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DR2 Playbook: A Resource for Deployment When Disaster Strikes

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Contents

Introduction

The aftermath of a natural or manmade disaster, such as a chemical incident, infectious disease outbreak, hurricane, flood, oil spill, or wildfire, raises questions regarding impacts to human health and the environment. Although these events are unfortunate, they create unique opportunities for scientists to step in to identify ways to mitigate short- and long-term health effects and prepare for future disasters.

The purpose of this document is to guide researchers through the process of disaster research deployment, from the planning phase through the completion of data collection and the researchers' return home. Specifically, this document will discuss how to organize research teams, formulate research questions, store data, disseminate findings, and work with vulnerable communities. It is intended to provide researchers and research organizations, university professors and universities, and government researchers and agencies with guidance and recommendations to better prepare for conducting disaster research. Those conducting environmental, clinical, or community-engaged research in post-disaster situations will find this document especially useful.

This guide is not intended to replace a research organization's policy, guidance, or protocol and should not supersede any written regulations. Please note that a **DR2 Glossary** is available at the end of this document, which includes terms, definitions, and acronyms specific to disaster research (see Appendix 3: Glossary).

The National Institutes of Health (NIH) Disaster Research and Response (DR2) Program aims to create a system to maintain coordinated tools, efforts, and responders for the collection of environmental health disaster research data. The DR2 Program is the national framework for research on the medical and public health aspects of disasters and public health emergencies. The program provides tools and resources, research protocols, and training and exercises for researchers.

Tabletop exercises, hosted by the DR2 program, train a network of environmental health researchers to safely and effectively contribute to the disaster research process and share the work of the program. These exercises bring together key stakeholders and involve discussions between federal, state, and local public health officials; emergency management professionals; academics; communities; members of private industry; and others. These discussions are used to identify capacities, capabilities, and resources; network with colleagues; and discuss challenges associated with post-disaster research.

Overall, the exercises serve to introduce the concept of disaster research to local and state offices of emergency management and departments of public health and the environment, as well as academia, communities, and other stakeholders. Participants emphasize the need to engage with a wide group of partners including federal, state, and local stakeholders, public and private, including communities, volunteer organizations, academia, hospitals, and private industry.

Exercises have been hosted in Los Angeles (2014), Houston (2015), Boston (2016), and Tucson, Arizona (2019). The Tucson Workshop identified ways to integrate health care/clinical and community-based response efforts, data collection, and research implementation, and worked with the local Institutional Review Boards (IRB) to further understand how to improve engagement, reviews, and associated processes related to the development and implementation of disaster research protocols.

Case Study: Hurricane Harvey Disaster Response Research

Pre-deployment: In 2015, researchers, state and local agencies, and nonprofit organizations attended the Houston DR2 workshop. Coincidentally, the activities at the workshop were based on the idea that a large hurricane just made landfall. During the workshop, participants networked with each other, with the idea that those connections might be beneficial in establishing research collaborations should a large hurricane make landfall in the future. Even after the workshop, participants continued to develop collaborations, preparing data collection protocols and preparing for the next disaster.

Deployment: After Hurricane Harvey made landfall as a Category 4 storm in August 2017, researchers, media, state and local agencies, and nonprofit organizations conducted environmental and biological sampling, developed registries to track long-term health and housing, and supported access to health care and other services in the Houston area. Relationships formed at the 2015 DR2 workshop, along with DR2 protocols, and baseline data collected before Harvey, proved to be beneficial in collecting data, engaging with communities, and establishing partnerships with local organizations.

Post-Deployment: More than two years after Harvey hit, researchers are continuing to work on formal evaluations of DR2 activities related to the disaster. Efforts to promote the development, implementation, and coordination of timely data collection across multiple stakeholders have all been noted as successes of deployment.

Participants attending tabletop exercises discuss challenges in conducting research such as obtaining funding and IRB approval. The participants also brainstorm possible solutions to these issues, like developing pre-approved protocols. Lessons learned from these exercises can improve preparedness for future events.

Related Links:

- NIEHS Preps for Disaster, Health Research with Derailment Scenario (Tucson, Arizona): https://factor.niehs.nih.gov/2019/4/community-impact/disaster/index.htm
- Hurricane Responses Build on Community Connections: https://factor.niehs.nih.gov/2017/10/feature/feature-2-hurricanes/index.htm
- Exercises by the Disaster Research Response Program: https://dr2.nlm.nih.gov/training-exercises#Exercises_by_the_Disaster_Research_Response_Program

Planning for Disaster: To Deploy, or Not to Deploy?

	To Deploy	Not to Deploy
Capacity	Research can be articulated into well defined research objectives and questions.	Research questions are beyond the scope and expertise of the team.
Capability	Deployment would be to a stable environment.	The team available for research is unable to support itself without relyling on local aid or without consuming scarce resources.
Community Connections	Researchers have an existing relationship in the community and access to affected populations.	Research interferes with lifesaving activities or requires resources to be removed from rescue, recovery, or victim support.
Health and Safety	No severe health impacts have been mentioned.	Hazards remain that compromise the health and safety of researchers and responders.

Figure 1: The elements of self-assessment are adapted from a National Institute for Occupational Safety and Health (NIOSH) article, "A Decision Process for Determining Whether to Conduct Responder Health Research Following Disasters." https://www.ncbi.nlm.nih.gov/pubmed/23716371

During the planning process, researchers must consciously make the decision to deploy. To do this, they must consider their personal safety, the safety of the affected community, and the ethical implications of post-disaster research. The **DR2 Self-Assessment Form** is available for researchers to use in assessing their capacity and capability to deploy (see Appendix 1: Self-Assessment).

Research is not always needed, or appropriate, after every disaster. The field of disaster research is growing quickly, with researchers monitoring and responding to human health threats, exploring novel tools and approaches, and conducting long-term investigations. Before diving into the creation of a disaster research plan in one of these areas, researchers should assess whether their goals and objectives of post-disaster research are practical and appropriate. As previously stated, researchers must always consider their organization's policies when considering disaster research.

By understanding their organization's capacity and capability in preparation for deployment, researchers can devise a disaster research plan, which serves as a roadmap before, during, and after deployment. This type of plan is sometimes called a Concept of Operations, or CONOPS.

The disaster research plan should begin by listing the research needs, which can be identified in collaboration with external stakeholders. These might include university health and safety officials, program officers, travel planners, legal departments, and Institutional Review Board (IRB) officials. This plan can help researchers devise a protocol for research to make deployment safe, productive, and effective for the research team and stakeholders.

Adapted from a NIOSH article[1], figure 1 breaks down the decision-making process, where researchers should consider scenarios in four different categories: capacity, capability, community connections, and health and safety. If the research organization was directly affected by the natural or manmade disaster of interest, it might be best to forego deployment, despite the organization's capacity, capabilities, and community connections.

Research Capacity and Capability

A researcher or research organization's capacity and capability are important factors when considering deployment. Research capacity refers to the resources and ability to define the problem and objectives, carry out research, and identify solutions. Research capability is the ability to carry out research in a specific post-disaster environment. Internal and external factors can impact an organization's research capacity and capability. Internal factors may include the size and experience of a research team. External factors may include the availability of emergency services and the extent of physical destruction in the location affected by the disaster.

Community Connections and Partnerships

Arriving to a disaster situation without preexisting connections or relationships with the affected community makes conducting research more difficult. Establishing connections before a disaster strikes gives the researcher time to build trust and a mutual understanding with the community.

[1] Decker JA, Kiefer, M, Reissman DB, Funk R, Halpin J, Bernard B, Ehrenberg RL, Schuler CR, Whelan E, Myers K, Howard J. 2013. A Decision Process for Determining Whether to Conduct Responder Health Research Following Large Disasters. AM J Disaster Med. https://www.ncbi.nlm.nih.gov/pubmed/23716371

An extremely useful way to conduct research is through community-engaged research projects, in which community members inform researchers of their biggest needs. From here, researchers work with the community to develop research questions, design studies, and collect data.

Communities can also lead projects through citizen science efforts, in which they work with researchers to collect data on a variety of topics. Citizen science can increase the amount of data collected and help people better understand the issues faced by their communities.

Formal and Informal Partnerships

Formal partnerships are created under legally binding documents, memorandums of understanding, mutual aid agreements, and other officially written and signed documents. These documents define rights, responsibilities, and expectations of those involved in the partnership. For example, after the Deepwater Horizon Gulf Oil Spill in 2010, NIEHS awarded research grants to Gulf area universities that partnered with communities affected by the spill. This network of universities addressed health questions identified by the communities such as reproduction and birth outcomes, general health of coastal residents, and seafood safety. Formal disaster research partnerships may be created between a funding agency and awardee, an awardee and sub-awardee, or researchers and non-governmental organizations. These partnerships are created to ensure that in the event of a disaster, essential support would be provided to the affected community. For instance, a signed agreement might allow researchers to use local lab space and equipment or stay in a common space (e.g., churches, conference facilities, etc.) while carrying out disaster-related research.

Informal partnerships are often equally as important as formal partnerships; however, they are built on mutual trust and interests and do not involve signed or formal paperwork. Informal partnerships still involve setting expectations and shared goals in the event of a disaster.

Community-Based Participatory Research

Community-based participatory research (CBPR) is a partnership approach to research that equitably involves community members, organizational representatives, and researchers. The partnerships between these entities may be formal or informal, but communities are involved throughout the research process, from the development of goals and objectives to the delivery of results and evaluation of the study. Community partners might be involved in framing research questions, designing research projects, collecting and analyzing data, interpreting and translating findings, communicating findings, and evaluating next steps.

Health and Safety

Disasters can create hazardous, chaotic, and austere environments. Those who live through a disaster and its aftermath experience physical and mental stress, along with other health risks. With this in mind, researchers should think about how deployment might increase their risk of exposure to harmful substances and other occupational hazards.

When it comes to the safety of the affected community, unless authorized by the appropriate party or organization, researchers must avoid interrupting any rescue or response effort.

