WORK 13. While working on the oil spill response, how many days (did/do) you usually work before getting a day off?

Don't know..... 88

Refused..... 99

WORK 14. While working on the oil spill response, how many hours per day (did/do) you usually work?

[INTERVIEWER: DON'T READ]

Varied too much to say.....77 Don't know.....88

Refused.....99

WORK 15. Which of the following best describes your usual work schedule while working on the oil spill response? [INTERVIEWER: READ LIST]

A daytime shift 1

An evening shift 2

A nighttime shift 3

A rotating shift, one that changes periodically from days to evenings or nights 4

A split shift, one that has two distinct periods each day 5

An irregular shift or on-call 6

Some other shift 7

[INTERVIEWER: DON'T READ]

Don't know 88

Refused 99

WORK 16. While working on the oil spill response, on average, how many hours of sleep do you get in a 24-hour period? [INTERVIEWER: ROUND HOURS OF SLEEP TO NEAREST WHOLE HOUR.]

☐

Don't know 88

Refused 99

WORK 17. While working on the oil spill response, where (did/do) you usually sleep when off duty? [INTERVIEWER: READ LIST. HERE, THE TERMS "TEMPORARY" AND "PERMANENT" REFER TO THE HOUSING FACILITIES' STRUCTURE, NOT TO THE RESPONDENTS' HOUSING ARRANGEMENT. THEREFORE, FOR EXAMPLE, A PERSON STAYING *TEMPORARILY* IN AN APPARTMENT OR HOUSE (BUILDINGS WITH FOUNDATIONS) RENTED BY THEIR EMPLOYER OR A CONTRACTOR IS LIVING IN A *PERMANENT* HOUSING FACILITY.]

Your own home or another person's home 1

Hotel or motel 2

Permanent military or other government facility such as a barracks, dormitory or Coast Guard Station 3

Temporary military or other government facility such as a camp or bivouac 4

Aboard ship 5

Aboard a "quarters barge" or "floatel" 6

Permanent housing facilities—that is, a building with a foundation (including houses and apartments)—provided by your employer or a contractor 7

Temporary housing facilities such as a tent or a trailer provided by your employer or a contractor 8

Other 9

[INTERVIEWER: DON'T READ]

Don't know 88

Refused 99

WORK 18. During the oil spill response, did/do you usually work ..... [INTERVIEWER: READ LIST]

Offshore, that is on a ship, boat or other vessel 1

On shore, including all land activities ..... 2 [GO TO QUESTION WORK 24]

Both offshore and onshore 3

For aviation or aviation support services ..... 4 [GO TO QUESTION PPEQ 1]

Don't know ..... 88 [GO TO QUESTION PPEQ 1]

Refused ..... 99 [GO TO QUESTION PPEQ 1]

[INTERVIEWER: READ THE FOLLOWING PROMPT ONCE BEFORE ASKING QUESTIONS WORK 19 THROUGH WORK 24] I am going to read you a list of different kinds of work you may have done. Please tell me whether or not you (or the vessel you were working on) did this kind of work for each of these while working on the oil spill response. If you are not sure whether you did any of these types of work, I can help by reading you a brief description of that type of work.

WORK 19. Source control

[INTERVIEWER: IF SUBJECT INITIALLY ANSWERS DON'T KNOW, PROBE BY READING THE FOLLOWING DESCRIPTION]

Source control operations include: containing and repairing the wellhead, drilling relief wells, underwater injection of dispersants, and collection of oil from the source.

Yes ..... 1 Don't know 88

No ..... 2 Refused 99

WORK 20. Offshore skimming operations

[INTERVIEWER: IF SUBJECT INITIALLY ANSWERS DON'T KNOW, PROBE BY READING THE FOLLOWING DESCRIPTION]

During offshore skimming operations, oil skimming equipment towed by ships or other vessels is used to remove oil from the surface of open water.

Yes ..... 1 Don't know 88

No ..... 2 Refused 99

WORK 21. Controlled burning of oil

[INTERVIEWER: IF SUBJECT INITIALLY ANSWERS DON'T KNOW, PROBE BY READING THE FOLLOWING DESCRIPTION]

During controlled burning operations, oil is burned off the surface of the water by igniting the upwind end of an oil-contaminated area of open water and allowing it to burn to the down-wind end.

Yes ..... 1 Don't know 88

No ..... 2 Refused 99

WORK 22. Boom deployment and recovery

[INTERVIEWER: IF SUBJECT INITIALLY ANSWERS DON'T KNOW, PROBE BY READING THE FOLLOWING DESCRIPTION]

Boom deployment and recovery operations include setting out hard or sorbent booms used to contain or absorb oil and oil products floating on the surface of the water from ships, boats, or other vessels, and pulling them back onboard after they are used.

WORK 23. Did you work on a vessel that was part of the Vessel of Opportunity Program?

Yes ..... 1 Don't know 88

No ..... 2 Refused 99

[INTERVIEWER: READ THE FOLLOWING PROMPT ONCE BEFORE ASKING QUESTIONS WORK 24 THROUGH WORK 27] I am going to read you a list of different kinds of work you may have done. Please tell me whether or not you did this kind of work for each of these while working on the oil spill response.

WORK 24. Cleanup of beaches, marshes or other areas along the shoreline

[INTERVIEWER: IF SUBJECT INITIALLY ANSWERS DON'T KNOW, PROBE BY READING THE FOLLOWING DESCRIPTION]

Cleanup of beaches, marshes, or other areas along the shoreline includes the removal and cleaning of oil, oil products, and oil contaminated materials from beaches, marshes and other shoreline areas.

Yes ..... 1 Don't know 88

No ..... 2 Refused 99

WORK 25. Cleaning oil from the spill off boats or equipment using pressure sprayers

[INTERVIEWER: IF SUBJECT INITIALLY ANSWERS DON'T KNOW, PROBE BY READING THE FOLLOWING DESCRIPTION]

Cleaning oil and oil products from the spill off boats or equipment using pressure sprayers includes the removal of spilled crude oil from the hull or other surfaces of boats or from other equipment using pressure sprayers after the boats or equipment became contaminated during use.

Yes ..... 1 Don't know 88

No ..... 2 Refused 99

WORK 26. Wildlife rehabilitation

[INTERVIEWER: IF SUBJECT INITIALLY ANSWERS DON'T KNOW, PROBE BY READING THE FOLLOWING DESCRIPTION]

Workers and volunteers are involved in cleaning, caring for and rehabilitating oil-contaminated wildlife.

Yes 1	Don't know 88
No 2	Refused 99

WORK 27. Waste stream management

[INTERVIEWER: IF SUBJECT INITIALLY ANSWERS DON'T KNOW, PROBE BY READING THE FOLLOWING DESCRIPTION]

Waste stream management involves the collection, transport, storage and recycling or final disposal of special or hazardous solid and liquid wastes generated during the oil spill response.

[INTERVIEWER: WASTE STREAM MANAGEMENT DOES NOT INCLUDE MERELY HANDLING WASTE AT THE POINT WHERE IT IS GENERATED, SUCH AS BEACH CLEAN UP SITES.]

Yes 1	Don't know 88
No 2	Refused 99

PERSONAL PROTECTIVE EQUIPMENT

PPEQ 1. How often (did/do) you wear chemical resistant gloves and rubber boots or overboots to protect your skin from contact with spilled crude oil or oil products while performing your oil spill response job?

All the time ..... 1 [GO TO QUESTION PPEQ 3]
Most of the time..... 2
Sometimes..... 3
Rarely 4
Never..... 5

[INTERVIEWER: DON'T READ]

Don't know..... 88 [GO TO QUESTION PPEQ 3]

Refused..... 99 [GO TO QUESTION PPEQ 3]

PPEQ 2. What were the reasons you [(did/do) not/(did/do) not always] wear chemical resistant gloves and rubber boots or overboots? [INTERVIEWER: READ LIST AND CODE ALL THAT APPLY]

It wasn't required for the work I did 1
None was available..... 2
They didn't have my size 3
Mine was damaged and I couldn't get a replacement 4
It got in the way of doing my work..... 5
It was too hot or uncomfortable 6
I didn't know how to wear it or use it 7
I didn't think I needed it..... 8
It got too dirty 9
I forgot to wear it..... 10
I thought wearing it made me less safe..... 11
Other 12

[INTERVIEWER: DON'T READ]

Don't know..... 88
Refused..... 99

PPEQ 3. How often (did/do) you wear chemical protective clothing, such as a coated Tyvek suit, to protect your skin from contact with spilled crude oil and oil products while performing your oil spill response job? [INTERVIEWER: READ LIST]

All the time ..... 1 [GO TO QUESTION PPEQ 5]
Most of the time 2
Sometimes 3
Rarely 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know ..... 88 [GO TO QUESTION PPEQ 5]

Refused ..... 99 [GO TO QUESTION PPEQ 5]

PPEQ 4. What (was/were) the reason(s) you [(did/do) not/(did/do) not always]wear chemical protective clothing? [INTERVIEWER: READ LIST AND CODE ALL THAT APPLY]

It wasn't required for the work I did 1
None was available 2
They didn't have my size 3
Mine was damaged and I couldn't get a replacement 4
It got in the way of doing my work 5
It was too hot or uncomfortable 6
I didn't know how to wear it or use it 7
I didn't think I needed it 8
It got too dirty 9
I forgot to wear it 10
I thought wearing it made me less safe 11
Other 12

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

PPEQ 5. How often (did/do) you wear a respirator while performing your oil spill response job? Examples of respirators include filtering facepieces such as a P100 and air purifying respirators that have chemical cartridges. Dust or surgical-type masks are not respirators. [INTERVIEWER: READ LIST]

All the time ..... 1 [GO TO QUESTION MDHX 1]
Most of the time 2
Sometimes 3
Rarely 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know ..... 88 [GO TO QUESTION MDHX 1]
Refused ..... 99 [GO TO QUESTION MDHX 1]

PPEQ 6. Did you go through "fit testing" to make sure your respirator fit correctly? You might have tried on different sizes or different respirators.

Yes 1
No 2
Don't know 88
Refused 99

PPEQ 7. Did you receive training about how and when to properly use the respirator you (wore/wear)?

Yes 1
No 2
Don't know 88
Refused 99

[INTERVIEWER: READ QUESTION PPEQ 8 ONLY IF QUESTION PPEQ 5 IS NOT=1. IF QUESTION PPEQ 5=1, GO TO QUESTION MDHX 1.]

PPEQ 8. What (was/were) the reason(s) you [(did/do) not/(did/do) not always] wear a respirator? [INTERVIEWER: READ LIST AND CODE ALL THAT APPLY]

It wasn't required for the work I did 1

None was available 2

They didn't have my size 3

Mine was damaged and I couldn't get a replacement 4

It got in the way of doing my work 5

It was too hot or uncomfortable 6

I didn't know how to wear it or use it 7

I didn't think I needed it 8

It got too dirty 9

I forgot to wear it 10

I thought wearing it made me less safe 11

Other 12

[INTERVIEWER: DON'T READ]

Don't know 88

Refused 99

MEDICAL HISTORY

[INTERVIEWER: READ THE FOLLOWING PROMPT ONCE BEFORE ASKING QUESTIONS MDHX 1 THROUGH MDHX 13]

Before you began working on the oil spill response, did a doctor ever tell you that you had any of the following:

MDHX 1. Asthma

Yes ..... 1 Don't know... 88 [GO TO QUESTION MDHX 3]

No ..... 2 [GO TO QUESTION MDHX 3] Refused ..... 99 [GO TO QUESTION MDHX 3]

MDHX 2. Do you still have asthma?

