

ANNEX A. DISASTER RESEARCH RESPONSE PROGRAM METRICS

INTRODUCTION

There is growing interest in research related to disaster preparedness, response, and recovery, yet there is a paucity of information to guide organizations in their development of a disaster research response program. Despite many calls for the expansion of disaster research, evidence-based guidance and metrics have not been published. This is not to say that many public health organizations and multiple academic institutions have not been conducting quality disaster research. In fact, they have. However, their best practices and keys to success have not been well described in readily available forums. Additionally, many of these practices have not been subjected to a rigorous evaluation of their real impact or effectiveness. The Disaster Research Response (DR2) program at the National Institute of Environmental Health Sciences (NIEHS) at the National Institutes of Health has spent the past 4 years advancing the practice of disaster research through stakeholder meetings, exercises, workshops, conferences, presentations, and peer-reviewed publications. Throughout the various activities, DR2 has noted a variety of lessons learned and best practices that can serve as the foundation for disaster research guidance and measures of effectiveness. DR2 has engaged a variety of disaster specialists from a multitude of professions resulting in a broad-based understanding of what characteristics exemplify a mature disaster research program. In addition to the information obtained from the activities noted above, we have obtained additional information from an assessment of the three exercises conducted in Los Angeles (2014), Houston (2015), and Boston (2016).

Disaster research, as defined by DR2, is research intended to investigate the real and potential health impacts and outcomes following a disaster. The metrics discussed below apply to research programs interested in disaster preparedness efforts, response methods, and/or recovery, they are not specifically intended to inform the effectiveness of such research, as the field of emergency management has its own established measures for effectiveness.

METHODOLOGY

In discussing metrics, it is important to provide a context for which the metrics provide a description of program maturity and functionality. Consequently, we have created a list of core competencies that disaster research programs can use as a model for their assessing their programs. This list is not all-inclusive. It has been assembled from comments received from DR2 exercise participants, meetings with disaster experts, and knowledge of the disaster literature. Both the competencies and the metrics described in this document are customizable by any disaster research program regardless of their level of development.

The framework for the metrics analysis is the NIEHS [Partnerships in Public Health Metrics Manual](#). This logic model incorporates five key program areas defined across three model components. The five program areas include: Partnerships, Leveraging, Products and dissemination, Education and training, and Capacity building. The 3 logic model components are: Activities, Outputs, and Impacts. In this logic model, increasing levels of program maturity

occur as the program moves from Activities to Impacts. Accordingly, metrics for Activities and Outputs are easier to identify than metrics for Impacts.

The NIEHS framework borrows the management methodology for writing program goals and objectives first described by George Doran in 1981. Doran described five metrics for measuring objective goals as Specific, Measurable, Attainable, Relevant, and Time-related also known by the mnemonic acronym as SMART. Specificity implies that the metric has milestones, describes who will achieve it, and how. Measurability defines what change is expected. Attainability means that the metric can actually be achieved. Relevance means that the metric is related to the goal. Time-related means that the measures can be achieved within a specified time frame.

In this report, the list of metrics is not exhaustive, but based on the analysis of information obtained from a variety of reports, meetings, and conversations conducted with stakeholders representing a diverse field of professions, jurisdictions, and organizations. Candidate metrics were evaluated against the SMART characteristics noted above, but with special emphasis on measurability and relevance to field researchers.

CORE COMPETENCIES FOR DISASTER RESEARCHERS

While the measurement of disaster research programs is important, metrics obtained in the absence of research program competencies do not reflect relevance to the ability to perform disaster research effectively. Newly organized programs will be able to perform certain competencies, and as they mature, more competencies will be added. The following competencies are core elements of a safe and effective disaster research program.