To ensure personal safety and the safety of the affected community, researchers should stay up to date on all appropriate trainings. This may include trainings offered through the Occupational Safety and

Health Administration (OSHA)[2] or the NIEHS Worker Training Program (WTP).[3] The Federal Emergency Management Agency's (FEMA) National Incident Management System (NIMS) training program can help researchers learn to prevent, mitigate, and respond to incidents[4]. In collaboration with the National Clearinghouse for Worker Safety and Health Training,[5] the NIEHS WTP has created disaster-specific training tools for use prior to and during deployment. These tools can help staff understand specific health and safety hazards common to disasters.

Reactions to traumatic sites are normal, but by preparing themselves ahead of time, researchers can better cope with traumatic situations. The NIEHS WTP has a comprehensive Responder and Community Resiliency Training Tool[6], and the Substance Abuse and Mental Health Services Administration (SAMHSA) offers a 4-hour interactive Disaster Worker Resiliency Training Course. Either of these training tools can be useful in helping disaster researchers recognize the signs and symptoms of stress and trauma, avoid post-traumatic stress disorder, and make use of organizational and community support resources.

Related Links

- Partnerships for Public Health (PEPH) Citizen Science Webinars: https://www.niehs.nih.gov/research/supported/translational/peph/webinars/citizen_science/index.cfm
- Gulf Oil Spill Response Efforts: https://www.niehs.nih.gov/research/programs/gulfspill/index.cfm
- Worker Training Program: An NIEHS Superfund-Related Activity: https://www.niehs.nih.gov/health/materials/worker_training_program_508.pdf
- For more information about NIEHS WTP Disaster Preparedness and Response tools and resources, visit: https://tools.niehs.nih.gov/wetp/index.cfm?id=556

Pre-Deployment

Once the research team has examined their ability to deploy, and decides it is the right option, the pre-deployment phase begins. During this phase, the team should solidify research goals and objectives and build a team of trained surveyors to carry out data collection. This is also the time that the team should seek approval from the IRB, an administrative body that provides ethical and regulatory oversight on research involving human subjects.

The research team should also think about logistics, and plan their travel, accommodations, and how they will store research equipment and materials. Lodging, transportation, and team meeting spaces should be arranged before arriving to the field site, if possible. Occasionally, it is not possible to plan transportation and meeting spaces until arriving to the area. The **DR2 Deployment Guide** is a helpful

[2] Occupational Health and Safety Administration. https://www.osha.gov/
[3] NIEHS Worker Training Program. https://www.niehs.nih.gov/careers/hazmat/about_wetp/index.cfm
[4] Federal Emergency Management Agency National Incident Management System: https://training.fema.gov/nims/
[5] NIEHS National Clearinghouse for Worker Safety and Health Training. https://tools.niehs.nih.gov/wetp/
[6] NIEHS Worker Training Program, Responder and Community Resilience, Disaster Worker Resiliency Training Materials. https://tools.niehs.nih.gov/wetp/index.cfm?id=2528

tool for researchers to use in planning and making accommodations for deployment (see Appendix 2: Deployment Guide).

Following deployment, researchers should consider completing an evaluation of the research conducted at the field site. Researchers will learn how to utilize the **logic model** to examine inputs, activities, outputs, and outcomes of research conducted during deployment.

Physical and Psychological Preparedness

When planning the logistics of deployment, the research team should understand their physical and mental capabilities. In the aftermath of a natural and manmade disasters, the affected areas will have sustained a varying degree of physical damages. These now austere environments may face limited transportation, communications, and in some instances, utilities such as electricity and water. It's beneficial that researchers be familiar with the demands the impacted environment might have on carrying out research and data collection.

If the site has been deemed safe for the research team to be there, researchers should still be prepared, both physically and mentally. Physical preparedness refers to the researchers' ability to perform the tasks of a particular job, e.g. sitting, lifting, walking, etc. Psychological preparedness refers to the researchers' ability to recognize and confront disaster-related stress, such as exposure to traumatic sights or emotions.

Related Links:

- For more information about preparedness, see the NIEHS Emergency Support Activation Plan and Researcher Deployment Guide located here: https://tools.niehs.nih.gov/wetp/public/hasl_get_blob.cfm?ID=11006

Research Goals and Objectives

Researchers and academic institutions often have their own goals and objectives for research; however, supporting recovery of affected communities should be top priority. When planning post-disaster research, researchers should keep in mind how they might help lessen long-term health impacts of harmful environmental exposures in affected communities. This may involve incorporating diverse stakeholders, empowering local researchers and responders, and anticipating future needs of the communities.

Team Building

Successful disaster research relies on a trained and experienced team that can deploy, carry out data collection, and conduct data analysis, while working in a stressful environment. In the pre-deployment stage, the leader of a research team should identify deployable staff. Staff may be located at the leader's institution or another institution – it may even be someone local to the affected area.

Researchers should consider forming a team of interdisciplinary members if their research question crosses different scientific disciplines. To maintain a cohesive team of interdisciplinary researchers, members should establish effective communication strategies and build trust internally and externally with local partners.

Existing literature in disaster research describes three obstacles researchers in interdisciplinary teams may face: dialect, metaphor, and interactional expertise. Dialect refers to the way a discipline uses vocabulary, and the colloquial meanings of the words and phrases used. Metaphor refers to the way a scientific discipline uses figurative language to describe the state of research. Lastly, interactional expertise refers to the basic knowledge needed to understand a specific discipline.

In order to understand a researcher's dialect and use of metaphor, members of an interdisciplinary team should have conversations with each other, or schedule meetings and seminars where they can get to know each other better. Additionally, participating in collaborative field work before deploying can help build common ground among team members.

To have a successful team, it is imperative to have a healthy team. Disaster sites create physical and mental stress, as well as risks, for those who respond. To ensure they are physically prepared for deployment, researchers should make sure that all necessary vaccinations are up-to-date. Tetanus and hepatitis B boosters are especially important as there is a possibility for exposure to bloodborne pathogens and other infectious materials. If a researcher hasn't had an annual physical in the past year, it may be necessary to do so before deployment, especially if the individual has a chronic medical condition. Researchers are responsible for letting the team leader know about any chronic conditions.

Related Links:

- Team Building Resources: https://onlinelibrary.wiley.com/doi/full/10.1111/risa.13407
- Recommended Vaccines: https://www.nc.cdc.gov/travel
- Responder and Community Resilience: https://tools.niehs.nih.gov/wetp/index.cfm?id=2528

Local Relationships

Establishing local relationships is critical to defining and determining a research team's logistics. Research teams should emphasize open communications and collaborations when establishing relationships in affected areas. Local relationships can assist a research team in navigating the geographic area, identifying safe locations, and establishing interactions with appropriate community members.

Local relationships should be made with multiple contacts prior to deployment and should be maintained throughout and after deployment. Examples of valuable relationships include:

- Local trusted leaders, such as church leaders and well-known community representatives, can inform the research team about community concerns.
- Local travel agencies and hospitality representatives can inform research teams of appropriate lodging and transportation logistics.
- Local universities and research facilities may be able to provide workspaces and aid the storage and transportation of biological specimens collected in the field.

Depending on the severity of the disaster, a research team may want to send a member of the team to conduct a site visit before committing to a full deployment at a specific time and location.

Data Preparedness and Collection

Many of the major challenges for researchers deployed to disasters is related to data collection. Data preparedness, or information management preparedness, is how some organizations have termed the ability of an organization to responsibly and effectively deploy and manage data collection and analysis tools. Literature on the topic defines five components of data preparedness.

1. Standard setting and risk analysis
2. Requirement planning and stress testing
3. Coordination and consultation
4. Capacity-building and training
5. Evaluation and improvement

A formal agreement and data sharing plan should be arranged prior to deployment to ensure there is a standard mechanism in place to manage, share, and store data. The data may be stored with the lead researcher's institution or another partner organization. Data collection tools must meet all data and security safety standards and must be identified with all usage regulations clearly noted.

According to the NIH, results from research supported by NIH funding should be made available to the research community. To create a meaningful data sharing plan that communicates essential information, researchers should answer the five basic questions of What, Who, Where, When, and How.

Considerations for Data Sharing	
What data will be shared?	Final research data, metadata, and descriptors should be shared and made usable to other researchers.
Who will have access to the data?	Data should be shared as broadly as possible to the extent consistent with applicable laws, regulations, rules, and policies.
Where will the data be shared and located?	Data repositories with common standards and an established infrastructure dedicated to the appropriate distribution of data is ideal.
When will the data be shared?	Data should be made available as soon as possible and for as long as possible.
How will researchers locate and access the data?	Researchers need to be able to easily identify locations of relevant data and be able to easily access the data.

NIEHS supports data sharing, as it accelerates new discoveries, stimulates collaborations, and increases scientific transparency and rigor. For more information on data sharing and collection, refer to the Deployment section of this document.

Related Links:

- Data Preparedness: https://hhi.harvard.edu/sites/default/files/publications/data_preparedness_update.pdf
- Improving Data Collection Capabilities and Information Resource: https://www.ncbi.nlm.nih.gov/books/NBK285425/
- Key Elements to Consider in Preparing a Data Sharing Plan Under NIH Extramural Support: https://www.nlm.nih.gov/NIHbmic/data_sharing_plan.html

Equipment

Research equipment will be specific to each research question and each team member's role. The research team should discuss and be informed about what equipment will be needed for their research, and what equipment they will be bringing from their home lab. The team should then inform appropriate personnel and team leaders on equipment needs.

The team should consider the disaster environment when selecting equipment for deployment. Will there be power? Will there be cellular and internet data? What about a cool place to properly and safely store samples?

Training and Certifications

In addition to informal meetings and conversations, team members may also need to obtain credentials, or required certifications, prior to conducting research with human subjects. These trainings are usually mandated by state and federal agencies, or organizations.

For example, the Federal Policy for the Protection of Human Subjects, or the **Common Rule**, and the **HIPAA Privacy Rule** must be followed by researchers. The Common Rule is described in Federal Regulations 46 CFR 45,[7] and defines the processes for IRB review and approval of research with human subjects.