Yes ..... 1 Don't know 88

No ..... 2 Refused 99

MDHX 3. Emphysema or chronic bronchitis (COPD)

Yes ..... 1 Don't know 88

No ..... 2 Refused 99

MDHX 4. High blood pressure (high blood – to some)

Yes ..... 1 Don't know 88

No ..... 2 Refused 99

MDHX 5. Heart disease

Yes ..... 1 Don't know 88

No ..... 2 Refused 99

MDHX 6. Diabetes (high sugar, sugar, or sugar diabetes to some)

Yes ..... 1 Don't know 88

No ..... 2 Refused 99

MDHX 7. Anxiety

Yes ..... 1 Don't know 88

No ..... 2 Refused 99

MDHX 8. Depression

Yes ..... 1 Don't know 88

No ..... 2 Refused 99

MDHX 9. Alcohol abuse problem

Yes ..... 1 Don't know 88

No ..... 2 Refused 99

MDHX 10. Sleep problems (e.g., sleep apnea, insomnia, restless leg syndrome)

Yes ..... 1 Don't know 88

No ..... 2 Refused 99

MDHX 11. Allergies

Yes ..... 1 Don't know 88

No ..... 2 Refused 99

MDHX 12. Back problems

Yes ..... 1 Don't know 88

No ..... 2 Refused 99

MDHX 13. Migraine or cluster headaches

Yes ..... 1 Don't know 88

No ..... 2 Refused 99

MDHX 14. How tall are you in feet and inches when not wearing shoes?

|___| feet |___|___| inches

Don't know ..... 88 Refused 99

MDHX 15. What is your current weight in pounds when not wearing shoes?

|___|___|___| lbs.

Don't know ..... 88 Refused 99

MDHX 16. Have you smoked at least 100 cigarettes in your entire life? [INTERVIEWER: 100 CIGARETTES=5 PACKS]

Yes ..... 1 Don't know 88

No ..... 2 [GO TO QUESTION MDHX 18] Refused 99

MDHX 17. Do you now smoke cigarettes... [INTERVIEWER: READ LIST]

Every day 1

Some days 2

Not at all 3

[INTERVIEWER: DON'T READ]

Don't know 88

Refused 99

MDHX 18. Do you now SMOKE tobacco in any other form such as a pipe or cigars?

[INTERVIEWER: DO NOT INCLUDE SMOKELESS TOBACCO PRODUCTS SUCH AS CHEWING TOBACCO OR SNUFF.]

Yes 1

No 2

Don't know 88

Refused 99

MDHX 19. Do you currently use chewing tobacco, snuff, or snus every day, some days, or not at all? [INTERVIEWER: SNUS RHYMES WITH GOOSE. SNUS (SWEEDISH FOR SNUFF) IS A MOIST SMOKELESS TOBACCO, USUALLY SOLD IN SMALL POUCHES THAT ARE PLACED UNDER THE LIP AGAINST THE GUM.]

Every day 1

Some days 2

Not at all 3

[INTERVIEWER: DON'T READ]

Don't know 88

Refused 99

MDHX 20. [INTERVIEWER: ASK ONLY IF RESPONDENT INDICATED THAT THEY USED SOME FORM OF TOBACCO IN QUESTION MDHX 17 OR MDHX 18 OR MDHX 19. OTHERWISE, GO TO QUESTION MDHX 21.] Are you currently using the same amount of tobacco (smoking, chewing or snuff) as before your work on the oil spill?

More 1

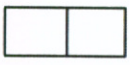
Less 2

About the same 3

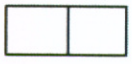
Don't know 88

Refused 99

MDHX 20. During the past 30 days, how many days per week or per month did you have at least one drink of any alcoholic beverage?



Days per week



Days per week

Don't know 88

Refused 99

No drinks in the past 30 days 77

MENTAL HEALTH

MHLT 1. [INTERVIEWER: ASK ONLY IF QUESTION MDHX 20 ≥ 1 AND NOT=77, 88 OR 99. IF QUESTION MDHX=0, 77, 88 OR 99, GO TO QUESTION MHLT 3.] One drink is equivalent to a 12-ounce beer, a 5-ounce glass of wine, or a drink with one shot of liquor. During the past 30 days, on the days when you drank, about how many drinks did you drink on the average?

[INTERVIEWER: A 40 OUNCE BEER WOULD COUNT AS 3 DRINKS, OR A COCKTAIL DRINK WITH TWO SHOTS WOULD SOUNT AS 2 DRINKS.]

Don't know ..... 88 Refused 99

MHLT 2. [INTERVIEWER: ASK ONLY IF QUESTION MDHX 20 ≥ 1 AND NOT=77, 88 OR 99. IF QUESTION MDHX=0, 77, 88 OR 99, GO TO QUESTION MHLT 3.] Are you currently drinking MORE than you drank in the 12 months before the oil spill, LESS, or ABOUT THE SAME as in the 12 months before the oil spill?

More ..... 1 Don't know 88

Less ..... 2 Refused 99

About the same 3

[INTERVIEWER: READ THE FOLLOWINGPROMPT BEFORE ASKING QUESTIONS MHLT 3 TO MHLT 20.]

Now I am going to ask you some questions about some feelings that you have had in the past 30 days so that we can understand more about this type of work for the future. Please answer: All the time, Most of the time, Sometimes, Rarely or Never.

MHLT 3. In the past 30 days, how often was your sleep restless?

All the time ..... 1 Rarely 4

Most of the time ..... 2 Never 5

Sometimes 3

[INTERVIEWER: DON'T READ]

Don't know ..... 88 Refused 99

MHLT 4. During the past 30 days, how often did you feel fearful?

All the time ..... 1 Rarely 4

Most of the time ..... 2 Never 5

Sometimes 3

[INTERVIEWER: DON'T READ]

Don't know ..... 88 Refused 99

MHLT 5. During the past 30 days, how often did you feel hopeful about the future?

All the time 1
Most of the time 2
Sometimes 3
Rarely 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

MHLT 6. During the past 30 days, how often did you feel lonely?

All the time 1
Most of the time 2
Sometimes 3
Rarely 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

MHLT 7. During the past 30 days, how often did you have trouble keeping your mind on what you were doing?

All the time 1
Most of the time 2
Sometimes 3
Rarely 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

MHLT 8. During the past 30 days, how often did you feel sad or depressed?

All the time 1
Most of the time 2
Sometimes 3
Rarely 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

MHLT 9. During the past 30 days, how often did you feel that everything you did was an effort?

All the time 1
Most of the time..... 2
Sometimes..... 3
Rarely..... 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

MHLT 10. During the past 30 days, how often did you feel bothered by things that usually don't bother you?

All the time 1
Most of the time..... 2
Sometimes..... 3
Rarely..... 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

MHLT 11. In the past 30 days, how often have you felt so angry that you either lost your temper or felt out of control?

All the time 1
Most of the time..... 2
Sometimes..... 3
Rarely..... 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

MHLT 12. During the past 30 days, how often did you feel happy?

All the time 1
Most of the time..... 2
Sometimes..... 3
Rarely..... 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

MHLT 13. During the past 30 days how often did you feel that you could not get "going"?

All the time 1
Most of the time..... 2
Sometimes..... 3
Rarely..... 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

MHLT 14. During the past 30 days, how much have you worried about your future physical health as a result of working on the oil spill? [INTERVIEWER: READ LIST]

All the time 1
Most of the time..... 2
Sometimes..... 3
Rarely..... 4
Never 5

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

MHLT 15. In the last 30 days how often did your oil spill response job interfere with your family life in any way (e.g., time spent with family, being distracted or short-tempered because of work)? Would you say... [INTERVIEWER: READ LIST]

Never 1
Less than once a month 2
1—3 days per month 3
1—2 days per week 4
3—4 days per week 5
5 or more days per week 6

[INTERVIEWER: DON'T READ]

Don't know 88
Refused 99

MHLT 16. People differ a lot in their feelings about professional help for mental health problems. If you had a SERIOUS mental health problem, would you DEFINITELY go for professional help, PROBABLY go, PROBABLY NOT go, or DEFINITELY NOT go for professional help?

Definitely go 1
Probably go..... 2
Probably not go 3
Definitely not go 4
Don't know 88
Refused 99

MHLT 17. Do you have access to professional help for mental health concerns if desired?

Yes 1
No 2
Don't know 88
Refused 99

MHLT 18. Are you able to contact people you rely on for support if desired (people such as family member, friend, spiritual leader, or trusted coworker)?

Yes 1	Don't know 88
No 2	Refused 99

MHLT 19. What concerns do you have about the impact of this oil spill ? [INTERVIEWER: CODE ALL THAT APPLY.]

Loss of personal or family business 1

Loss of job opportunities 2

Needing to relocate 3

Loss of usual way of life 4

Damage to wildlife and the natural environment 5

Health concerns about food sources from local waters 6

Loss of tourism 7

Personal health effects 8

Don't know 88

Refused 99

MHLT 20. In the past 30 days, how often have you had nightmares about the oil spill or thought about it when you did not want to?

All the time 1	Rarely 4
Most of the time 2	Never 5
Sometimes 3	

[INTERVIEWER: DON'T READ]

Don't know 88	Refused 99

SAFETY CLIMATE

SAFE 1. (Did/does) your employer on the oil spill response provide you clean drinking water every day?

Yes ..... 1 Don't know 88

No ..... 2 Refused 99

[INTERVIEWER: READ THE FOLLOWING PROMPT BEFORE ASKING QUESTION SAFE 2 AND SAFE 3.]

Please tell me whether you strongly agree, agree, disagree, or strongly disagree with the following two statements that might or might not describe your oil spill response job.

SAFE 2. There (were/are) no significant shortcuts or compromises taken when worker safety was/is at stake.

Strongly agree ..... 1 Disagree 3

Agree ..... 2 Strongly disagree 4

[INTERVIEWER: DON'T READ]

Don't know ..... 88 Refused 99

SAFE 3. I (had/have) the training I needed/need to perform my job safely and competently.

Strongly agree ..... 1 Disagree 3

Agree ..... 2 Strongly disagree 4

[INTERVIEWER: DON'T READ]

Don't know ..... 88 Refused 99

DEMOGRAPHICS

DEMO 1. [INTERVIEWER: CODE SEX OR ASK IF NOT KNOWN] Are you male or female?

Male 1

Female 2

Refused 99

DEMO 2. Are you Hispanic or (Latino/Latina)?

Yes 1

No 2

Don't know 88

Refused 99

DEMO 3. I'm going to read a list of race categories, please choose one or more categories that best indicate the race you consider yourself to be. Are you... [INTERVIEWER: READ ALL CATEGORIES AND CODE ALL THAT APPLY]

White 1

Black or African American 2

American Indian or Alaska Native 3

Asian 4

Native Hawaiian 5

Other Pacific Islander 6

[INTERVIEWER: DON'T READ]

Other 7

Refused 99

Don't know 88

DEMO 4. What is the highest grade or year of school you completed? [INTERVIEWER: READ ONLY IF NECESSARY]

Never attended school or only kindergarten 1

Grades 1 through 8 (elementary) 2

Grades 9 through 11 (some high school) 3

Grade 12 or GED (High School graduate) 4

College 1 year to 3 years (some college or technical school) 5

College 4 years or more (college graduate) 6

[INTERVIEWER: DON'T READ]

Don't know 88

Refused 99

RESPONDENT IDENTIFICATION

[INTERVIEWER: IF FIRST AND LAST NAME FIELDS ARE ALREADY POPULATED, READ QUESTION IDNT 1. OTHERWISE, SKIP TO QUESTION IDNT 2]

IDNT 1. On the roster form you completed earlier, we have your name listed as [INTERVIEWER: READ AND SPELL RESPONDENT'S NAME]. Is that correct?

Yes ..... 1 [GO TO QUESTION IDNT 5] Refused 99

No 2

IDNT 2. Please spell your last name.

Refused 99

IDNT 3. Please spell your first name.

Refused 99

IDNT 4. What is your middle initial?