Core Competency 1: Identify potential disaster research needs, available resources, and potential stakeholders and partners

- Work with leadership to determine organizational support for disaster research program
- Identify existing interests, expertise, researchers, surveys/tools, and funding
- Leverage existing resources, such as shared space, equipment, IRB's, research expertise
- Create Strategic Plan for your disaster research project/program that includes goals, objectives, themes and evaluation

Core Competency 2: Establish partnerships with local and regional stakeholders to form a research coalition before a disaster or project begins

- Identify and contact stakeholders from public and private sectors
- Identify community interests, risks, needs, and partnerships
- Conduct meetings with stakeholders
- Establish formal agreements with stakeholders (e.g., Memorandum of Understanding)
- Submit joint proposals for funding, conduct joint presentations, submit co-authored articles, conduct collaborative investigations
- Network with other disaster researchers to learn, share and expand best practices

Core Competency 3: Create administrative, fiscal, and operational procedures that provide accountability, administrative control, and define roles and responsibilities for the research program

- Develop a Concept of Operations for field research
 - Write policies and procedures for the operational aspects of disaster research

Disaster Research Metrics (2017)

- Define roles and responsibilities of research and support teams
- Establish lines of leadership and decision-making authorities
- Outline various protocols for data sharing, financial management, communications, etc.

Core Competency 4: Put together a research team that is qualified, trained, and equipped to integrate into the local regional response infrastructure

- Identify and obtain funding
- Recruit and hire staff (full-time, part-time, volunteer)
- Conduct a training Gap Analysis
- Develop a training curriculum/Modify existing training curriculum
 - Must include an introduction to the Incident Command System (ICS)
 - Must include Health and Safety for researchers focused on a disaster environment and specific threats
- Train staff
 - Conduct courses for all team members
 - Conduct one exercise annually
 - Hold refresher courses and/or identify additional courses to advance training for staff each year
 - Be prepared to provide site-specific training
- Create a plan to include and support citizen science in research efforts
- Identify, meet with and coordinate with local response organizations and agencies before an event
 - Create a plan to integrate and/or communicate during an event

Core Competency 5: Create brochures, presentations, and articles that are suitable for professional meetings and peer-reviewed journals to communicate findings, challenges, and best practices

- Develop a Communications Plan
- Create awareness documents
- Collaborate with institution's public information office

Core Competency 6: Write a research protocol that receives IRB approval

- Access NLM DR2 website for data collection tools
- Work with local IRB to obtain advance/conditional approval

Core Competency 7: Write a funding proposal that receives consideration by public or private funding organizations

- Identify funding sources in public and private sectors
- Respond to grant announcement or other funding request for proposals

Core Competency 8: Effectively communicate internally and externally

Establish procedures to communicate with researcher teams during non-deployments and deployments

Establish procedures to communicate with stakeholders

Establish procedures to communicate with communities affected by disasters and those who are partners in the disaster research

LOGIC MODEL PROGRAM AREAS

A solid program plan, that includes evaluation from the beginning, is essential to ensuring a successful program and can be tracked and evaluated and is correlated to outcomes and goals.

PARTNERSHIPS

We have heard repeatedly that disaster research requires a multidisciplinary, multi-organizational, multi-jurisdictional approach. Successful disaster research demands functional partnerships of key representative stakeholders who can work together to help affected communities address health issues that may arise following a disaster. Partnership can take on many forms, ranging from informal groups to formalized organizations with charters, advisory boards, contracts, and funding which supports collaborative research activities.

Activities of basic partnerships can include:

- Identifying partners
- Conducting informal discussions with potential partners
- Conducting meetings with potential partners
- Creating partnership descriptions, requirements, benefits

Metrics for these activities include:

- Partners identified and/or contacted
- Meetings held with partners
- Partnership documents developed

Partnership outputs demonstrate more formalized relationships of the various partners and may include:

- Memoranda of Understanding (MOUs)
- Formal contracts between partners
- Written agreements/Charters for the partnership that outline roles and responsibilities of each partner
- Assignment of a Board of Directors/Advisors

The impacts of these outputs can be expressed as follows:

- Formalized sharing of resources, including personnel, funding, and equipment
- Joint research activities (presentations, articles, proposals) submitted
- Collaborative research projects initiated/completed
- Evidence of sustainability (new partners, # of years of partnership)

LEVERAGING

Disaster Research Metrics (2017)

Developing disaster research programs must often rely on space, personnel, and equipment that has a primary designation for other projects. The dual utility concept, along with use of part-time personnel can be used to measure the development of a program as well as expand capacity and capability of a research partnership.