The HIPAA Privacy Rule protects a person's medical records and personal health information.[8] In addition to protecting data, the Rule sets limits for how data may be used. For example, the creation of databases for research purposes is permitted, as long as the researchers have documentation that an IRB or Privacy Board approved of the use. Data is also permitted to be used in future studies. Lastly, the Rule allows IRB to use expedited review procedures[9] as permitted by the Common Rule to review and approve requests for waiver authorizations. Consider the following security policies when collecting data:

- Secure all sensitive information via approved encryption solution or through adequate physical security and operational controls.

[7] Electronic Code of Federal Regulations. https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=83cd09e1c0f5c6937cd9d7513160fc3f&pitd=20180719&n=pt45.1.46&r=PART&ty=HTML

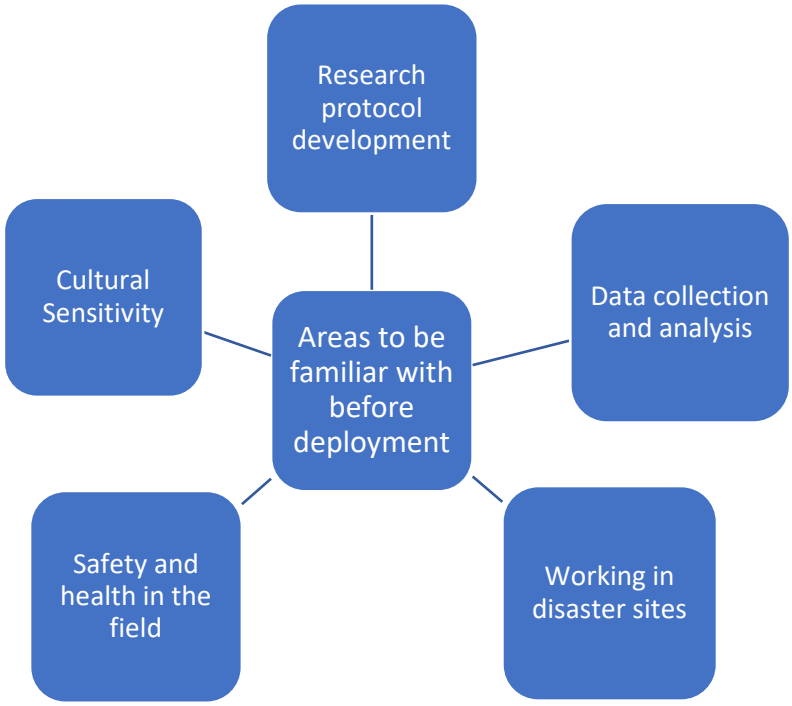
[8] U.S. Department of Health & Human Services, Health Information Privacy, The HIPAA Privacy Rule. https://www.hhs.gov/hipaa/for-professionals/privacy/index.html

[9] U.S. Department of Health & Human Services, Health Information Privacy, The HIPAA Privacy Rule, For Professionals, FAQs. https://www.hhs.gov/hipaa/for-professionals/faq/307/how-does-the-rule-help-institutional-review-boards-handle-additional-responsibilities/index.html

- Only use encrypted computers and computer drives.
- Protect all computers with strong passwords.
- Do not share passwords between users.
- When necessary, encrypt all PIIs during transmission.

Having a well-trained team prior to deployment is critical to ensure safe, effective, and successful research. Through training, the physical and mental impacts of being placed in an unfamiliar environment under less than ideal conditions can be minimized.

The following graphic displays some of the key skills staff should be trained on and have knowledge of before deployment.



The following is a list of different trainings that researchers may find useful and should consider prior to deployment. This is by no means an exhaustive list.

- Basics of the Incident Command System (ICS)
- CBPR approaches
- Cultural awareness or communications trainings
- Comprehensive safety and health practices, including use of personal protective equipment (PPE)
- General safety trainings that follow the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) standard
- Human subjects' protection
- Health Insurance Portability and Accountability Act (HIPAA)

- Mental health resiliency (e.g., NIEHS WTP Responder and Community Resilience Training, SAMHSA Disaster Resiliency Course)
- Personal security
- Research protocols that will be used in the field
- University required deployment and site-specific hazard trainings
- Other trainings (ethics, IT, harassment, etc.)

IRB Approval Process

Researchers should balance data collection with the appropriate protection of human subjects. The NIEHS IRB provides ethical and regulatory oversight of research that involves human subjects by NIEHS researchers or grantees. The IRB process protects the rights, welfare, and well-being of human research participants; ensures compliance with local, state, and federal laws and regulations; ensures compliance with NIEHS and NIH policies and regulations; employs the highest ethical standards for human research protections in all human subjects; and provides guidance to ensure sound research design, scientific integrity, and considerations to determine if the research furthers the field.

Universities conducting human subjects research have special policies regarding collection and storage of biospecimens. While collecting and storing biospecimens, researchers must follow appropriate procedures. Biospecimens must be handled in accordance with the U.S. Occupational Safety and Health Administration's Bloodborne Pathogens Standard (OSHA Standards, Booklet 3186-06R, 2003). Laboratories must have a Standard Operating Procedure in place for labeling, handling, and storage of biospecimens. Biospecimens containing select agents or toxins are regulated under 42 CFR 73 (HHS 42 CFR 73, 2012).

The NIEHS-approved Rapid Acquisition of Pre- and Post-Incident Disaster Data (RAPIDD) study[10] protocol minimizes the time needed to begin collecting health data and biological samples from those who may have been exposed to environmental contaminants.

Notable Considerations Prior to Seeking IRB Approval	
Does the work qualify as research?	The U.S. Department of Health and Human Services defines research as, "A systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge."
Does the work involve human subjects?	Humans are subjects if the researcher interacts or intervenes directly or if the researcher collects identifiable, private information.
Is the work exempt from approval?	Disaster research that may be exempt involves the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens; or research projects conducted by or subject to the approval of

[10] NIH Disaster Research Response (DR2) Research Protocols, NIEHS RAPIDD Study. https://dr2.nlm.nih.gov/protocols

	department or agency heads. *An IRB official must make the decision regarding exemption.*

Related Links:

- NIEHS Institutional Review Board: https://www.niehs.nih.gov/about/boards/irb/index.cfm
- The Protection of Human Subjects: https://ori.hhs.gov/content/chapter-3-The-Protection-of-Human-Subjects-Definitions
- Guidelines for Human Biospecimen Storage, Tracking, Sharing, and Disposal within the NIH Intramural Research Program: https://oir.nih.gov/sites/default/files/uploads/sourcebook/documents/ethical_conduct/guidelines-biospecimen.pdf

Funding and Support

Because most federal government funding mechanisms take time to award, it might be complicated for a researcher to find funding for disaster research. That is why it is important for researchers to be aware of and discuss funding limitations, as well as mechanisms and opportunities, before a disaster strikes.

NIEHS' **Time-Sensitive Research (R21) grants**, the National Science Foundation's grants for **Rapid Response Research (RAPID)**, and other supplemental funding from existing awards are all options for post-disaster research funding. The NIEHS Time-Sensitive Research program supports environmental health research following unpredictable events, where there is a short time frame to collect human biological samples or environmental exposure data. RAPID proposals are accepted when there is a severe urgency with regard to availability of, or access to, data, facilities, or specialized equipment following unanticipated events. The award often enables program managers to initiate funding within days of a disaster event.

Related Links:

- Time-Sensitive Research Opportunities in Environmental Health (R21): https://tools.niehs.nih.gov/srp/programs/r21current.cfm
- National Science Foundation Responses to Natural Disasters: https://www.nsf.gov/naturaldisasters/

Deployment

Once deployed, the research team will carry out data collection. Researchers must maintain open lines of communication with one another and with external stakeholders during data collection. This section focuses on making the most of the research team's progress during deployment by outlining considerations of plans for data sharing, communications, and outreach.

Data Collection, Storage, and Sharing

Data storing and sharing require careful actions during deployment. It's important to keep track of unique data, or raw data, gathered in the field that cannot be easily replicated. Researchers are encouraged to maintain multiple copies of data on encrypted external hard drives or cloud-based systems in case the original data is lost. Without backup copies, researchers are often left with no choice

but to go back into the field to collect new data. It is also important to note that certain grants have established rules for where and how long data must be stored after collection.

The research team must plan how data will be stored among team members. If members are sharing external hard drives and USB flash drives, a designated storage place should be established in the lab. If a device goes missing, it should be reported to the team leader immediately. Ultimately, researchers should maintain multiple copies of their data, whether that is on a personal computer, an external hard drive, or an off-site, cloud-based system.

Because data gathered from individuals living in affected communities is often sensitive, private information, researchers should consult with their organization's IRB and IT department to determine the proper place to store data. It is important to keep in mind that certain grants have established rules for where and how long data must be stored after collection.

The research team should establish additional security precautions if data containing **personal identifying information (PII)** such as the study subject's name, social security number, address, or telephone number, is collected. This is especially true when collecting biospecimens. Universities and other research institutions have policies in place to protect PII. The research team leader must ensure that PII and other data are protected when in use and properly disposed of when no longer needed.

Related Links:

- Guide for Identifying and Handling Sensitive Information at the NIH https://oma.od.nih.gov/DMS/Documents/Privacy/Guide%20for%20Handling%20Sensitive%20Information%20at%20NIH.pdf
- 11 Ways to Avert a Data-Storage Disaster: https://www.nature.com/articles/d41586-019-01040-w
- Frequently Asked Questions: Data Sharing: https://grants.nih.gov/grants/policy/data_sharing/data_sharing_faqs.htm

Internal Communication Plan

A clear communication plan is integral to safe deployment and successful research. The internal communication plan keeps all team members up to speed on data collection and sharing, while the external plan communicates important findings to stakeholders outside the research team. Organizations conducting disaster research should create a plan outlining internal and external communication, frequency of communication, tools for communication, and responsibilities of researchers in communication.

Many research organizations, institutions, and universities have communications plans. These may serve as a useful starting point for developing a communications plan.