None ..... 88 Refused 99

[INTERVIEWER: IF DATE OF BIRTH FIELD IS ALREADY POPULATED, READ QUESTION IDNT 5. OTHERWISE, SKIP TO QUESTION IDNT 6]

IDNT 5. We have your date of birth listed as [INTERVIEWER: READ DATE OF BIRTH]. Is that correct?

Yes ..... 1 [GO TO QUESTION IDNT 8] Don't know 88

No ..... 2 Refused 99

IDNT 6. What is your date of birth?

_____/_____/_____

Don't know.....88 [GO TO QUESTION IDNT 7]

Refused.....99 [GO TO QUESTION IDNT 7]

IDNT 7. [INTERVIEWER: READ QUESTION IDNT 7 ONLY IF QUESTION IDNT 6 = 88 OR 99. OTHERWISE, SKIP TO QUESTION IDNT 8.] How old are you?

Don't know ..... 88 Refused 99

[INTERVIEWER: IF LAST FOUR DIGITS OF SSN FIELD IS ALREADY POPULATED, READ QUESTION IDNT 8. OTHERWISE, SKIP TO QUESTION IDNT 9]

IDNT 8. We have the last four digits of your Social Security Number listed as [INTERVIEWER: READ LAST FOR DIGITS OF RESPONDENT'S SSN]. Is that correct?

Yes ..... 1 [GO TO QUESTION IDNT 10] Refused 99

No 2

IDNT 9. What are the last four digits of your social security number? [INTERVIEWER: IF RESPONDENT INITIALLY ANSWERS DON'T KNOW OR REFUSES, READ THE FOLLOWING:] The reason we are collecting this information is to match the responses you give us today to our response worker roster.

Don't know ..... 88 Refused 99

IDNT 10. Is the telephone number I reached you at today the best number to reach you at in the future?

Yes ..... 1 [GO TO QUESTION IDNT 12] Don't know 88

No ..... 2 Refused 99

IDNT 11. Could you give me a phone number, including the area code, that we could use to reach you at in the future?

(___|___|___) |___|___|___|—|___|___|___|___|

None ..... 88 [GO TO QUESTION IDNT 15] Refused ..... 99 [GO TO QUESTION IDNT 15]

IDNT 12. Is that a landline home phone, a cell phone, work phone or something else?

Landline home phone... 1 Other 4

Cell phone ..... 2 Don't know 88

Work phone ..... 3 Refused 99

IDNT 13. Do you have another phone number we could use in case we are unable to reach you at the number you just gave me? For example, a cell phone or a work phone number.

(___|___|___) |___|___|___|—|___|___|___|___|

None ..... 88 [GO TO QUESTION IDNT 15] Refused ..... 99 [GO TO QUESTION IDNT 15]

IDNT 14. Is that a landline home phone, a cell phone, work phone or something else?

Landline home phone... 1
Cell phone 2
Work phone..... 3
Other..... 4
Don't know..... 88
Refused 99

IDNT 15. Could you tell me the phone number of a family member, friend or other person who would know how to contact you 6 months from now?

(___|___|___) |___|___|___|—|___|___|___|___|

Don't know.....88
Refused..... 99

[INTERVIEWER: IF THE STREET ADDRESS, CITY, STATE, AND ZIPCODE FIELDS ARE ALREADY POPULATED, READ QUESTION IDNT 16. OTHERWISE, SKIP TO QUESTION IDNT 17.]

[INTERVIEWER: FOR QUESTONS IDNT 16 TO IDNT 20, IF THE RESPONDENT INITIALLY ANSWERS DON'T KNOW OR REFUSES, READ THE FOLLOWING:] The reason we are asking for your permanent address is so we can share information with you in the future.

IDNT 16. We have your permanent address listed as [INTERVIEWER: READ THE RESPONDENT'S STREET ADDRESS, CITY, STATE, AND ZIPCODE]. Is that correct?

Yes ..... 1 [GO TO QUESTION IDNT 21]
No..... 2
Don't know ..... 88 [GO TO QUESTION IDNT 18]
Refused..... 99 [GO TO QUESTION IDNT 18]

IDNT 17. What is the zip code of your permanent mailing address?

Don't know.....88
Refused..... 99

IDNT 18. What state is that? [INTERVIEWER: IF IDNT16=88 OR 99, READ THE QUESTION AS, "In what state is your permanent residence?"]

Don't know.....88
Refused..... 99 [GO TO QUESTION IDNT 21]

IDNT 19. What city is that? [INTERVIEWER: IF QUESTION IDENT 16=88 OR 99, READ THE QUESTION AS, "In what city is your permanent residence?"]

Don't know.....88 [GO TO QUESTION IDNT 21]
Refused ..... 99 [GO TO QUESTION IDNT 21]

IDNT 20. [INTERVIEWER: IF QUESTION IDENT 16=88 OR 99, READ THE QUESTION AS, GO TO QUESTION IDNT 21.]What is the street number and street name of your permanent mailing address?

Don't know..... 88 Refused..... 99

[INTERVIEWER: IF E-MAIL ADDRESS FIELD IS ALREADY POPULATED, READ QUESTION A21. OTHERWISE, SKIP TO QUESTION A22.]

IDNT 21. We have your email address listed as [INTERVIEWER: READ RESPONDENT'S E-MAIL ADDRESS]. Is that correct?

Yes ..... 1 [GO TO QUESTION IDNT 23] Refused..... 99 [GO TO QUESTION IDNT 23]

No..... 2

IDNT 22. Is there an e-mail address we could use to contact you in the future?

Don't know..... 88 Refused..... 99

[INTERVIEWER: READ THE FOLLOWING.]

Thank you very much for your participation. Dr. Renee Funk is the Principal Investigator for this study. Would you like Dr. Funk's e-mail address or telephone number in case you want to contact her about the study at any time?

[IF YES, PROVIDE THE FOLLOWING.]

cdcnioshgulfworker@cdc.gov (404) 498-4853

In the future, you may be contacted about participating in longer-term research studies on the potential health effects of the Gulf oil spill response efforts, and you can choose whether or not you want to participate in those studies at that time.

[END]

Reference Document Used to Support This Section

STORM, FLOOD, AND HURRICANE RESPONSE

Guidance for Post-exposure Medical Screening of Workers Leaving Hurricane Disaster Recovery Areas

http://www.cdc.gov/niosh/topics/emres/medScreenWork.html

Overview

Working in physically demanding, unclean, or unstable work environments, such as hurricane recovery areas, raises the question of whether work exposures will have adverse health consequences. The likelihood of such adverse health outcomes will depend on factors such as work load and work duration, type and severity of work exposures, and work organization, as well as the workers' prior physical and mental health status, knowledge about and experience with disaster work, and precautions taken while working (e.g., work practices, personal protective equipment).

Because of potential health risks inherent in postdisaster work, screening programs should be undertaken to determine the extent, if any, to which individual workers have been adversely affected by their work and to identify as early as possible any affected workers needing preventive measures or medical care. This document is intended for occupational health professionals and other clinicians who are responsible for physical and mental health oversight of workers who have deployed or worked in hurricane disaster response (e.g., response and recovery workers). It provides guidance on an appropriate medical screening approach for these workers as they complete their response activities or return home from the affected areas. The document does not address issues related to the period prior to initiating response or recovery work, such as predeployment screening, medical clearance, or training; these are important occupational safety and health considerations that are addressed in a companion document. This document will be reassessed periodically and updated as appropriate.

In general, the level of screening appropriate for a given work activity depends on multiple factors. However, because the conditions encountered by response and recovery workers may involve complex, uncontrolled environments, possibly involving multiple or mixed chemical exposures, hazardous substances, microbial agents, temperature extremes, long work shifts, or stressful experiences, all such workers should receive some assessment as a precaution. This may range from completion of brief assessment forms to more comprehensive and focused evaluations. High priority worker groups include those most likely to have exposures to hazardous agents or conditions and those reporting outbreaks of similar adverse health outcomes. Public health criteria, such as frequency of adverse health effects; their severity, preventability, or communicability; public interest; and cost effectiveness, are often useful for setting screening priorities.

Purpose of screening

The primary purpose of worker screening programs is to protect worker health by early identification of work-related conditions in individual workers. Through screening, adverse effects in individuals can be recognized in a timely way to provide intervention for the individual, while identifying potential risks to others in the same population of workers or populations with similar exposures. The goal of screening is to identify those who need further medical attention, not necessarily to definitively diagnose or treat based only on information provided through the screening. Therefore, screening programs collect and analyze individual-specific data related to postexposure physical and mental health status, which are used to:

- Detect possible adverse mental or physical health effects related to work or exposure
- Identify those who need further medical evaluation and treatment

- Monitor developing trends and patterns of illness or sequelae to injury or exposure among workers

Determining a need for screening

When developing a postexposure screening program, it is important to determine who should be screened and the reasons for screening them. For each group of workers, work-related risk factors or characteristics of commonly experienced occupational injuries and illnesses will determine the level or extent of screening appropriate to members of the group. These may include emotional as well as physical health factors. The following factors should be considered:

- Exposures or other risk factors encountered while deployed
  - Type of work performed
  - Dates of deployment
  - Specific locations of work assignments
  - Characteristics of work locations and relationship to known or suspected hazardous agents or conditions
  - Specific job tasks and work load at work locations
  - Specific high-risk exposures or conditions at work locations (e.g., contaminated floodwaters, moldy indoor environments, oil or other toxic spills)
  - Exposure to traumatic events
  - Protective measures used to prevent hazardous exposures (e.g., use of personal protective equipment)
  - Dates started and finished work at locations listed above
    - Shift schedules: hours per day, days per week, rotation schedules
- Reports of adverse health effects among particular groups of workers with similar job tasks, work location, exposure characteristics, etc.

Deciding who should be screened

Given the broad range of potential hazards and difficult working conditions encountered in hurricane response work, all workers returning from or completing hurricane response activities should receive some basic screening to capture information about their demographics, preexisting medical conditions, work experience and potential exposures while deployed, and any injuries or illness symptoms experienced while in the field or since leaving the disaster area. As described below, those meeting certain criteria should receive more extensive screening.

Determining the type of screening to be done

In the early phases of response efforts, it is often not possible to fully characterize the spectrum of hazardous agents and conditions that may have caused immediate or may cause future adverse health outcomes. As time elapses following hurricanes, environmental conditions, response activities, exposures, and possible health outcomes will continue to evolve, and information about some of these factors may remain incomplete.

It is not possible to specify here a single defined set of conditions for which workers should be screened. Decisions about screening needs and which health outcomes to monitor should be based on information about known or suspected risk factors (listed in the section "Determining a Need for Screening"), which is elicited through the basic screening recommended for all workers leaving the disaster area. Similarly, acute physical, cognitive, or emotional symptoms experienced during response work may be indicators of

a potential future chronic condition, so the presence of symptoms during or after deployment may indicate a need for more extensive screening.

Different screening approaches will be appropriate for different groups. For example, rescue and recovery workers with prolonged and repeated exposures to contaminated floodwater, workers at an evacuation center, truck drivers delivering supplies, and workers handling logistics at a staging facility will each require different screening strategies.

Without specific information about chemical exposures, biological monitoring (i.e., measuring in body tissues or fluids [such as blood or urine] a chemical, one or more of its metabolites, or a biochemical marker of its effects) will not have great predictive or diagnostic value, nor would it be expected to be cost effective. Such specific exposure information is unlikely to be available for most locations and circumstances. Additionally, biological monitoring would be recommended only if its use as a screening tool for a specific exposure were well established and certain criteria were met, for example, exposure to the specific hazardous agent; ability to retrieve the agent or its metabolites from the body; existence of established reference values for interpreting test results; and relevance and usefulness of results (e.g., important for determining treatment and for predicting health outcome, severity, chronicity, or need for future screening or surveillance). Any other use of biological monitoring would be considered investigative (e.g., toxicology research), with objectives that are different from those of screening programs.

Finally, in addition to documenting predictable adverse health outcomes (on the basis of known exposures, activities, and work conditions), screening programs may identify unexpected health outcomes. Should such a potential emerging problem be identified, further investigation using an epidemiologic or "outbreak investigation" model may be necessary to characterize it and assess possible work-relatedness. If this investigation suggests that the unanticipated health outcome was related to response work, the screening program could then be modified to incorporate this new information to detect reappearance of the problem at an early stage.

When to screen

Immediate data on postexposure health status should be collected at the time of completion of response work or departure from the affected area, or as soon as possible afterward.

Depending on what is learned about exposures and on the results of the initial screening, more detailed medical evaluation may be indicated. Long-term data on health status may need to be collected on some individuals after a period away from exposure. Timing will depend on the nature of the exposure or health condition.

Minimum screening information needs

The following information should be collected on all individuals undergoing screening upon completion of or return from response or recovery activities:

Personal information

Identifying and Contact Information

- Name, address, appropriate telephone number(s), e-mail addresses (work, personal)
- Age, date of birth, birthplace, sex, social security number
- Contact information for someone who will know where the worker is 6 months after leaving response work
- Response organization:
    - Employer vs. volunteer organization (indicate which)

- Name and address
- Contact person's name and telephone number

Usual work

- Industry, occupation, job tasks, number of years

Special needs

- Primary language

Health status before response work

- Preexisting medical and mental health conditions
- Relevant lifestyle factors (e.g., smoking status)
- Other specific risk factors (depend on job, e.g., use of personal protective equipment, exposures)
- Immunization status: adult and special risk (e.g., health care worker)

Response-related information

Response work

- Type of work performed as response or recovery worker and circumstances under which that work was performed, with special attention to documentation of the geographic location of the work and when the work was performed. See the section titled "Determining a need for screening."

For known hazardous exposures or conditions

- Type of exposure or conditions, work practices, and protective measures (e.g., personal protective equipment)

Injuries sustained or symptoms experience during response work

- Injuries: description of injury and circumstances; treatment received; whether injury resolved or still present
- Symptoms: type, new onset or exacerbation of preexisting condition, treatment, if any; symptom still present after return or new symptoms developed after return
- It may be appropriate to include specific screening for stress-related or emotional symptoms

Additional screening information needs

Workers leaving disaster work who report repeated or prolonged exposures or who report injuries or symptoms should receive more comprehensive screening, which should address the specific exposures or adverse health effects encountered. Additional screening may include a more comprehensive medical history and review of symptoms, a physical examination, or, in some instances, laboratory testing, as indicated by clinical judgment and good occupational medical practice.

For reported exposures

If potentially significant exposures are reported, additional screening should be directed to detect potential adverse affects commonly associated with these exposures. Thus, for example, if repeated or prolonged

exposures to dusty or moldy environments are reported, screening should address possible respiratory or allergic outcomes.

For reported symptoms

If illnesses or symptoms are reported, information should be obtained regarding corresponding organ systems (e.g., cardiac, respiratory, gastrointestinal, skin, mental health), symptoms, whether illnesses or symptoms represent new onset or exacerbation of preexisting condition, and treatment, if any.

For reported injuries

If injury is reported, information should be obtained regarding location and operation where injury occurred, nature of injury, part of body affected, severity (e.g., lost work time), and treatment. Minimum information about injury should include information sufficient to meet OSHA requirements for recordable injuries. Injuries caused by acts of violence should be included.

How information will be used

For the reasons listed in the previous section titled "Purpose of Screening," screening programs may be set up by various organizations, including public health agencies from all levels of government, public sector response programs (including regulatory agencies and contractors), medical staff at private companies, or individual practitioners. To maintain confidentiality of workers' medical information, medical or public health personnel typically administer screening programs. Other interested parties, such as public health organizations, academicians, media, labor unions, and attorneys, may want access to grouped screening results (with individual identifiers removed) for other reasons; policies for handling such requests should be developed in advance.

Other considerations

Administrative

- Decisions should be based on needs assessment before establishment of any screening program
- Programs should address clearly stated objectives
- Those staff members with access to data results should be clearly identified
- Policies, mechanisms, administration, and monitoring of privacy, confidentiality, and data security concerns should be stated clearly
- Adequate funds, personnel, materials, space, timeframe should be available
- Provisions should be made to ensure a system is in place for prompt and effective referral for more definitive evaluation and possible treatment of workers identified with emergent medical problems, whether physical or psychological

Staffing

- Program administrator
- Designated custodian of information collected
- Staff dedicated to collecting the information should be trained in the importance of accurate data collection, privacy, and confidentiality of sensitive and medical information
- Staff members available to analyze the data and interpret and report the results

Logistics

- Data collection locations should be convenient to workers (e.g., central location where workers report)
- Private space for maintenance of privacy
- Secure space for maintenance of confidential information

Other

- Screening instrument should be simple, concise, and standardized when available and appropriate.
- Screening system should be simple enough for administration by healthcare professionals
- Program should recognize potential implications regarding worker's compensation and related issues

Summary

- Workers involved in hurricane response may encounter hazardous or stressful working environments and may be at risk for work-related adverse health consequences.

- All workers returning from or completing response and recovery activities should undergo as soon as feasible basic screening to document their activities and working conditions and identify any recognized exposures, illnesses, or injuries.
- Workers who report repeated or prolonged hazardous exposures, injuries, or symptoms or for whom specific risk factors are identified in the basic screening should receive more comprehensive screening, which should be directed at the risk factors, exposures, or adverse health effects encountered.

10T. Post-Event Tracking of Emergency Responder Health and Function

Contents:

Disaster Mental and Behavioral Health Indicators and Example Measures

Potentially important mental and behavioral health indicators (and example measures) that responders may consider for surveillance analyses and primary data collection efforts are listed below. If used baseline screeners for emotional health status, these measures should be repeated to evaluate changes/trends:

- Brief Symptom Inventory (BSI):
- Kessler questionnaire (K10):
- SPRINT-E:
- Sheehan Disability Scale (SDS):
- Medical Outcomes Study Short Form-12 (MOS SF-12): (quality of life indices)
- Patient Health Questionnaire from PRIME-MD (PHQ) modules for depression, anxiety

Indicators and Example Measures/Tools

Indicator	Example Measure/Tool
Serious Psychological Distress	Kessler-6 or 10
Alcohol and drug use/abuse	C.A.G.E. –AID or BRFSS
Change in health-risk behaviors (job safety compliance, seatbelts, speeding, smoking, drug use)	*
Tobacco use	BRFSS
Perceived stress	Perceived Stress Scale (PSS)
Suicidal/homicidal ideation or behavior	*
Violence	*
Capacity for self/dependent care	*
Financial stressors/income/employment status	*
Health-related quality of life/ Mentally healthy/ unhealthy days	BRFSS
Sleep-loss	BRFSS

Adherence to public health recommendations (i.e., infection control/restricted activities/evacuation)	*
Depression	BRFSS Optional module
Anxiety	BRFSS Optional module
Preexisting chronic conditions	*
Barriers to Mental/behavioral health care (beliefs, stigma, logistics/access to services and medications)	*
Psychosomatic Symptoms (somatization)	PHQ-15
Family Dynamics & Conflict	*
Child Stress/Anxiety	RCMAS
Child Abuse & Neglect	*

**** Indicates no specific measure recommended or use a measure adapted to specific population/survey method***

Description of Example Measures

NIOSH Mental Health Questions

To view the mental health items that are part of the NIOSH Deepwater Horizon Worker Health Survey please see the *Mental Health* section of the survey. This section assesses depressive symptoms, alcohol and substance abuse, social support, and access to mental health professional support. The NIOSH Deepwater Horizon Worker Health Survey is located in subsection *9T. Incident Personnel Out-Processing Assessment* of the Tools Section of this document.

Individual Measures

CAGE

- This simple four-question self-test specifically focuses on alcohol use, and not on the use of other drugs.
- The CAGE Questionnaire was developed by John Ewing. No permission is necessary for using the questionnaire, unless it is used in a profit-making endeavor.
- To access the questionnaire, see Ewing JT [1984]. Detecting alcoholism: The CAGE Questionaire. JAMA 252(14): 1905–1907.

CAGE-AID (CAGE Questions Adapted to Include Drugs)

- Screens for alcohol use and has been adapted to include drugs
- An easy-to-administer interview consisting of eight items
- For more information on CAGE-AID, see Brown RL, Rounds LA [1995]. Conjoint screening questionnaires for alcohol and drug abuse: criterion validity in a primary care practice. Wis Med J. 94(3):135–140.

Kessler-6 (K-6 or K-10)

- Designed to be sensitive to discriminate serious mental illness.
- A 6-item self-report or interview in less than 2 minutes; preferred in screening for DSM-4 mood or anxiety disorders.
- Used in past or currently by the National Health Interview Survey (NHIS) and National Household Survey on Drug Abuse, Katrina
- http://www.hcp.med.harvard.edu/ncs/k6_scales.php

Patient Health Questionnaire (PHQ-15)

- Useful in screening for somatization and in monitoring somatic symptom severity in clinical practice and research.
- Brief, self-administered questionnaire
- The scale and further information can be found in the following article: Kroenke K, Spitzer RL, Williams JB [2002]. The PHQ-15: validity of a new measure for evaluating the severity of somatic symptoms. Psychosom Med. 64(2):258–66.

Perceived Stress Scale (PSS)

- Measures degree to which situations in one's life are appraised as stressful (The questions in the PSS ask about feelings and thoughts during the last month)
- The questionnaire is available in several languages and consists of a 14-item self-report.
- Available for free from Dr. Sheldon Cohen: http://www.psy.cmu.edu/~scohen/
- Used in Hurricane Hugo

Revised Children's Manifest Anxiety Scale (RCMAS)

- Assesses the degree and quality of anxiety experienced by children and adolescents.
- 37-item instrument, can be administered individually or to a group.
- Used in response to Hurricane Hugo.
- Can be purchased at: http://portal.wpspublish.com/portal/page?_pageid=53,234661&_dad=portal&_schema=PORTAL

Additional Examples of Measures/tools

PsySTART-Oil spill incident modified version:

- Assesses impact of traumatic exposures, loss, post-event adversities, loss of social support, and injury/illness.
- Comprised of 16 items, it can be administered in less than 1 minute by non-mental health professionals

Contact MSchreiber@mednet.ucla.edu **Acute Stress Disorder Scale (ASDS)**

- Indexes acute stress disorder and predicts PTSD. Based on DSM-4 criteria and assesses trauma and stress responses.
- A 19-item self report.
- Used with Hurricane Katrina evacuees.

- Scale can be found in Acute Stress Disorder Scale: A Self Report Measure of Acute Stress Disorder by Richard Bryant et. al. at: http://www.psych.on.ca/files/nonmembers/AcuteStressDisorderScale_DRN_March_5_2010.pdf

Brief COPE

- Useful instrument in health-related research that measures coping.
- A 28-items questionnaire consisting of 14 scales of 2 items each
- Used after September 11th attacks, Hurricane Andrew
- Scale can be found in the following article: Carver CS [1997]. You want to measure coping but your protocol's too long: consider the brief COPE. Int J Behav Med 4(1):92–100. [http://www.ssc.wisc.edu/wlsresearch/pilot/P01-R01_info/aging_mind/Aging_AppB18_BriefCopeScale.pdf]

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Additional Resources for Post-event Tracking

- Army post-deployment evaluation form is available at
  http://www.dtic.mil/whs/directives/infomgt/forms/eforms/dd2796.pdf

  This form is a post-deployment health assessment created and used by the Army. This is an electronic form filled out by the returning personnel and a physician.