The **internal communications plan** details the roles, responsibilities, and line of reporting between researchers at home and in the field. The plan should address communication within and among the team, including meetings and debriefings. The plan should not only define preferred forms of communication (e.g., phone calls, text messaging, email), but it should also clarify alternatives, should one form of communication be inaccessible. The frequency of expected communications should be defined as well as the parties responsible for communicating in the field.

The internal communications plan should include the following, at a minimum:

- **Brief overview of deployment situation:** Include affected community and type of disaster.
    - **Safety policies and procedure:** Procedures can be adapted from researchers' home institution policies and procedures.
        - **Examples of safety policies and procedures may include:** Reporting back to sleeping quarters by curfew, traveling to data collection sites with at least one other person, carrying communications devices and first aid kits when collecting data.
    - **Standard of conduct:** Can be adapted from home institution.
        - **Examples of standard of conduct might include:** Policies on social media use during deployment, policies on photographs being taken/used, requirements that certain customs can be observed.
- **Objectives and goals of deployment:** Brief description of what the team hopes to accomplish, potential obstacles to goals, and significance of research on affected community
- **Methods of communication:** Consider accessibility of methods, including phone, text, and email, in the field.
    - Chain of command in communicating important messages, both research related, and team/personnel related.
- **Frequency of communication:** Expected amount of communication between researchers and home institutions.
- **Emergency communication:** Researchers should have emergency contacts listed and carry a hard copy to the field.

Situation Reports, or SITREPs, can give researchers within the team an idea of their colleagues' progress on data collection and research in the field. These reports help researchers remain safe during data collection, as they should include updates on weather conditions and activities in the field. Informal debriefs with team members may also be beneficial.

The internal communications plan should contain the contact information for each researcher in the field, as well as emergency contacts for all deployed researchers. Should cell or internet services fail, a backup plan should be put in place by the research team.

External Communication Plan

The **external communications plan** engages all stakeholders and can assist in the adoption of behaviors that safeguard health and limit the impact of disasters on affected populations. The plan should define the stakeholders, consider their cultural background and potential language barriers, and lay out the best strategies to reach them.

Some elements of the plan might need to be updated prior to deployment to be customized for the disaster situation at hand. Additionally, some elements may occur during the deployment phase, while others occur during the post-deployment phase. This is left to the discretion of the research team.

The external communications plan should include:

- **Objectives and goals**: Brief overview of what you hope to communicate to stakeholders, with special consideration for language and cultural barriers. For example, think about how local emergency response teams, local organizations and partners, suppliers, vendors, media, community members and research participants, relate to the research you are doing. How might it affect them? Can they help you? How your project will benefit them?
- **Contact information:** Primary and alternative points of contact for all external stakeholders should be maintained and updated.
- **Evaluate and audit past disaster communication:** Analysis of the tools and messages your home institution has used to manage disaster deployment communication with stakeholders in the past – what worked and what wasn't so successful?
    - If deployed to an area where researchers don't speak the local language, a full-time translator may be needed to understand the concerns and customs of affected communities following disasters.
- **Post-disaster messages about research:** Following a disaster, members of the affected community will want to know what type of data is being collected by researchers, why that data is important, and where that data will be stored. They will be eager to know results. Teams should have clear messaging ready for anticipated questions so that all team members are communicating the same information.
- **Preliminary results of research (if available):** Sharing what is known with the affected community will foster a sense of trust and will be beneficial in conducting any future outreach activities. Understanding what will be shared, and when it will be available, is important for all team members collecting data to understand so that expectations are clear to all participants. Researchers should strive to present more than raw data to the public – they should prevent any important information in a way that is understandable to a general audience.
- **Success metrics:** Define how success will be measured; examples include the number of people participating in research, factsheets given, samples processed.
- **Incorporate the plan via outreach:** Include proposed activities to report-back results and inform audiences how to stay safe following a disaster. Examples of outreach activities are listed below.
- **Providing guidance on identified health issues:** It would be inappropriate and unethical for researchers to identify health issues without providing guidance on the issues. Community members with suspected conditions such as hypertension, diabetes, and asthma should be referred to a medical doctor for evaluation.

Related Links:

- Crisis Communications Plan: https://www.ready.gov/business/implementation/crisis

Outreach

Outreach activities help the research team build trust within communities and is essential to the success of disaster research. Engaging communities and building local relationships was discussed in the Pre-Deployment section. Through this process, researchers can better understand the priorities and needs

of affected communities. Research teams can conduct outreach once they have identified cohort populations. When considering a specific cohort, researchers should take time to consider vulnerable populations or communities. Researchers should also consider specific social, economic, cultural, and geographic factors of affected communities.

To engage participants effectively, researchers may consider providing incentives such as reimbursement for time or travel costs related to research participation. However, researchers should be careful to avoid potentially problematic incentives for participation including cash payments, gift cards, vouchers, or other prizes. These incentives could undermine participant autonomy.

Examples of outreach include:

- **Attending local meetings:** Attending community meetings, city council meetings, and other similar meetings is the first step to understanding a community's concerns after disaster hits. These meetings can help shed light on the needs of the community. Researchers should continue to attend meetings throughout deployment to communicate findings and next steps with the communities.
- **Working with local trusted leaders:** Researchers should identify and work with local leaders such as church leaders or other well-known community figures. These individuals can build trust in communities where research is taking place by articulating the benefits of research without overpromising commitment. Trust is hard to gain back after it is broken.
- **News coverage:** Researchers might cooperate with local media teams to be interviewed for a story on research and data collection. A very detailed communications plan is required for these types of activities and should be created in conjunction with your institution's office of public communications.
- **Citizen science:** Researchers can take advantage of local knowledge and resources to involve the community in participating in data collection and research translation.

Related Links:

- Principles of Community Engagement: https://www.atsdr.cdc.gov/communityengagement/pdf/PCE_Report_508_FINAL.pdf
- Improving Ethical Review of Research Involving Incentives for Health Promotion: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3313933/

Post-Deployment

A large part of post-deployment involves researchers deciding how to best share and use their valuable data. However, researchers should also consider their mental health and physical resiliency when returning home. Although the Pre-Deployment section touches on mental health, this section will further explain steps that can help ensure a smooth transition.

Data Sharing and Use

Results from community-based research should be reported back to those affected communities. This step of information sharing should begin before deployment, during, and after deployment. During the

post-deployment phase, however, researchers will have additional time to analyze results, create formal reports, and contribute to publications.

Similar to designing surveys, researchers must consider cultural diversity, language, and education level when communicating results. Researchers should also consider how results lend themselves to solutions that benefit communities. That is, if researchers identify a problem in a community, researchers should be prepared to communicate potential impacts to the community and direct them to appropriate public health experts. For example, if a community has elevated levels of a chemical, there could be immediate or long-term health consequences for individuals in that community. It is the researcher's responsibility to be transparent with the community, discuss potential impacts, and identify or recommend solutions to eliminate and reduce the health threat.

Community meetings are an effective method of sharing data that have been collected within communities. Researchers should work with a trusted community leader or group to organize the meetings, which can help translate results and report back to communities.

Researchers should also be prepared to discuss any scientific publications they publish after deployment. A general audience may not easily be able to understand results, formal reports or publications, so researchers should consider developing talking points for multiple audiences within a community. Researchers develop trust when they effectively communicate their results and implications. They can do this through press conferences, speaking to media outlets, and written commentaries

Measuring Success of Data Collection and Sharing

To measure success of data collection and sharing, researchers should reflect on and evaluate their experiences, in terms of how their research has benefited the affected community. The study methods and results should satisfy community expectations. During the reflection and evaluation process, the researcher might consider how the affected population was impacted by the work and how the researcher might continue that work in the coming days, weeks, and years.

Reflections are personal to the researcher. Thinking about deployment can help researchers see how they have grown, both as a person and scientist, during deployment. Researchers should think about lessons learned during deployment, and what might be useful if they were to be deployed again under similar circumstances.

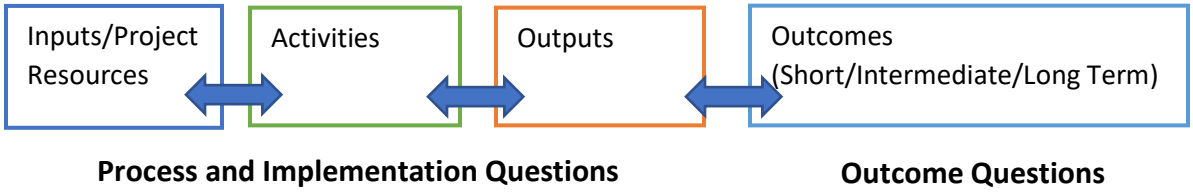
NIEHS places emphasis on evaluation, which is a formal review of how research was conducted and how it could be made better for the next event. Evaluation considers the impact of research, training, and translation activities. It is worth nothing that evaluation plays a large role in the WTP, which uses lessons learned to develop safety and health resources for the field, such as online e-learning tools on topics like safety, personal protective equipment and training supplies, and printed training materials.

Tools for Evaluation: Logic Model

Post-deployment is a time that researchers should consider conducting an informal or formal evaluation of what was done and what can be improved for future deployments. Evaluation tools are helpful for researchers when assessing research outcomes. These tools are beneficial for researchers conducting internal discussions with their research team. They can also be used to connect with stakeholders to determine if the outcomes of research matched the expectations and needs of the community.

During evaluation, researchers should reflect on inputs, activities, outputs, and outcomes of research. Before deployment, researchers should consider creating a logic model, a comprehensive program model used across research programs. The model can aid in the process of evaluation by helping the researcher see if the goals and objectives of the deployment were met.