- NIOSH Pocket Guide to Chemical Hazards is available at http://www.cdc.gov/niosh/npg/

  Pocket Guide presents key information and data in abbreviated tabular form for 677 chemicals or substance groupings. The industrial hygiene information found in the Pocket Guide should help users recognize and control occupational chemical hazards. The Pocket Guide contains information on Chemical Name, Structure/Formula, CAS Number, RTECS Number, DOT ID and Guide Numbers, Synonyms and Trade Names, Conversion Factors, Exposure Limits, Immediately Dangerous to Life and Health (IDLH), Physical Description, Chemical and Physical Properties, Incompatibilities and Reactivities, Measurement Methods, Personal Protection and Sanitation Recommendations, First Aid, Respirator Selection Recommendations, Exposure Route, Symptoms, and Target Organs.

- NIOSH Publication No. 2008-115: First Responders: Protect Your Employees with an Exposure Control Plan is available at http://www.cdc.gov/niosh/docs/2008-115/

  Pamphlet that gives basic information on the components of an exposure control plan

- NIOSH Publication No. 2002-107: Traumatic Incident Stress: Information for Emergency Response Workers is available at http://www.cdc.gov/niosh/docs/2002-107/

  This two-page handout educates workers about traumatic incident stress, including how they can recognize it and what they can do about it.

- Screening and Surveillance: A Guide to OSHA Standards is available at: http://www.osha.gov/Publications/osha3162.pdf

This document was created by OSHA as a quick reference to help locate and implement the screening and surveillance requirements of the Federal OSHA standards published in Title 29 of the Code of Federal Regulations (29 CFR) regarding certain chemicals, substances, and other work hazards. This guide provides a general overview of OSHA requirements.

11T. Lessons-Learned and After-Action Assessments

Contents:

Advice on instituting and implementing an after-action report is very detailed, and numerous documents exist to help organizations establish their own system. However, the most essential and challenging part of using this as a tool for the Emergency Responder Health Monitoring and Surveillance program is confirming that these topics are specifically addressed in the report. Adjustments should be made to ensure that ERHMS is being properly evaluated in this system during all phases and for all modules.

Guidance

Homeland Security Exercise and Evaluation Program, Volume III: Exercise Evaluation and Improvement Planning, Rev. Feb. 2007.

https://hseep.dhs.gov/support/VolumeIII.pdf

A document that offers proven methodology for evaluating and documenting exercises and implementing an Improvement Plan.

A Leader's Guide to After Action Reviews, Department of the Army, TC 25-20, 1993.

http://www.au.af.mil/au/awc/awcgate/army/tc_25-20/table.htm

The Army has developed this guide in order to use every training opportunity to improve soldier, leader, and unit task performance. To improve their individual and collective-task performances to meet or exceed the Army standard, soldiers and leaders must know and understand what happened or did not happen during every training event.

Lessons Learned Information Sharing
www.LLIS.gov

LLIS.gov is a U.S. Department of Homeland Security/Federal Emergency Management Agency program: national, online network of Lessons Learned, Best Practices, and innovative ideas for the emergency response and homeland security communities.

Example

Arlington County, V. 2002. Arlington County after-action report on the response to September 11 terrorist attack on the Pentagon.

http://www.floridadisaster.org/publications/Arl_Co_AAR.pdf

An actual after-action report.

Template

HSEEP AAR Template

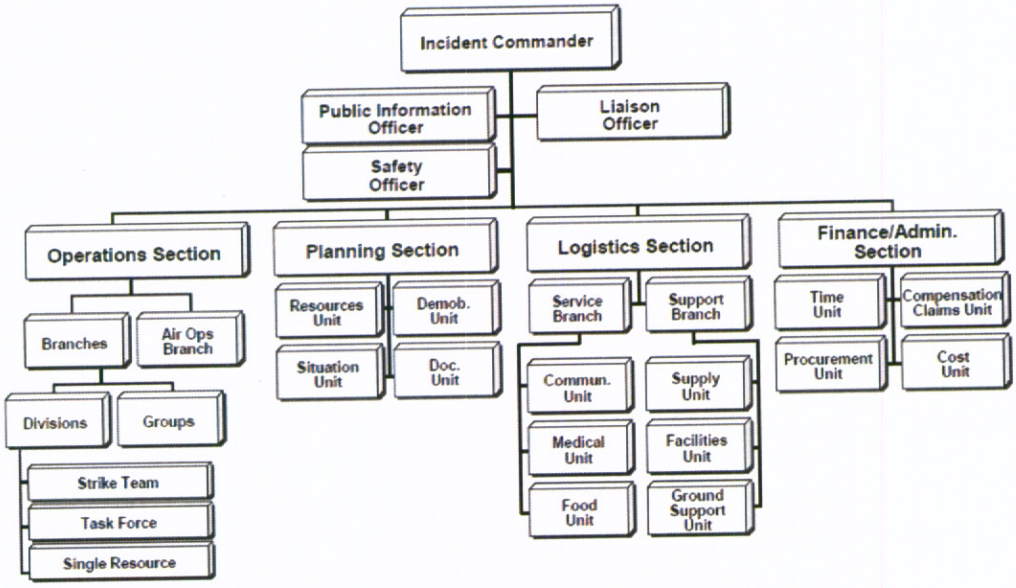
https://hseep.dhs.gov/support/AAR-IP_Template%202007.doc

A well-designed template for creating an after action report.

Appendix A

The Role of the Incident Command System (ICS) and Emergency Responder Health Monitoring and Surveillance (ERHMS)

ERHMS should be integrated into the ICS as soon as it is established for a given incident. The ICS is a management system designed to enable effective and efficient domestic incident management. ICS integrates a combination of agencies, facilities, equipment, personnel, procedures, and communications operating within a common organizational structure. It is designed to promote effective and efficient domestic incident management. A basic premise of ICS is that it is widely applicable and scalable. It is used to organize both near-term and long-term field-level operations for a broad spectrum of emergencies, from small to complex incidents, both natural and man-made. ICS is used by all levels of government—federal, state, local, and tribal—as well as by many private-sector and nongovernmental organizations. ICS is also applicable across disciplines. It is normally structured to facilitate activities in five major functional domains: (1) command, (2) operations, (3) planning, (4) logistics, and (5) finance and administration [FEMA 2008; FEMA 2010; OSHA 2009].



The Incident Commander (IC) or the Unified Command (UC) is responsible for all aspects of the response, including developing incident objectives and managing all incident operations. The IC is faced with many responsibilities when he or she arrives on scene. Unless specifically assigned to another member of the Command or General Staffs, these responsibilities remain with the IC.

Some of the more complex responsibilities include the following:

- Establish immediate priorities, especially regarding the safety of responders, other emergency workers, bystanders, and people involved in the incident.

- Stabilize the incident by ensuring that health and safety issues are addressed and that response resources are used in an efficient and cost-effective manner.
- Determine incident objectives and strategy to achieve the objectives.
- Establish and oversee incident organization.
- Approve the implementation of the written or oral Incident Action Plan.
- Ensure adequate health and safety measures are in place.

The Command Staff is responsible for public affairs, health and safety, and liaison activities within the incident command structure. The IC/UC remains responsible for these activities or may assign individuals to carry out these responsibilities and report directly to the IC/UC.

The safety officer (SO) is in a unique and centralized position to oversee and support many of the processes that provide data to and perform the functions of ERHMS, from preparedness and training to monitoring responders, health, activities, and their environment. Although the duties of the SO may not directly contribute to all of the data collected, the resulting information will have an impact on the duties and actions the SO takes; as such, much of the activities described in ERHMS are conducted, overseen, or accessed by the SO when performing his or her duties.

The SO monitors incident operations and advises the incident commander (IC) on all matters relating to operational safety, including the health and safety of emergency responder personnel. The ultimate responsibility for the safe conduct of incident management operations rests with the IC or Unified Command (UC) and supervisors at all levels of the incident management. The SO is, in turn, responsible to the IC for the set of systems and procedures necessary to ensure ongoing assessments of hazardous environments, coordination of multi-agency safety efforts, and implementation of measures to promote emergency responder safety efforts, as well as the general safety of incident operations. The SO has emergency authority to stop and/or prevent unsafe acts during incident operations. In a UC structure, a single SO should be designated, in spite of the fact that multiple jurisdictions and/or functional agencies may be involved. Assistants/consultants may be required and may be assigned from other agencies or departments, constituting the UC. The SO, Operations Section chief, and Planning Section chief must coordinate closely regarding operational safety and emergency responder health and safety issues. The SO must also ensure coordination of safety management functions and issues across jurisdictions, across functional agencies, and with private-sector and nongovernmental organizations. The agencies, organizations, or jurisdictions that contribute to joint safety management efforts do not lose their individual identities or responsibilities for their own programs, policies, and personnel. Rather, each entity contributes to the overall effort to protect all responder personnel involved in incident operations.

Various ERHMS-related activities conducted under the ICS and are identified by an asterisk (*) in the following ICS position descriptions.

Safety Officer Responsibilities

The SO is responsible for monitoring and assessing safety hazards or unsafe situations and developing measures for ensuring personnel safety. It is the safety officer's role to ensure that appropriate safety procedures have been identified and are being strictly followed.

The SO reports directly to the IC. Some of the duties related to ERHMS include, but are not limited to the following:

- Keeping the IC informed of operational safety problems and potential hazards through illness and injury reports.*
- Assessing local risk* and determining the need for resources (including staff) and programs. Focusing on the identification of unsafe conditions and practices and ensuring that solutions are developed to correct the identified problems.
- Ensuring personnel are following safety procedures.
- Ensuring that a personnel accountability system is established on-site and is utilized.

- Identifying necessary safety and health training,* developing, coordinating, or providing necessary training related to the event.
- Having the authority to correct unsafe conditions immediately, such as removing all personnel from areas of immediate danger. Having the authority to stop all operations when, in his or her judgment, an unsafe condition or practice exists that could lead to personal injury or death of any personnel.
- Developing and implementing an appropriate site health and safety plan (HASP) in coordination with existing health and safety programs and the on-scene Incident Commander's designated safety officer (SO), or other federal, state, tribal, or local governmental agency in charge of the incident. If a HASP is not established, the SO will ensure that one is established to protect responder personnel.
- Initiating and conducting accident investigations for on-site responding personnel or equipment and forwards reports to the IC and the responder's employer.
- Maintaining a site-specific incident and accident log.
- Maintaining and submits all safety-related documentation to appropriate offices both on-site and to AHJ and Incident Commander for inclusion into after-action reports.
- Participateing in After Action Report (AAR) processes on-site and at DHHS related to the event.
- Maintaining accountability for personnel entering site.*
- Recommending and enforceing Personal Protection Equipment use.*

The Logistics Section provides for all the support needs for the incident, such as ordering resources and providing facilities, transportation, supplies, equipment maintenance and fuel, food service, communications, and medical services for incident personnel.

The duties of the Logistics Section include the following:

- Establish the check-in function* at incident locations.
- Maintain and post the current status and location of all resources.*
- Maintain master roster of all resources* checked in at the incident.
- Provide input to and review the Communications Plan, Medical Plan and Traffic Plan.

The Medical Unit is responsible for the effective and efficient provision of medical services to incident personnel* and reports directly to the Logistics Section chief.

The primary responsibilities of the Medical Unit include the following:

- Develop procedures for handling any major medical emergency involving incident personnel.*
- Develop the Incident Medical Plan (for incident personnel).
- Provide continuity of medical care, including vaccinations, vector control, occupational health, prophylaxis, and mental health services for incident personnel.*
- Provide transportation for injured or ill incident personnel.
- Coordinate and establish the routine rest and rehabilitation of incident responders.*
- Ensure that injured or ill incident personnel are tracked* as they move from their origin to a care facility and from there to final disposition.
- Assist in processing all paperwork related to injuries, significant illnesses, or deaths of incident-assigned personnel.*
- Coordinate personnel and mortuary affairs for incident personnel fatalities.