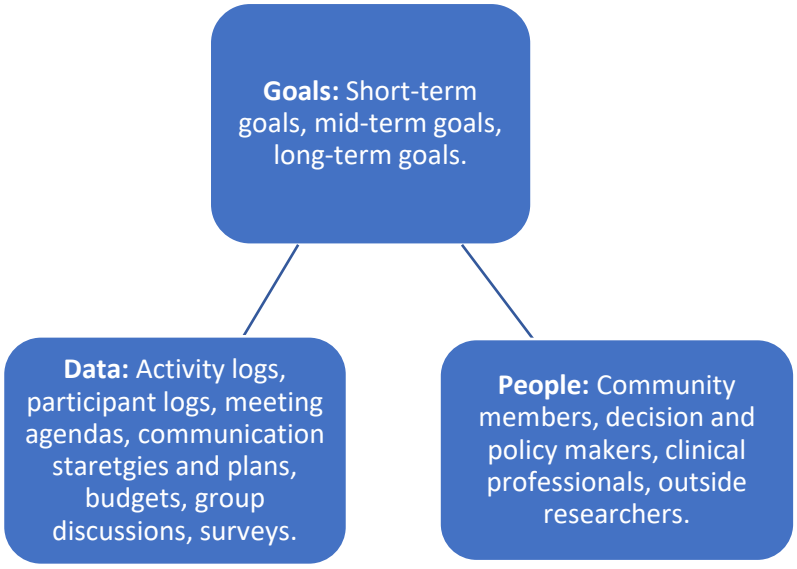
- **Inputs:** Time, materials, money, equipment, facilities
- **Activities:** Actions carried out through the use of inputs
- **Outputs:** Direct products of activities
- **Outcomes:** Benefits of changes resulting from activities and outputs



Researchers should consider the following types of questions in working with the Logic Model:

- Inputs:
  - Were there inputs (resources) that we did not use? How could we have made better use of resources?
- Activities:
  - Was the amount of time and resources spent on post-disaster research efforts justified?
  - Did community members understand the research questions we were asking?
- Outputs:
  - Did we collect the data that we planned on collecting?
  - How could data collection be made more efficient?
  - Did the public have any concerns with the manner in which data collection occurred?
- Outcomes:
  - Are there communities that might benefit from a similar type of post-disaster research in the future?

Although these questions are a small sample of the items to include in evaluation, they are a good place to start. After asking these questions, researchers should use the following diagram, which contains three major aspects of post-disaster research, to evaluate their impact. Using this diagram, researchers can think about the nature of their goals, the validity of their data, and outcomes in communities.



Transition and Mental Health

Following deployment, getting back into a routine and achieving a sense of normalcy could take time. After working under extreme conditions in the field, researchers may experience distress and anxiety about the disaster area and recovery efforts. With preparation and support throughout the entire deployment process, most researchers will recover without professional help or intervention. Completing the Responder and Community Resilience Training[11] offered through the WTP can teach researchers to recognize the signs of symptoms of stress and trauma (also on pg. 8).

An informal debriefing, or "hotwash," is often conducted following deployment. Researchers discuss what happened during deployment, challenges and lessons learned, and best practices. Through this process, the facilitator can gauge who may need additional support.

Institutions are strongly encouraged to provide their researchers with the proper work conditions to help adjust back to life in the office. An institution may encourage researchers to take time in returning to the office after deployment or encourage researchers to share lessons learned with their peers. Sharing lessons can help a university or organization better prepare researchers for future deployments and understand the support needed upon return.

In addition to this, institutions might work to create support systems to make the transition to daily life after deployment as smooth as possible. Assigning deployment "buddies," researchers who can check in on each other upon returning home, can make the transition process easier. If the "buddies" work at the same institution, in-person meetings might work best. If they work far away from each other, email or phone calls can be beneficial.

[11] NIEHS Worker Training Program, Responder and Community Resilience, Disaster Worker Resiliency Training Materials. https://tools.niehs.nih.gov/wetp/index.cfm?id=2528

Familial support systems play a key role in a researcher's transition back home as well. The researcher's family should encourage him or her to get quality sleep, eat well, spend time with family and friends, and reflect upon the deployment experience. Reflecting on the positive aspects of the experience, like the way they performed under pressure, is an excellent way for researchers to cope with stress.

Please note this information is not intended to be a substitute for professional medical advice or diagnosis. Always seek advice of your physician or other qualified health provider if you have any questions about mental health.

Related Links:

- NIEHS Disaster Worker Resiliency Training Manual: https://tools.niehs.nih.gov/wetp/public/hasl_get_blob.cfm?ID=10382
- Emergency Responder Health Monitoring and Surveillance: Post Deployment Phase: https://www.cdc.gov/niosh/erhms/postdeploy.html
- Department of Health and Human Services Disaster Behavioral Health Concept of Operations: https://www.phe.gov/Preparedness/planning/abc/Documents/dbh-conops-2016.pdf
- A Post-Deployment Guide for Emergency and Disaster Response Workers: https://www.osha.gov/SLTC/emergencypreparedness/resilience_resources/support_documents/postdeploy/er_disaster_workers_nmh05-0219.html
- First Responders and Disaster Responders Resource Portal: https://www.samhsa.gov/dtac/disaster-responders

Appendix 1: Self-Assessment

The goal of this self-assessment form is to help principal investigators (PIs) or research team leads assess how prepared his/her team is to deploy (i.e., travel to the field) to conduct research following a disaster, without outside support.

The intent of this form is to encourage research teams' preparedness before a disaster occurs, and to generate meaningful conversation to help them better understand their capability to respond in a way that limits risks and aligns with best practices for conducting research in an uncertain environment. PIs or leads may find that their team is not fully capable to deploy to a disaster; however, completion of this research deployment self-assessment could help identify: 1) needs and gaps in research capabilities that should be addressed; or 2) skills and resources that may benefit other research teams that deploy.

Instructions and Notes

Note: This information is for research teams' internal use only and is not expected to be shared. The form should be completed by one (or more) of the following research team members or personnel:

- Grant PIs;
- Lab or team leaders; and
- Program managers

Important notes to consider prior to completing the form:

- Personnel are encouraged to determine the size of the team for which they are determining capabilities.
    - For example, does this form represent the capabilities and resources of a single research lab, a Center or Consortium, or a specific research core?
- Personnel are also encouraged to determine which services they would consider deploying, then limit answers to focus on the capabilities needed to meet these services during deployment.
    - For example, does the research team plan to perform only epidemiological questionnaires? Use passive sampling devices? Perform full blood testing?
- Personnel who wish to limit their assessment of deployment capabilities to a specific geographic region or disaster type are encouraged to clearly define these limitations.
    - For example, is the research team interested or capable in only deploying for events within a 200-mile radius? Or only events where power remains available to hotels or other lodging locations?

Capacity and Capability

Research Team personnel & staff

- Do you have staff who can be deployed?
    - Do any members of your research team have a job description that includes disaster research/deployment? Or have any indicated an interest in disaster research/deployment?
        - If so, how many?
        - Are there enough staff members, with diverse capabilities, to support your work?

        - How much time would it take for these staff to transition from daily duties to deployment?

    - Do you have access to other staff or personnel (researchers, students, sub-contractors, etc.) who may be able to augment your staff to deploy?

    - Does your institution have limitations or rules for sending staff or personnel to potentially hazardous situations?

    - Do available team members or personnel have training in any of the following? Please mark all that apply.
        - ☐Basics of the Incident Command System (ICS)
        - ☐Comprehensive safety and health practices, including use of personal protective equipment (PPE)
        - ☐Clinical research protocols that will be used in the field
        - ☐Human subjects' protection
        - ☐Hazardous Waste Operations and Emergency Response (HAZWOPER)
        - ☐Health Insurance Portability and Accountability Act (HIPAA)
        - ☐Personal security
        - ☐Community-based participatory research (CBPR) approaches
        - ☐Any cultural awareness or communications trainings?
        - ☐Any university required deployment/hazardous environment site-specific hazard trainings?
    - Do you keep an up-to-date record of training completion dates for staff?
    - Do you have a policy in place on how current specific trainings must be prior to a staff member's or researcher's deployment?
    - Is all staff training provided inclusive of the latest science, techniques, and procedures?
    - Do you have a source for pre-deployment, disaster-specific training, or other trainings that may take place immediately before deploying?

Equipment (monitoring or sampling)

- Do you have access to all the equipment needed to conduct research in the field?
    - Are there any pieces of equipment or devices that are loaned to other users, which not be available for deployment to the field?
    - Are there any perishable materials or supplies that need to be sent with the equipment?
        - Certain perishable materials, such as ice and water, may not be available during a disaster. Do you have a plan to provide perishable materials to the deployed team?
- Can the necessary equipment be easily transported to/from the field?
    - Are there special transportation/delivery needs?
    - Is specific packaging required?
        - Is that readily available for use?
    - Are any forms, certifications, or declarations needed for transportation?

- Does the equipment need special care once on site?
    - Does the equipment require special products or cleaners for maintenance in the field?
    - Is it electricity dependent?
        - Do you have battery backup, charging devices, generators, etc.?
    - Are there any considerations for a maximum/minimum temperature, or other environmental factors, for use or storage of the equipment?
- For how long can the equipment be used before required maintenance or down time?
- Is all equipment clearly labeled as property of your institution?
- Do you have a chain of custody plan for equipment that is sent to the field for a disaster research project? Do you have appropriate forms such as monitor logs, data collection or other report forms?

Laboratory Support

- Do you have access to laboratory support that can analyze the data collected in the field?
    - Is there a plan for data analysis if the laboratory itself is impacted by a disaster?
- Do you have a plan for samples to be transported to the laboratory from the field?
    - Do samples require special handling?
    - Will samples require refrigeration?
    - Will additional documentation or forms be required to accompany samples?
- Do you have a data chain of custody?
- Is field processing of samples required or possible?

Funding and Financial Support

- Is disaster research part of the statement of work for any of your currently funded, active grants?
- Are you currently adding disaster research to upcoming applications?
- Is it possible for you to reprogram any existing funds to support disaster-specific research in the absence of new funds?
    - If so, for how many days will that work be covered?
- Are there limitations on any of your funding sources that may prevent or limit travel to a disaster/hazardous area, or that may restrict your ability to conduct research to a specific geographic region or amount of time?
- Do you have a well-defined process for writing a proposal for immediate submission?
    - If so, do you have individuals that have been identified who could quickly write a proposal?
    - Do you keep an up-to-date list of all individuals who would be required to sign/approve a proposal at all levels of your institution?
- Do you have a process that enables quick processing and distribution of funds to support team members upon award?
- Do you keep all grant application and proposal information (biosketches, eRA Commons accounts, etc.) for NIH and other agencies up-to-date?
- Do you monitor funding sources for announcements, modifications, or disaster information regularly?

    - Are you aware of any current sources of disaster research funding for which you are eligible to apply?
        - If so, do you have any text drafted for a possible application?

Survey Tools and Research Protocols

- Have you created, used, and/or reviewed a survey tool that could be adapted and used in a disaster setting, such as the NIH RAPIDD tool?
    - Have you identified the staff members who could customize this tool based on a disaster?
    - Do you have staff members who can translate and validate the tool if required for the disaster?
- How long do you estimate adaptation and customization of the survey tool would take?
- Do you have readily available tools to conduct the survey?
    - Do you have equipment for collecting survey responses?
    - Does the equipment require power? Internet connection?
- Do you have staff trained to use the survey tool?
    - Do you have a data quality plan?
- Is there a research protocol that you have created or used previously that could be adapted for use in a disaster setting?
    - Have you identified the staff members who could customize this protocol based on the type of disaster?
    - How long do you estimate adaptation and customization of the protocol would take?
- Do you have staff trained to use this protocol?
- Do you have access to supplies needed for the collection of biological specimens (if applicable)?
    - Does the protocol for collection of these specimens require special equipment, power, ice etc.?
- If your protocol includes medication administration or medical referrals, do you have a plan to customize each for the specific community and disaster?
    - Do you have a plan to acquire and bring all medications to the disaster area, including proper storage and disposal containers?
    - Does the medication require sharps containers, chilling, or special handling?
    - Do you have instructions for medication recipients that include where to report adverse health outcomes?
        - Do you have staff available to translate these instructions for recipients?
    - Have you communicated the plan to both administer medications or provide referrals to local clinicians or clinical researchers? Do you have a process for randomization?
- Do you have a consent process and appropriate forms for any of the above processes?

Logistics (Transportation, Communication, Collaboration)

- Do you have a deployment plan which defines the following:
    - Team leader
    - Required communications with the team and to your institution

    - Standards of conduct
    - Safety policies and procedures
    - Team security and protection
- Do you have a plan for finding and arranging transportation to, during, and from the field for the deployed staff?
- Do you have a plan to provide comprehensive pre-deployment training (see training section above) to all researchers prior to departure?
- Do you have a plan for identifying and arranging lodging for the deployed staff?
- Do staff have access to institutional resources from a distant or remote location (e.g., VPN/network connectivity, email, etc.)?
- Do you have existing relationships with other organizations or institutions outside your geographic area that you could support in the event they are impacted by a disaster?
    - Are these relationships formalized through Memorandum of Understandings, letters of agreements, or mutual aid agreements?
- Have you communicated with these partners your interest in conducting disaster research?
- Do they have community connections to help facilitate entry into disaster impacted communities?
- Will they provide information on security considerations for your team while deployed?

Research Support

Organizational Support

- Do you have support from your institution and agency/grant leadership to conduct the research?
    - Does your institution allow disaster deployments?
    - Does your institution cover liability in case of injury?
    - Does your institution or team provide PPE?
        - If not, do you have a plan to acquire PPE?
- Does your institution have a Concept of Operations for Disaster Research?

IRB Pre-Approvals

Final NIH Policy on the Use of a Single Institutional Review Board for Multi-Site Research

- Do you have a pre-approved protocol?
    - Can you get a pre-approved IRB?
    - Can you fast-track the IRB approval?
- Have you discussed your interest in disaster research with your institutional IRB?
- Does your institution have agreements to act as the IRB of record, allowing other institutions to cede review for disaster-related research?
- Has your institution agreed to cede review to an external IRB? Are there scenarios where they might?
- Do you have a data quality plan?

Data Processing and Analysis

- Do you have in-house staff to analyze the data sent back from a deployed team?
    - How quickly can analysis take place?
    - Does your research plan require rapid analysis?
- Do you have a plan to securely store the data?
- Do you have a long-term data storage plan?
- Do you have a plan to communicate the data to stakeholders?
- Do you have a plan to communicate the data to media members?

When Disasters Hit Home

As a final activity, consider the impacts on your ability to conduct post-disaster research if a disaster were to impact your community and institution.

- Are there any capabilities identified in this form that you would be able to provide if your own institution was impacted, but not destroyed, by a disaster?
- Do you have agreements or relationships with other institutions who may be able to provide research support in the event your team is unable to, due to a local disaster?
- Do you have relationships with community organizations or local government(s) that may turn to you for scientific information or advice during a disaster?
    - Do you have a plan to provide information even if you are unable to conduct research?
- Has your team held a refresher on your institution's disaster response procedures, policies, etc.?
    - Would any of those policies limit your ability to support disaster research, such as restricting access to buildings?

Community and Non-Profit Partnerships

- Do you have existing relationships with community organizations or partners whom you could work with in the event your community is struck by a disaster?
    - Are these relationships formalized through Memorandum of Understandings, letters of agreements or mutual aid agreements?
    - How long have you worked with these partners?
- Have you communicated with these partners your intent to or interest in conduct disaster research?
    - Have you discussed the community or organization's role in your disaster research?
- What role might the organization have in your disaster research?
    - Support or conduct citizen science
    - Provide community input into research questions/study design
    - Provide trusted introductions to community members who may be involved in a study
    - Continue to participate in studies as part of an existing cohort
    - Resources/supplies/shelter
    - Other
- Have you discussed disaster preparedness and specific disaster risks with these community organizations?

- If an outside institution were to support disaster research efforts, would you be able or willing to connect them to your community partners?

Government Partnerships

- Do you have existing relationships with local or state agencies that you can partner with to conduct research and/or to help answer important disaster questions in the event of a local disaster?
- Are these relationships formalized through Memorandum of Understandings, letters of agreements or mutual aid agreements?
- Have you communicated with these partners your intent to conduct disaster research?
    - Have you established a research plan?
- Have you communicated your capabilities to help answer disaster-related questions to these agencies?
- Have you provided these partners contact information they can use to contact your research team in the event of a disaster?
    - Do you have their contact information?

Appendix 2: Deployment Guide

This guide is intended to help you and your family prepare for deployment and to serve as a resource for during your deployment. This guide is not intended to replace your organization's policy, guidance, or protocol, or any written law or regulations.

We encourage principal investigators and researchers to visit the office or department of occupational safety and health within their respective institutions for any official protocols on worker safety and health for deployment or field work. NIEHS cannot be held liable or responsible for any errors or omissions, or for any harm or damage resulting from the use of the information contained in this checklist.

Pre-deployment

This section provides information that will help you and your family be prepared prior to leaving for field research. It contains topic areas and checklists that we encourage you to consider prior to leaving.

Home and Personal Preparedness

The checklist below includes recommendations to help ensure that you, your spouse, and dependents are prepared while you are away from home. It is recommended that you review this list with your family members/caregiver.

Family Preparedness Checklist

Arrange or prepare for:

☐Relatives or friends to check on family
☐Legal guardianship for children
☐Children's medical files
☐Power of attorney for children
☐Pet care
☐Financial affairs are in order (for bill pay, childcare, daily expenses, etc.)
☐Contact numbers in case of emergency

Legal Preparedness Checklist

Arrange or update:

☐Power of attorney
☐Update living will or health care directive
☐Last will and testament

Daily Living Preparedness Checklist

Arrange for or set up:

☐Lawn service and/or snow plowing service
☐Someone to check on your home
☐Timers for lights
☐Family/neighbors/friends to set out garbage
☐Automatic bill paying

Suspend:

☐Mail delivery
☐Newspaper delivery
☐Other regular delivery services

Health Preparedness

As disaster sites can be extremely dangerous environments, any person responding in a disaster area should take serious precautions. Before leaving to conduct research in disaster areas, you should visit your institution or organization's occupational safety and health office for travel guidance and protocol for field work. This section provides checklists aimed to protect your health.

Healthcare Checklist

Ensure you get:

☐Vaccinations (if applicable)
    ☐See CDC's list of recommended vaccinations
☐medical clearance from your primary health care provider
☐Forced Expiratory Volume in One Second (FEV1) testing (especially if you will be exposed to asbestos)
☐Dental and vision check up
☐30-day supply of prescription medication (if applicable)

- If medication requires refrigeration or special handling, make sure that you will have the necessary accommodations during deployment.
- Notify your team leader if your medication needs special accommodations.

☐Second pair of prescription glasses/contact lenses (if applicable)
☐Map/address of clinics and pharmacies in the deployment areas

For a comprehensive list of medicines/first aid kits to pack, see the "Clothing and Packing Requirements/Recommendations" Section
Note: Keep in mind Transportation Security Administration (TSA) requirements may impact flying with certain medical equipment.

Mental Health Preparedness

☐Do some research on the area in which you will be staying

- News
- Social Media
- Talk to locals
- Travel advisories in the area

☐Be prepared to recognize and confront stress

Training

Recommended trainings:
☐Incident Command System (e.g., FEMA Course IS-100.C. Introduction to the Incident Command System)
☐Site-Specific Training (e.g., on the specific dangers found on the site)
☐Cultural Sensitivity

☐OSHA 5600 Disasters Site Worker
☐Protocol-specific training (i.e., specific to the research being conducted)
☐Detailed safety and health training (if applicable and depending on the site)

Clothing and Packing Requirements/Recommendations

The following section provides a recommended checklist of what you should pack for your trip.

Decide based on working location condition, duration, and mission. Keep in mind to pack light as you will be responsible to carry your own bags. (Note: Not all items are necessary).