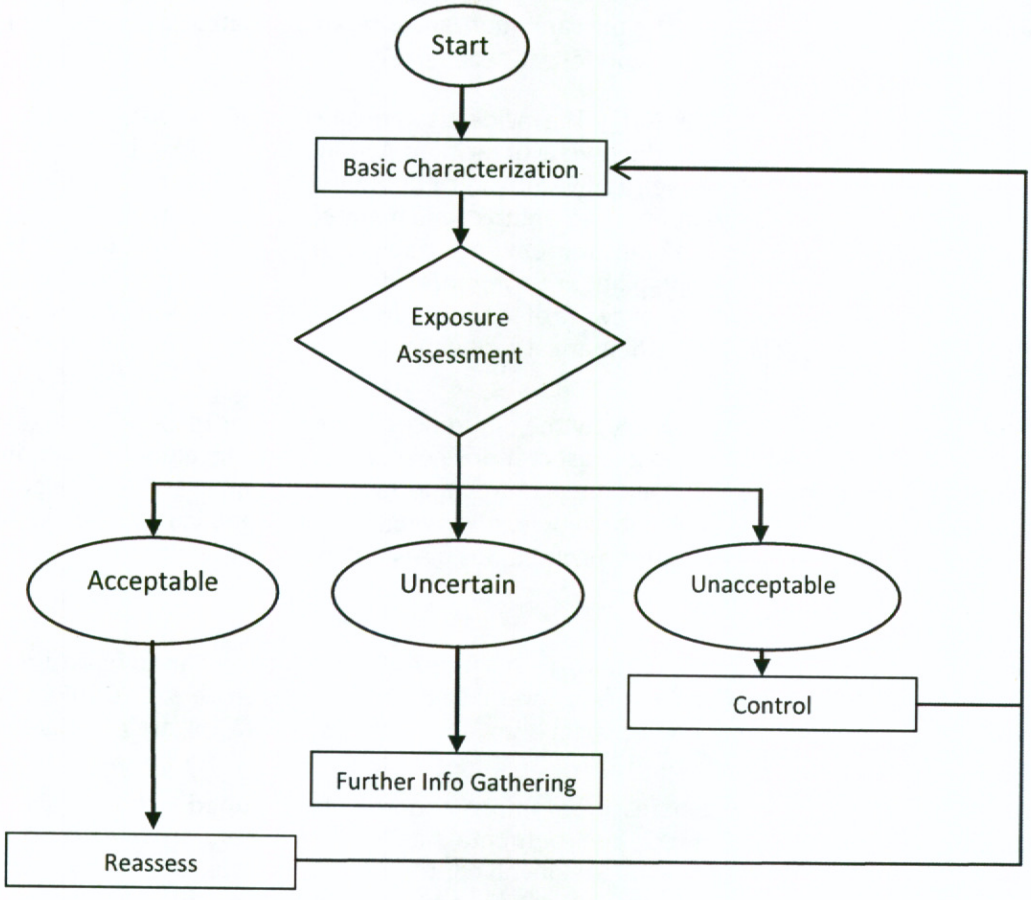
Appendix B

Exposure Assessment and Strategy in Incident Response Operations

Methodology

A consistent approach to assessing exposures regardless of the incident size or complexity is important. An exposure assessment model as depicted in Figure 8 provides a sound framework that can be used when characterizing health and safety risks at an incident response, regardless of its size or complexity. Figure 2 depicts the exposure assessment's centrality to myriad safety and health functions.

Figure 8: American Industrial Hygiene Association (AIHA)Exposure Assessment Model [16]



Starting the Exposure Assessment Process

The designated incident safety officer or his or her assistant safety officers are responsible for initiating an exposure assessment process. Below is a list of questions to begin this process:

a. What are the incident goals and objectives as set forth by either the incident commander or Unified Command?

b. What are the specific operations planned or currently being conducted that support the accomplishment of these goals and objectives?

c. Who and which organizations are performing these operations?

d. How do these jobs or tasks get communicated, supported, and supervised?

e. Where are the specific locations that these operations are occurring?

f. Within those operations, what are the specific jobs or tasks being performed as part of that operation?

g. What is the duration of these jobs or tasks? Is it ongoing 24/7 operation until complete, or are the tasks occurring within only a specified period?

h. Are there adequate food, water, shelter, sanitation, security, and rest areas available or brought in to meet the needs of the affected workforce at each site?

Figure 8 is a tiered, cyclic process [Bullock 2007]. The incident safety officer (SOFR) or assistant safety officer (ASOFR) attains this information through the review of Incident Action Plans, and/or discussions with key command or general staff members, as well as division or group supervisors, this initial assessment will be able to resolve low or trivial exposures as being acceptable, and many of the apparent gross overexposures as unacceptable [Bullock 2007]. Because of insufficient data, however, there exists a number of exposures that cannot be resolved in terms of acceptability, and therefore, the exposure assessment process depicted in Figure 8 becomes continuous. Subsequent cycles of the assessment process will generate more exposure information or the use of predictive mathematical modeling to better characterize these unresolved exposures [Bullock 2007].

Every incident response is unique, not simply by the differences in location or responding organizations, but also by the method of tactical response. Past response experiences are invaluable, but adjusting to specific conditions or issues on the scene are much more important. Real-time events on the ground, and one's willingness to travel, meet and talk with people, observing, listening, and learning are key activities that an SOFR or ASOFR should be engaged in a continuous basis [Ritchie 2004].

Basic Characterization

Once oriented to the overall incident operation, an SOFR or ASOFR should begin the hazard recognition process as part of basic characterization. There are several areas to focus this process [CDC 2008]: (a) tactical operations area(s), (b) incident command post, (c) evacuation centers, (d) staging area, (e) base camp, (f) helibase or helispot locations [CDC 2008].

In each of these locations, exposure assessment information can be grouped into the following four categories: (1)workplace information (i.e., environmental, facility, and general working conditions), (2) workforce information (i.e., specific responders involved, their numbers, appropriateness of training/ experience, and personal protective equipment used), (3)command/control structure (i.e., workload, pace, flexibility; clarity and coordination of job tasking, supervision, and reporting), and (4)hazardous agent information (i.e., specific contaminant(s) released or used, the agent's physical state, likelihood of co-occurring "psychological toxins") [Bullock 2007; Reissman (In Press); Reissman 2010].

Table 1 provides a general guide on specific information to gather in each of these categories.

Table 1 – Specific Information to Gather at Each Incident Response Location [Bullock 2007]

Workplace Information [Ritchie et al. 2006; Bullock 2007]	• Sources of release (e.g., tanker, ground leak) • Dispersion potential downrange as a liquid, vapor, etc. • Environmental conditions such as wind, ambient temperatures, humidity • Engineering controls • Potable water and food sources • Access to toilet facilities and safe running water for hygiene • Types of responder vehicles and support set-up • Defined delineation of contaminated and non-contaminated areas • Restricted access to affected or secure areas • Visually evident health and safety hazards (e.g., slip/trip/fall, crushing, confined spaces, dermal, or respiratory hazards) • Air, water, or soil monitoring already conducted and the owner of these results • Presence and condition of corpses • Number of wounded and if children are involved • Adequacy of security
Workforce Information [FEMA 2010; Swanson 1996; McCallister 2010]	• Response agencies or firms involved to include any subcontractors • Number of personnel involved • Validating which workers are performing a particular response operation (and appropriateness of training/experience/supervision) • In each response operation, identify specific and implied tasks being performed • Validate the use, and type of PPE • Observe safe work practices being used • Note any signs/symptoms observed on response personnel or their verbal concerns of medical, psychological or behavioral problems • Operations briefings being done, and if health and safety information is relayed • Medical and psychological support on-site • Operational work shifts and rest breaks • Reasonable shelter/lodging situations (safe, clean, quiet, easy transport access to worksite)
Command and Control Structure [FEMA 2010, McCallister 2010]	• Physical and mental workload • Pace or tempo of work • Flexibility and control over how the work is done • Clarity and coordination of job tasking, supervision, and reporting (especially on the front line of the job site; and with in the command center)

Hazardous Agent Information [FEMA 2010; Swanson and Guttman 1996; McCallister 2010; National Fire Protection Association 2008; OSHA 2007]	• Specific chemical, biological, and/or radiological agents released or used by responders • Specific psychological exposures related to working at the site (e.g., sensory reactions to death or mutilation, especially of co-workers, children, or in mass casualty scenarios; mysterious threats (e.g., biological or radiological hazards); near-miss events, and other unfamiliar challenges to workers (e.g., near-miss events, having to manage distraught community members, VIPs or media reporters/technicians) • Physical state(s) • Chemical and toxicological properties

Exposure Assessment

Following the "basic characterization" of the incident scene, the next step in the process is to perform an "exposure assessment." To do so, the SOFR and/or ASOFR should perform the following procedures: establishing Similar Exposure Groups (SEGs), defining exposure profiles, and comparing the exposure profiles with established Occupational Exposure Limits (OELs) [Ignacia 2008]. As described by Mulhausen, Damiano, and Pullen [Mulhausen 2007], an exposure profile is a characterization of the temporal (e.g., day-to-day) variability of exposure levels for a SEG. This characterization requires an estimate of the exposure and its variability in addition to judging how good those estimates are [Mulhausen 2007]. In an incident response, the exposure profiles are likely to be qualitative in nature because air monitoring will likely not be done in the initial response phase. At best, however, initial air monitoring conducted by hazardous material teams will be limited to a specific area where the contaminant(s) were released and not necessarily representative of actual personal exposure monitoring data.

Table 2 provides an example of an AIHA form for Hazard and Risk Analysis, which may assist in this process [Ignacia 2008].

This process involves the following basic steps:

- Define the specific work assignment/task that you are assessing
- List up to five hazards associated with performing this assignment
- For each hazard, rate the health, exposure, uncertainty, and risk level per this chapter.
- List the specific types of controls needed to prevent injury or illness. Use general control categories, such as "PPE," "Respiratory Protection," or "Eye Protection."
- Assign a health risk rating for each identified hazard using the AIHA Health Effects Rating scheme.

Table 3 – Health Effect Rating Categorization [Ignacio 2007]

Category	*Health Effect*
4	Life-threatening or disabling injury or illness
3	Irreversible health effects of concern
2	Severe, reversible health effects of concern
1	Reversible health effects of concern
0	Reversible effects of little concern or no known or suspected health effects

- Assign an exposure risk rating (ERR). The ERR is an estimate of the exposure level that response personnel may be exposed to relative to a specific Occupational Exposure Limit (OEL) [Ignacio 2008]. For safety hazards, the ERR can be used to define the likelihood of the hazard actually causing illness, injury or death [Ignacio 2008].

  A lack of sufficient quantitative analysis of chemical, biological or radiological exposures and a subsequent comparison to existing OELs hinders the ability of the SOFR to make a hazard determination. Compounding this problem is that in many cases the environment will not have been well characterized. The SOFR can rate his/her level of uncertainty for the assessment, which can then prompt a higher priority to conduct further information gathering [Ignacio 2008].

  ERR can be rated according to the following AIHA Exposure Risk Rating scheme [OSHA 2010; Ignacio 2008]

Table 4 – Exposure Risk Rating

Category	*Exposure Rating Categorization*	*Safety Hazard Rating Category*
4	> OEL	Very High Risk
3	50-100% of OEL	High Risk
2	10-49% of OEL	Moderate Risk
1	<10% of OEL	Low Risk

- When determining ERR, review the notes taken from walk around surveys, and interviews. The ratings should be based on the following information [Ignacio 2008]:
  - Monitoring data: area or personal monitoring
  - Surrogate data: exposure data from past response operations or using another environmental agent also present in the environment
  - Modeling data: should be performed by a qualified industrial hygienist or other qualified technical specialists, and should be based on physical and chemical properties of the environmental agents, and also, the response operations activities.
  - Controls used by the workers, either engineering, safe work practices, and/or PPE and their observable effectiveness in controlling exposures.
- Assign an uncertainty rating (UR). As described above, the exposure assessments to characterize the exposure risks to response personnel are likely qualitative in nature. The magnitude of the uncertainty associated with exposure assessments is an important consideration when judging exposures [Bullock 2007]. This knowledge is important to determine if an assessment has maintained its integrity or if significant gaps in the assessment exist requiring further information gathering [Bullock 2007].

Judging Exposures

The final step in the Exposure Assessment process depicted in Figure 1 is to assign a risk level for each identified hazardous exposure. A risk level is calculated based on the input from the ERR, health risk rating (HRR), and uncertainty rating for the particular hazard, which reflects the risk associated with a given set of responders performing a similar job. From this process, the SOFR can determine if the exposure to health and safety hazards identified are one of the following:

- **Acceptable:** Hazard identified has been determined to be low enough that risks associated with the exposure are low. Though rated acceptable, the SOFR should continue to reassess the particular hazard to verify the acceptability judgement [Bullock 2007].
- **Unacceptable:** Hazards identified have been determined to have an average exposure or the upper extremes of the exposure (e.g., peak) to be significantly high exceeding the established OEL. For safety hazards, these are typically hazards with a significantly high health risk rating and a high risk of occurrence [Bullock 2007].
- **Uncertain:** Insufficient data in either the associated response task or job, or information of the hazard may warrant an SOFR to determine the hazard as uncertain. Whereby unacceptable judgments assume that the SOFR knows the specific hazards involved and therefore, mechanisms of effective controls can be recommended, uncertain exposure judgments warrant a high priority for further surveys and other information gathering efforts or reach-back expert consultation in order to make the appropriate control recommendations [Bullock 2007].

On the forms used by the AIHA, a formula exists whereby the values assigned in the HRR and ERR are multiplied and then added to the determined uncertainity rating. The higher the risk level value, the higher the priority to either perform additional information gathering methods or implement control methods. The primary advantage in using the AIHA version of an ICS215A Hazard and Risk Analysis Worksheet is the limited ratings available to the user. There are only four ratings to choose in the HRR and ERR and three ratings in the UR. Arbitrary "fudging" of the numbers is minimized in order to provide increased "quantitative" judgment to determining risks. There are other ICS215A forms that provide a much wider composite-type assessment of risk, which could potentially lead to very wide and arbitrary interpretations of the severity, probability, and exposure risk ratings. Where a lower risk level value is assigned to one rating, the overall risk value assigned may, then, bias towards either a higher or lower assessment of risk. Consequently, an under- or over-estimation of the risk occurs resulting in either inadequate controls to protect responders or excessive waste of resources to control. Note that this form avoids the question of determining a probability rating because in a very dynamic incident response operation, quantifying the probability of a hazard happening or not happening could not be reliably ascertained or subsequently predicted.

Control Strategies in an Incident Response

After assigning the appropriate values and determining a risk level for each of the hazards identified in a work assignment, Block 7 allows the user to describe specific control methods (e.g., N95 filtering facepiece respirator, decontamination) in a short narrative and a simple, checked box format associated with a specific hazard in which this control method would be appropriate to implement against.

Early in a response, safety hazards and environmental agents present with known and immediate short-term health effects should be the primary focus [Bullock 2007]. The reason is due to the limited time available for an SOFR and his or her staff to perform this hazard and risk analysis. Identifying and assessing the significant and largely observable hazards should be focused for immediate control [Ignacio 2008]. Uncharacterized work environments involving hazardous substances in any physical state requires the highest level of PPE and, if possible, first combined with engineering controls until these substances are identified and quantified to substantiate lower level of controls.

The control strategy hierarchy is identical to any general industry or construction hierarchy of controls. However, because of the nature of an emergency incident, the predicted use is reversed, as shown in Figure 2.

Once specific control methods are identified for protecting response and support personnel from the identified hazards, the risk level can be used to prioritize the need for immediate implementation. Ideally, if resources are fairly robust, all recommended control methods should be implemented, but in reality, logistical lines at a response will be taxed. SOFR and ASOFRs need to work closely with the appropriate command and general staffs with a prioritized list of control methods using the analysis described above.

Assessing and intervening for psychological hazards may require additional skill sets, special consultants, and conducive relationships with key incident leaders (i.e., with authority to change process or procedure as needed) [Reissman (In Press-a); Reissman 2010]. There is great variability in stress tolerance and

coping schemes among those responding and leading response activities in a disaster context. Gruesome situations, especially those involving coworkers or children may ignite strong emotional responses. Unusual or mysterious exposures, especially infectious diseases or radiation, may lead to unrealistic safety or health concerns among responders. Administrative controls are likely to be useful in limiting exposure to the "psychological toxins," along with providing adequate recovery time and, possibly, professional support. In addition, conflicting safety information, multiple lines of reporting, and/or role confusion often lead to increased tensions at the worksite. The ability of the SOFR to reduce unnecessary stress attributable to command and control structure or communication style will depend on access to, and relationship with, key decision-makers.

In terms of post-event medical surveillance, the hazard and risk analysis documents, documented field observations of health and safety compliance, air monitoring records, Incident Action Plans for each operational period, and site safety plans should be reviewed and included in this surveillance to determine anticipated health effects associated with known response exposures that may occur among the event responders.

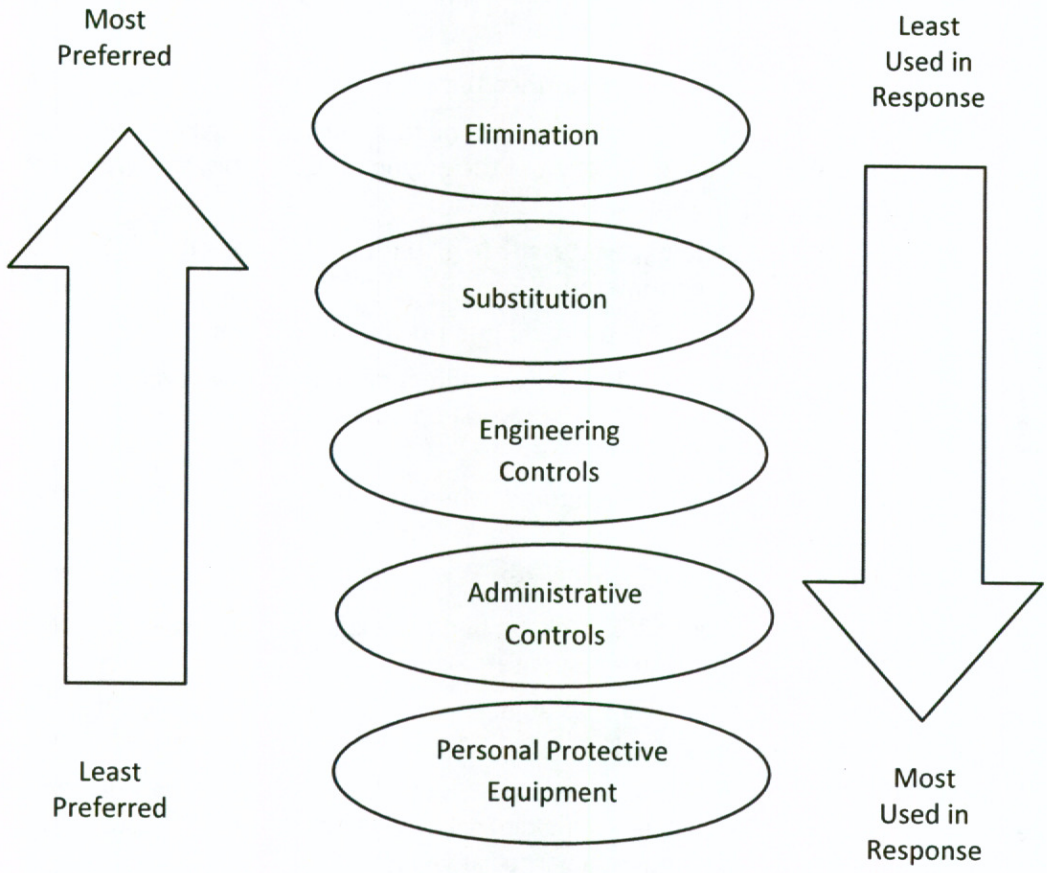


Figure 2 Hierarchy of Controls Preferred and Most Used in Response

Data Quality Management in an Incident Response

When gathering quantitative exposure data, Safety Officers will face situations where there may be too little quantitative data (from field direct-reading instruments and/or sampling and analysis), or there is too much data. In either circumstance, when analyzing data to determine acceptability of exposures, the Safety Officer or Industrial Hygienist needs to assess the data quality. Data quality management is a huge topic, which requires further in-depth discussion specific to chemical, biological, or physical agent hazards. This section will attempt to briefly describe a succinct evaluative process to assessing data quality in order to drive one's professional judgment towards determining acceptability of exposure or if additional information gathering is required.

Evaluating Source of Data

Quantitative exposure data, either derived from field direct-reading instruments or sampling and laboratory analysis (air, dermal, or biological), require careful evaluation. Ideally, the monitoring results should be recorded on a company or generic air-monitoring form that answers the questions below. Chain-of-custody records should be attached to the monitoring results for sampling and laboratory analysis to validate compliance. When evaluating the data, here are some questions to ask based on the source of the air monitoring data.

- Specifically, who and what company performed the air monitoring?
- Is there a brief description of the response job or task performed when the monitoring was performed? What about a brief description of the engineering controls, safe work practices and/or respirators/PPE used by the workers?
- What type of detection technology was used? (e.g., photoionization, ion mobility spectrometry, gas chromatography/mass spectrometry)
- When did the manufacturer and the user calibrate the direct-reading instrument?
- What were the environmental conditions (e.g., air temperature, humidity levels, precipitation, wind speed/direction) and physical location (e.g., at sea on-board a vessel or along a beach) when the air monitoring was performed?
- In relation to the responders being monitored, where was the distance and approximate location of the air monitoring?
- Is the display a digital readout or analog dials?
- Are the users of the instrument adequately trained and experienced on using the devices, or was the training done just-in-time for the response?
- Could there have been other chemicals adjacent to the air monitoring activity that may have confounded the air-monitoring results?
- When readings were taken, did fluctuations exist in the display, and if so, how did the reader then determine the results? (e.g., simply the middle region of where the needle fluctuated, or when the needle stabilized for a few seconds at a particular value?)
- What are the recognized limitations of the particular sampling methodology used?
- Were the sampling pumps calibrated in accordance with the sampling methodology used?
- What laboratory analyzed the results? Did the manufacturer and the user calibrate the direct-reading instrument accredited to perform this kind of sampling analysis?
- How were the sampling media stored and transported to the laboratory? How compliant was the chain-of-custody?

Evaluating the Data

This is the difficult portion of this section, but it requires brief discussion. Some questions to ask when evaluating the data quality include the following:

- Is there sufficient data for this operation to perform statistical analysis?
- Is the data exceeding a given OEL? What OEL is being used and why? Does the data comply with regulatory compliant OELs (e.g., OSHA Permissible Exposure Limits), but exceed recommended consensus-based OELs?
- If the data indicates a certain air-monitoring level for a specific chemical (e.g., benzene at 2 parts per million), but the data was derived from a non-specific direct-reading instrument (e.g., flame ionization detector or photoionization detector), how did the source know what he or she was specifically measuring? Was the correct compensation factor applied for the PID?
- Based on the data given, are there trends? For example, is the data showing higher levels at particular times of the day or when particular operations are occurring (maintenance down times versus actual response operations occurring)?
- Based on the data given, and after performing a statistical analysis of the standard deviation, what data points, if any, represent outliers? Do they represent data errors resulting from sampling, or laboratory analysis or instrumentation malfunction, or actual spikes/low reading levels?