Important Paperwork

☐Driver's license/Picture ID
☐ Passport (some locations may require two forms of government ID)
☐Certification/Professional license (if applicable)
☐Credentials (if applicable)
☐Government ID badge
☐Vaccination records
☐Emergency notification form (next of kin and primary agency notification)
☐List of medical conditions for field team members

Medicines

☐Prescription drugs (30-day supply)
☐Over-the-counter drugs
☐Antacids
☐Analgesics
☐Antihistamines
☐Ibuprofen/Pain medication
☐Acetaminophen
☐Decongestant
☐Glasses/Contact lenses (two pairs) and copy of the prescription
☐Bug repellent
☐Sun block
☐Lip balm
☐Small first aid kit
☐Hand sanitizer
☐Medical form (with individual and primary point of contact) in case of emergency

Clothing

☐Weather and climate appropriate pants and shirts
☐Uniforms if issued
☐Shoes/Boots (closed-toed, broken-in, comfortable, and, if possible, steel toe/12 inches high)
☐Rain gear
☐Cold weather if appropriate
☐Under garments

☐Socks
☐Personal protective equipment/gear (e.g., gloves, goggles, hearing protection, etc.)

Toiletries

☐Razor and blades (manual or battery-operated)
☐Body and hair wash/toilet paper/baby wipes
☐Towel/washcloth
☐Sewing kit with scissors
☐Toothbrush and toothpaste
☐Tampons/sanitary napkins/pads

Equipment (if applicable)

☐Flashlight—hand-held, helmet/head-mounted, small hand crank (recommend with FM radio)
☐Extra batteries for each of the flashlights
☐Pens and pocket notepad
☐Marker (Sharpie type)—black
☐Safety shears*
☐Leatherman tool*
☐Pocket knife*
☐10-by-10-foot plastic tarp (fold up)

Miscellaneous

☐Cash, debit, or credit card ($100-150/week—cash recommended)
☐Cell phone and chargers, and battery packs
☐Sunglasses
☐Water bottle with filter or water-purifying straws
☐Travel cup
☐Professional tools, instruments, equipment, uniforms etc.
☐Backpack
☐Books, deck of cards, or other forms of entertainment that require little or no power
☐Camera
☐Portable music (with headset) or movies saved to a USB drive or on tablet or movie streaming account (e.g., Netflix)
☐External batteries for camera, portable music, tools, etc.*
☐Snacks, granola bars etc.
*Keep in mind that these may not be allowed on airplane carry-on bags

Questions to Ask Prior to Deployment

How long will I be deployed?

- How will I get there? How will I get back home?
- How will I travel locally between work site and base camp?
- What am I going to be doing?
- What emergency services are available in the area (e.g., police, EMS, coast guard)?
- Who do I report to and where is that person located?
- Where will I be living? Do I need a sleeping bag, etc.?

- What will I eat? Are meals provided or are there restaurants within walking distance?
- Is there cell phone service? Internet access?
- What are the daily temperatures—highs and lows?
- Is there electricity at the work site/base camp?
- How many others are being deployed at the same time?
- Will others be deployed after me?

In the Field (During Deployment)

Post-disaster conditions in the field are treacherous and hazardous and can pose extreme mental and physical injury to those who are unfamiliar or have little experience with the risks and hazards of the environment. Below are some recommended actions and objects for you to take, as well as considerations to think about, while deployed.

Research Operations

☐Letter from your organization formally describing the mission (recommended)
☐Government issue photo ID and other identification with your affiliation
☐Contact information for local guide or community group
☐Emergency contact information document
☐Emergency medical information (i.e., allergies, medications)

Equipment

☐IRB approved protocol
☐ Protocol (preferably laminated/weather proofed) and survey instructions for data collection team
☐Clipboards, Pencils, or electronic data collection devices
☐Printed consent forms
☐Printed names and contact information for local partners
☐Secure method of transporting data collected (encrypted and properly stored)
☐All research equipment
☐Cleaning supplies and storage containers for research equipment
☐Instruction manuals, maintenance logs, and inventory lists for all equipment and supplies
☐Chargers, cords, and converters for equipment requiring power
☐Pre-printed, prepaid shipping labels and all required shipping documentation for returning samples or equipment
☐Storage containers for sample holding prior to shipping/analysis
☐Labels, pens, makers to label all equipment, boxes, samples, etc.

Communication

☐Communication plan with your organization or deployed group
☐Schedule daily/weekly check-in with your team lead/supervisor
☐Draft situation report, or SitRep (i.e., what you did and see during the day/week or major concerns)
☐Report issues if necessary

Mental Health Resilience

Here are recommended ways to stay resilient during deployment:
☐Take a break from work
☐Stay active
☐Stay in communication with friends and family
☐Keep a log of your daily activities
☐Stay Positive
☐Avoid use of alcohol and illegal substances

Returning Home (Post-Deployment)

The following section provides recommendations and items to consider when you return home after deployment.

☐Schedule a discussion with your supervisor about your experiences and lessons learned
☐Monitor your own physical health to detect possible exposure to adverse impacts*

- ERHMS Assessment (http://www.cdc.gov/niosh/erhms/pdf/IncidentPersonnelOutProcessingAssessment.pdf)
- NIOSH Guidance for Post-exposure Medical Screening (https://www.cdc.gov/niosh/topics/emres/medscreenwork.html)

☐Monitor your own mental health to make sure you have not developed post-traumatic stress disorder*

- NIEHS Mental Health Resiliency Guide (https://tools.niehs.nih.gov/wetp/public/hasl_get_blob.cfm?ID=10382)

*If you experience abnormal symptoms or conditions (e.g., fever, flu-like illness, chills, headache, muscle pains, depression, sleeplessness, hard time readjusting), please see your doctor as soon as possible.

Appendix 3: Glossary

Acronyms

Federal Agencies

ASPR	Assistant Secretary for Preparedness and Response, HHS https://www.phe.gov/about/aspr/pages/default.aspx
CDC	Centers for Disease Control and Prevention https://www.cdc.gov/
DR2	NIH Disaster Research Response Program https://dr2.nlm.nih.gov/
FEMA	Federal Emergency Management Agency https://www.fema.gov/
HHS	U.S. Department of Health and Human Services https://www.hhs.gov/
NIEHS	National Institute of Environmental Health Sciences https://www.niehs.nih.gov/index.cfm
NIOSH	National Institute for Occupational Safety and Health https://www.cdc.gov/niosh/index.htm
NIH	National Institute of Health https://www.nih.gov/
NLM	National Library of Medicine https://www.nlm.nih.gov/
NTP	National Toxicology Program https://ntp.niehs.nih.gov/

Definitions

Disaster Research: Research seeking to understand the impacts on a population of an unusual, disruptive event, natural or manmade, intentional or accidental, that threatens lives, health, infrastructure or environment. This includes acute disaster surveillance, public health epidemiological investigations and longitudinal cohort research.

Disaster: Disruptive event, natural or manmade, intentional or accidental, that threatens lives, health, infrastructure or environment and often requires response beyond the capabilities of a single entity. Disasters can be acute or prolonged.

While many definitions of disaster are available, common definitions include those from FEMA and the Stafford Act (explained below).

- FEMA defines a disaster as an occurrence that has resulted in property damage, deaths, and/or injuries to a community. (FEMA, 1990)
- The Stafford Act defines a major disaster as any natural catastrophe (including any hurricane, tornado, storm, high water, wind-driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought) or, regardless of cause, any fire, flood, or explosion, in any part of the United States, which, in the determination of the President, causes damage of sufficient severity and magnitude to warrant major disaster assistance under the Stafford Act to supplement the efforts and available resources of States, local governments, and disaster relief organizations in alleviating the damage, loss, hardship, or suffering caused thereby." (Robert T. Stafford Act 102; 44 CFR 206.2 and 206.36)

Common Acronyms and Definitions

CBO Community Based Organizations: "A local organization (which may or may not be an affiliate of a national organization) with a primary mission to provide services to specific groups of people. This could include services to people who are developmentally disabled, homeless, low-income elderly, non-English speaking, or others. CBOs are usually nonprofit organizations. Most have a 501 (c) (3) tax-exempt status from the Internal Revenue Service. Some may have the nonprofit status from the Franchise Tax Board. In size, they range from all volunteer organizations that get by on virtually no budget, to multi-million-dollar operations. Examples include Food Banks, Centers for Independent Living, Immigration Assistance Programs, Easter Seals, Neighborhood Clinics, and Family Centers." (CA OES, SEMS Guidelines, 2006, Glossary, p. 5)

CBPR Community Based Participatory Research. NIEHS defines CBPR as "a methodology that promotes active community involvement in the processes that shape research and intervention strategies, as well as in the conduct of research studies" (O'Fallon 2000). NIEHS notes that partners can be involved with almost every aspect of research projects, including:

- Collecting and analyzing data
- Communicating findings to others
- Designing the research projects
- Evaluating what worked and designing next steps
- Framing research questions
- Interpreting and translating findings

Safety Training Safety and health training that gives attendees an understanding of all potential hazards, disaster-specific threats, and builds an understanding of how they can protect themselves from these hazards. Comprehensive training should include instruction and hands-on practice in the use of Personal Protective Equipment (PPE). Comprehensive training focuses on all-hazards safety issues, beyond just site-specific issues and 'just in time' training.