When dealing with quantitative exposure data taken from consultants or other government agencies, these assessment questions are important for the analyst to ask. Ideally, these kinds of data quality management expectations should be communicated to all response organizations gathering exposure monitoring data so that these performers can document compliance with these expectations.

Communicating Exposure Assessment

Detailed Report

When reporting exposure assessments, a well-written report should reflect the following areas [Reissman (In Press-a); Reissman 2010].

- Summary to include the purpose of the assessment, general types of observations, conclusions and recommendations
- Environmental agents and the OEL(s) used in the assessment
- Assessment data used and a brief description of the exposure assessment ratings described
- Statistical analysis performed, if any
- Detailed observations in the field
- Conclusions
- Recommendations

The use of graphical tools, tables, and pictures will significantly assist the reader to understand the scope of the assessment.

Communicating to Response Community

Copies of exposure assessment reports should be shared with the overall incident command and general staffs. If reports covered response or support contractors, these private entities should be provided the assessment report. Any individual personal monitoring data should be shared directly with the worker who was monitored, and the data should be treated as personally identifiable information (PII).

If data analysis clearly shows exposures exceeding OEL, immediate communication with the response organizations and incident command/general staffs should occur *ahead of* any final report writing. Immediate controls should be recommended so that affected responders may comply quickly to avoid any further exposures to harmful agents. When exposures later in a response show a decline below a given OEL, this information should be communicated to the same stakeholders described and recommendations to move away from the mandated use of engineering, safe work practice or in particular, respirators/PPE should also be communicated. Respirators and PPE do add a physical burden to the respiratory and circulatory systems and so, avoiding these kinds of controls, if determined to be no longer needed, should be communicated and implemented when practicable.

Communicating to the Public/Media & Policy Makers

In very large incident responses, public, political, and media attention to worker health and safety are likely issues for inquiry. All exposure assessment reports are discoverable items for future civil lawsuits or release as a form of public record. Written assessment reports, therefore, should be accurate and succinct. All reports, as with any public releasable document, should first be evaluated through the Incident Command's Public affairs officer, or in larger responses, with the Joint Information Center (JIC) before release. An Incident Command's legislative liaison or official should be consulted before anyone speaks with members of a political body at the local, state or federal level. Safety officers or members of a medical team focused on responder health and safety SHOULD NOT be releasing any documents directly to any member of the public or the media unless otherwise authorized by the Incident or Unified Command, through clearance from one's public affairs or JIC. This same guidance holds true for releasing documents to political entities.

The Centers for Disease Control and Prevention has tools available that provide instruction in how to effectively plan and deliberately deliver this information verbally to the public and media. No one should communicate risks without a well-rehearsed and well-written plan on what specific items to share and answers to anticipated questions. Complex exposure assessment data, conclusions, and recommendations should be carefully tailored down to simplest terms for the intended audience, who are non-public health and non-medical professionals.

Technical terms such as parts per million need to be avoided. Questions from the public and media NEED TO BE ANTICIPATED AHEAD OF TIME and answers appropriately crafted. Engagement with public affairs, legislative affairs, and the JIC are mandatory activities to ensure that this communication is done appropriately.

Glossary

- **After Action Report (AAR):** Reports that summarize and analyze performance in both exercise and actual events. The reports for exercises may also evaluate achievement of the selected exercise objectives and demonstration of the overall capabilities being exercised.
- **Brief Symptom Inventory:** An instrument that provides patient-reported data to help support clinical decision-making at intake and during the course of treatment in multiple settings.
- **Clinical care:** Medical assessment, diagnosis and treatment services for an individual worker's health complaints or impairments, including complaints related to mental health or injury. Healthcare services are rendered by licensed healthcare practitioners and subject to local standards of care, medical ethics, provider-patient relationship expectations, business rules and facility licensure.
- **Command staff:** An incident command component that consists of a public information officer, safety officer, liaison officer, and other positions as required, who report directly to the incident commander.
- **Emergency:** Any incident, whether natural or man-made, that requires responsive action to protect life or property. Under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, an emergency means any occasion or instance for which, in the determination of the president, federal assistance is needed to supplement state and local efforts and capabilities to save lives and to protect property and public health and safety, or to lessen or avert the threat of a catastrophe in any part of the United States.
- **Emergency Responder Health Monitoring and Surveillance (ERHMS):** A framework of activities designed to allow for the monitoring and surveillance of emergency responder safety and health during all phases of emergency response: pre-deployment, deployment, and post-deployment.
- **Health and Safety Plan (HASP):** The Health and Safety Plan is a procedure that assigns responsibilities, establishes personnel protection standards, specifies safe operation procedures, and provides contingencies that may arise during field operations.
- **Incident Command:** Entity responsible for overall management of the incident. Consists of the Incident Commander, either single or unified command, and any assigned supporting staff.
- **Incident commander:** The individual responsible for all incident activities, including the development of strategies and tactics and the ordering and the release of resources. The incident commander has overall authority and responsibility for conducting incident operations and is responsible for the management of all incident operations at the incident site.
- **Incident Command System:** A standardized on-scene emergency management construct specifically designed to provide an integrated organizational structure that reflects the complexity and demands of single or multiple incidents, without being hindered by jurisdictional boundaries. ICS is the combination of facilities, equipment, personnel, procures, and communications operating within a common organizational structure and designed to aid in the management of resources during incidents. It is used for all kinds of emergencies and is applicable to small, as well as large and complex, incidents. ICS is used by various jurisdictions and functional agencies, both public and private, to organize field-level incident management operations.
- **Kessler Questionnaire (K10):** A 10-item questionnaire intended to provide a global measure of distress based on questions about anxiety and depressive symptoms that a person has experienced in the most recent 4-week period.
- **Liaison officer:** A member of the Command Staff responsible for coordinating with representatives

from cooperating and assisting agencies or organizations.

- **Logistics Section:** (1) In the Incident Command, the section responsible for providing facilities, services, and material support for the incident. (2) Joint Field Office (JFO), the section that coordinates logistics support to include control of and accountability for Federal supplies and equipment; resource ordering; delivery of equipment, supplies, and services to the JFO and other field locations; facility location, setup, space management, building services, and general facility operations; transportation coordination and fleet management services; information and technology systems services; administrative services, such as mail management and reproduction; and customer assistance.
- **Medical monitoring**: Ongoing clinical assessment of physical and mental health in an individual worker to detect emerging health and injury effects that may be work-related (e.g., physiological, psychological), and to inform needs for medical treatment or other services and/or worker exposure control(s). Once the baseline clinical status has been established, participants in the program are periodically assessed for changes in their clinical status.
- **Medical Outcomes Study Short Form-12 (MOS SF-12):** The 12-Item Short Form Health Survey (SF-12) was developed for the Medical Outcomes Study (MOS), a multi-year study of patients with chronic conditions. The resulting short-form survey instrument provides a solution to the problem faced by many investigators who must restrict survey length. The instrument was designed to reduce respondent burden while achieving minimum standards of precision for purposes of group comparisons involving multiple health dimensions. (RAND).
- **Medical screening:** Medically assessing individual workers for the presence (or absence) of specific physical or mental health conditions at a specific time, with the express purpose of early diagnosis and, if appropriate, treatment (secondary prevention). Medical screening focuses on assessment of fitness and ability to safely and effectively deploy on a response and may entail history taking, examination, and/or testing procedures.
- **Medical surveillance:** Systematic and ongoing collection and evaluation of population clinical data (e.g., physical and mental health, work histories, medical/psychiatric examination, laboratory and imaging studies or other clinical testing) that is used to identify hazards, eliminate ongoing hazardous exposure, and to evaluate exposure-health outcome relationships.
- **Medical Unit**: Functional unit within the Service Branch of the Logistics Section responsible for the development of the Medical Emergency Plan, and for providing emergency medical treatment of incident personnel.
- **National Incident Management System**: A set of principles that provides a systematic, proactive approach guiding government agencies at all levels, nongovernmental organizations, and the private sector to work seamlessly to prevent, protect against, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity, in order to reduce the loss of life or property and harm to the environment.
- **National Response Framework**: Guides how the nation conducts all-hazards response. The Framework documents the key response principles, roles, and structures that organize national response. It describes how communities, states, the federal government, and private-sector and nongovernmental partners apply these principles for a coordinated, effective national response. It describes special circumstances where the federal government exercises a larger role, including incidents where federal interests are involved and catastrophic incidents where a state would require significant support. It allows first responders, decision makers, and supporting entities to provide a unified national response.
- **Nongovernmental Organization (NGO)**: An entity with an association that is based on interests of its members, individuals, or institutions. It is not created by a government, but it may work

cooperatively with government. Such organizations serve a public purpose, not a private benefit. Examples of NGO's include faith-based charity organizations and the American Red Cross. NGO's, including voluntary and faith-based groups, provide relief services to sustain life, reduce physical and emotional distress, and promote the recovery of disaster victims. Often these groups provide specialized services that help individuals with disabilities. NGO's and voluntary organizations play a major role in assisting emergency managers before, during, and after an emergency.

- **Occupational health surveillance:** Refers to the ongoing and systematic collection, analysis, interpretation, and dissemination of health and injury data related to an event's emergency responder population as a whole; the data are intended to inform public health practice. The analysis and interpretation of these data should be disseminated in a timely manner to those who need to know (such as the incident command personnel, health and safety representatives), which must include the workers who contributed their health information to the system.
- **Post-event responder health tracking:** Refers to the collective suite of options for following the health and functional status (includes injury) of workers involved in incident response and recovery operations after their response work is completed (i.e., after workers demobilize).
- **Post-event responder health tracking:** Refers to the collective suite of options within the ERHMS system for following the health and functional status (includes injury) of workers involved in incident response and recovery operations after their response work is completed (i.e., after workers demobilize and return to their usual locations and activities).
- **Post-traumatic stress disorder:** A type of anxiety disorder that is triggered by a traumatic event. A post-traumatic stress disorder can develop when an individual experiences or witnesses an event that causes intense fear, helplessness, or horror. (MayoClinic.com).
- **Public information officer:** A member of the Command Staff responsible for working with the public and media and/or with other agencies to provide required incident-related information.
- **Responder:** Includes paid affiliated personnel, contractors, and subcontractors, and volunteer workers involved in incident operations. Responders include police, fire, and emergency medical personnel, as well as other responder groups such as public health personnel, cleanup, and repair/ restoration workers.
- **Response**: Immediate actions to save lives, protect property and the environment, and meet basic human needs. Response also includes the execution of emergency plans and actions to support short-term recovery.
- **Roster**: A roster is a list of response workers who have been or continue to be participating in any capacity during a response event, or who are available and ready to respond before an event. The purpose of maintaining such a roster is to provide a formal record of all those who have participated in response and cleanup activities. It functions as a mechanism to contact workers about possible work-related symptoms of illness or injury, as needed, and serves as the basis for determining which workers may require post-event tracking of their health.
- **Safety officer:** A member of the Command Staff responsible for monitoring and assessing safety hazards or unsafe situations, and for developing measures for ensuring personal safety. The safety officer may have assistants.
- **Sheehan Disability Scale:** The Sheehan Disability Scale (SDS) was developed to assess functional impairment in three inter-related domains—work/school, social, and family life.
- **Sprint-E:** An 11-question post-disaster assessment and referral tool that contains the Short Post Traumatic Stress Disorder (PTSD) Rating Interview (SPRINT) and several questions regarding depression and impaired functioning.
- **Unified Command:** An Incident Command System application used when more than one agency

has incident jurisdiction or when incidents cross political jurisdictions. Agencies work together through the designated members of the UC, often the senior person from agencies and/or disciplines participating in the UC, to establish a common set of objectives and strategies and a single Incident Action Plan.

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