ConOps	Concept of Operations: "The concept of operations will capture the sequence and scope of the planned response, explaining the overall approach to the emergency situation similar to a researcher's protocol. The concept of operations should include division of responsibilities, sequence of action (before, during, and after the incident), and how requests for resources will be met. It should also mention direction and control, alert and warning, or other activities. This information is usually outlined in the basic plan and fully detailed in the functional and hazard-specific annexes and appendices." (*adapted from* DHS, Local and Tribal NIMS Integration: Integrating the National Incident Management System into Local and Tribal Emergency Operations Plans and Standard Operating Procedures (Version 1.0), November 15, 2005, p. 7 of 33)
Credentialing	"The credentialing process is an objective evaluation and documentation of a person's current license or degree; training or experience; competence or certification; and the ability to meet nationally accepted minimum standards, to provide particular services and/or functions or perform particular procedures during an incident." FEMA, National Incident Management System (FEMA 501/Draft), August 2007, p. 39) Credentialing for researchers can refer to trainings required for individuals who will be conducting human subjects of research. These trainings are usually agency/organization-specific, and the researchers must complete these trainings in order to be able to conduct field work. Examples of the trainings are HIPAA training, clinical trials trainings, responsible conduct of research training, etc.
Cultural Competence	"A set of values, behaviors, attitudes, and practices that enables an organization or individual to work effectively across cultures; the ability to honor and respect the beliefs, language, interpersonal styles, and behaviors of individuals and families receiving services, as well as of staff who are providing such services." (HHS, 2003, p. 60)
Deployment	The process of sending staff members to a disaster site. Deployment does not have to be for a prolong amount of time and they could still have support from their home institution.
Formal Agreement:	The NIEHS Partnerships for Environmental Public Health (PEPH) notes the following: "A detailed agreement clarifying expectations through a formal agreement might include: – Names of partner agencies, organizations, and individuals – Statement of purpose – Participation requirements – Opportunities or plans for exiting the partnership – Expectations for meeting frequency, duration, etc. – Expectations or goals for the project as a whole and for each partner – Description of allocation of resources – Approach to addressing cultural competency – Data sharing and ownership agreements –

	Publication and authorship guidelines – Signatures of agencies and organizations committed to accomplishing the goals. This could be in the form of a contract, Memorandum of Understanding, Interagency Agreement, or other mechanisms.
ICS	Incident Command System: A management system designed to enable effective and efficient domestic incident management by integrating a combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure.
MOU	Memorandum of Understanding: Provides the goals of the group and documents the roles and responsibilities of each of the partners. This can be in the form of a contract, formal and legally binding agreement. It can also be in the form of a mutual aid agreement, an agreement facilitating the rapid sharing of resources or assistance without obligation. NIEHS PEPH example: https://www.niehs.nih.gov/research/supported/assets/docs/j_q/peph_evaluation_metrics_manual_chapter_8_508.pdf FEMA definition of Mutual Aid Agreement: https://emilms.fema.gov/IS703A/RES0102130text.htm
Partnerships:	NIEHS PEPH says successful partnerships portray the following characteristics: • Patience, flexibility, and adaptability • Recognition of and respect for what each partner does well • Respect for each partner's need for autonomy • Trust, openness, and mutual concern • Understanding and respect for the mission of each partner agency • Willingness to make decisions about adding or removing • Willingness to share resources for the benefit of all

Additional Acronyms and Definitions

Chemical Agents: "Chemical agents are poisonous vapors, aerosols, liquids, and solids that have toxic effects on people, animals, or plants. They can be released by bombs or sprayed from aircraft, boats, and vehicles. They can be used as a liquid to create a hazard to people and the environment. Some chemical agents may be odorless and tasteless. They can have an immediate effect (a few seconds to a few minutes) or a delayed effect (2 to 48 hours). While potentially lethal, chemical agents are difficult to deliver in lethal concentrations. Outdoors, the agents often dissipate rapidly. Chemical agents also are difficult to produce." (FEMA, Chemical Threats, March 21, 2006)

Chemical, Biological, Radiological, Nuclear, and High-yield Explosive Hazards: "Those chemical, biological, radiological, nuclear, and high-yield explosive elements that pose or could pose a hazard to individuals. Chemical, biological, radiological, nuclear, and high-yield explosive hazards include those created from accidental releases, toxic industrial materials (especially air and water poisons), biological pathogens, radioactive matter, and high-yield explosives. Also included are any hazards resulting from

the deliberate employment of weapons of mass destruction during military operations. Also called CBRNE hazards." (DOD Dictionary of Military and Related Terms, 2007)

Chemical Facility: "Any establishment that possesses or plans to possess, at any relevant point in time, a quantity of a chemical substance determined by the Secretary (DHS) to be potentially dangerous or that meets other risk-related criteria identified by the Department." (DHS, Chemical-Terrorism Vulnerability Information, November 2007, Glossary, p. 1)

Community Emergency Response Team(s) (CERT): "CERTs are funded by Congress through Citizen Corps program grants, which are made available to local communities. A key component of Citizen Corps, the CERT program trains citizens to be better prepared to respond to emergency situations in their communities. When emergencies occur, CERT members can give critical support to first responders, provide immediate assistance to victims, and organize volunteers at a disaster site. The CERT program is a 20-hour course, typically delivered over a seven-week period by a local government agency, such as the emergency management agency or fire or police department. Training sessions cover disaster preparedness, disaster fire suppression, basic disaster medical operations, light search and rescue, and team operations. The training also includes a disaster simulation in which participants practice skills that they learned throughout the course." (The Joint Commission, Standing Together, 2005, p. v)

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 1980: (Public Law 96-510.) "The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, was enacted by Congress on December 11, 1980. This law created a tax on the chemical and petroleum industries and provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment….CERCLA: • established prohibitions and requirements concerning closed and abandoned hazardous waste sites; • provided for liability of persons responsible for releases of hazardous waste at these sites; and • established a trust fund to provide for cleanup when no responsible party could be identified. The law authorizes two kinds of response actions: • Short-term removals, where actions may be taken to address releases or threatened releases requiring prompt response. • Long-term remedial response actions, that permanently and significantly reduce the dangers associated with releases or threats of releases of hazardous substances that are serious, but not immediately life threatening. These actions can be conducted only at sites listed on EPA's National Priorities List (NPL). CERCLA also enabled the revision of the National Contingency Plan (NCP). The NCP provided the guidelines and procedures needed to respond to releases and threatened releases of hazardous substances, pollutants, or contaminants. The NCP also established the NPL. CERCLA was amended by the Superfund Amendments and Reauthorization Act (SARA) on October 17, 1986." (EPA, CERCLA Overview, July 17, 2007 Update)

Declaration: The formal action by the President to make a State eligible for major disaster or emergency assistance under the Robert T. Stafford Relief and Emergency Assistance Act, Public Law 93-288, as amended. (FEMA, Disaster Basics (IS-292), 2007 update, p. A-2 (Glossary)

Robert T. Stafford Disaster Relief and Emergency Assistance Act (commonly known as the Stafford Act): Act that constitutes the statutory authority for most Federal disaster response activities especially as they pertain to the Federal Emergency Management Agency (FEMA) and FEMA programs. (https://www.fema.gov/media-library/assets/documents/15271)

National Disaster Recovery Framework (NDRF): Enables effective recovery support to disaster-impacted local communities, states, tribes, territories, and insular area governments. It provides a flexible structure that enables disaster recovery efforts to be executed in a unified and collaborative manner. The NDRF focuses on how best to restore, redevelop, and revitalize the health, social, economic, natural, and environmental fabric of the community whilst simultaneously seeking to build a more resilient Nation.
(https://www.doi.gov/sites/doi.gov/files/migrated/pmb/oepc/upload/NDRF_pdf.pdf)

Post-Katrina Emergency Management Reform Act: This Act modified the Stafford Act with respect to the organizational structure, authorities, and responsibilities of the FEMA. Following this Act, FEMA now leads the coordination of and supports the Nation in a risk-based, comprehensive emergency management system of preparedness, protection, mitigation, response, and recovery.

Sandy Recovery Improvement Act of 2013 (SRIA): Authorizes multiple changes to the way in which the FEMA may deliver disaster assistance under a multitude of programs. Currently, FEMA is developing specific implementation procedures for all new authorities, which will detail the applicability of each provision, provide further guidance as to how the authority will be implemented, and may include metrics and other such assessment tools and procedures.

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Department of the Interior. Relevant Disaster Legislation and Materials. Available at : https://www.doi.gov/recovery/about-recovery/disaster-laws Accessed Sept 7 2018.

Appendix 4: Additional Resources

Select disaster research resources and tools from universities, DR2, Worker Training Program (WTP), and other NIH programs or agencies are listed below.

Article on Decision to Conduct Research

- A Decision Process for Determining Whether to Conduct Responder Health Research Following Large Disasters: http://www.ncbi.nlm.nih.gov/pubmed/23716371

Community Engaged Research and Partnerships

- Successful Models of Community-Based Participatory Research Final Report: https://www.hud.gov/sites/documents/DOC_12485.PDF
- NIEHS Partnerships for Environmental Public Health https://www.niehs.nih.gov/research/supported/translational/peph/index.cfm

Protocol Development Tools and Sample Protocols

- NIH DR2 Library of Existing Disaster Research Tools: https://dr2.nlm.nih.gov/tools-resources
- The Rapid Acquisition of Pre- and Post-Incident Disaster Data (RAPIDD) NIH Disaster Research Protocol: https://disasterinfo.nlm.nih.gov/content/files/RAPIDD%20Protocol_v8.0_2015-07-16_508_CLEAN.pdf
- Sample Protocols from U.S. Universities: https://dr2.nlm.nih.gov/protocols#University_of_Iowa_Protocols
- National Library of Medicine (NLM): How to Write a Research Protocol Tips and Tricks: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6172884/

Deployment Safety

- NIEHS Researcher Deployment Guide: https://tools.niehs.nih.gov/wetp/public/hasl_get_blob.cfm?ID=11006
- NIEHS Worker Training Program Disaster Preparedness and Response: https://tools.niehs.nih.gov/wetp/index.cfm?id=556
- NIEHS Worker Training Program Responder and Community Resilience: https://tools.niehs.nih.gov/wetp/index.cfm?id=2528

Institutional Review Board (IRB) Resources

- Final NIH Policy on the Use of a Single Institutional Review Board for Multi-Site Research: https://grants.nih.gov/grants/guide/notice-files/NOT-OD-16-094.html
- Conducting Science in Disasters: Recommendations from the NIEHS Working Group for Special IRB Considerations in the Review of Disaster Related Research: https://ehp.niehs.nih.gov/doi/10.1289/EHP2378

University Links Specific to Disaster Preparedness and Research

- University of Texas Medical Branch Emergency Preparedness For Research Clinics and Labs: https://research.utmb.edu/home/emergency-preparedness-for-research-clinics-and-labs

- University of Texas Medical Branch Environmental Health and Safety Disaster Planning Kit: https://ispace.utmb.edu/collaboration/Research%20Resources/WebFiles/Emergency%20Preparedness%20Research/2019%20Hurricane%20Plan%20for%20Labs.pdf

Lessons Learned

- American Journal of Public Health Improving Hurricane Harvey Disaster Research Response Through Academic–Practice Partnerships: https://ajph.aphapublications.org/doi/10.2105/AJPH.2019.305166
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