Actions include:

- Determination of available resources
- Determination of existing funding, administrative services
- Determination of similar programs and related research projects that may have elements or resources applicable to disaster research

Outputs include

- A catalogue of resources
- Agreements to share resources/expanded collaborations
- Expanded scope of research

Impacts include:

- Expanded research projects
- Efficiency of overhead costs

PRODUCTS AND DISSEMINATION

As partnerships develop and formulate their research program, they are likely to need guidelines and protocols that assist with execution of research projects and describe the various processes that help drive the support necessary to conduct research. Additionally, as programs mature, there will be the need to make others aware of their services, capacities, and capabilities. Programs may choose various media venues to disseminate information, including print, audio/video, and web-based sources.

Activities in this program area include:

- Discussions regarding a communications plan
- Discussions regarding an operations plan, protocols, procedures
- Meetings to create communications materials
- Evaluation of communications channels, methods, and policies

Outputs for these activities can be measured as:

- Awareness materials created and disseminated
- Creation of a Communications Plan/Strategy
- Creation of a Concept of Operations Plan
- Procedures and protocols developed and used
- Meetings attended to generate program awareness
- Contacts received from awareness materials

Measured impacts include:

- Increased awareness of program within local response community

Disaster Research Metrics (2017)

- Involvement in local preparedness activities
- Improved deployment of research resources
- Research protocols that are pre-approved by the IRB

EDUCATION AND TRAINING

Well prepared researchers are the result of an education and training program that describes the unique disaster environment and the response infrastructure. Programs also require that field staff fully understand the data collection tools and research protocol, which requires specialized training from research partners.

Activities for this function could include:

- Gap analysis of training needs
- Meetings of partners to develop training curriculum that includes ICS, health and safety, and research protocol review

Outputs include:

- A stakeholder-approved training curriculum
- Training courses conducted

Impacts are noted as follows:

- Staff knowledgeable on ICS, field health and safety, research protocol
 - Field research with less confusion, better integration, and less health issues
 - Safe field research

CAPACITY BUILDING

Disaster research depends on the ability to sustain a research program that meets the local and regional needs, with the potential to provide support to national efforts when necessary. Capacity building requires funding and skilled personnel to assist with preparedness, response, and recovery needs. The strategy for program growth must be well-articulated and the product of all partners.

Activities include:

- Meetings with partners to develop a strategic plan
- Meetings with leadership to discuss strategic plan and funding options
- Gap analysis of funding and personnel

Outputs include:

- A 3-5 year Strategic Plan
- Listing of funding sources
- A staffing plan

Impacts include

- Increase in research staff
- Increase in funding

- Increased capacity to conduct disaster research

CANDIDATE METRICS

SMART metrics are an important element of planning, evaluating and measuring program success. The metrics below are samples and programs are encouraged to add a relevant or target number, timeframe and details specific to their program goals and objectives.

	Activities	Outputs	Impacts
Partnerships	# of meetings with potential partners	# of MOU's, contracts # of joint proposals, articles, presentations	# of multi-organizational research activities # of different partners
Leveraging	# of meeting regarding resource needs # partners contributing to gap analysis	Report on Disaster Research Gap analysis # of briefings on Gap analysis Staff identified Funding sources identified	# of staff recruitment activities # of staff /HR agreements \$ amount of funding obtained or new processes created to move funding # of Leadership endorsements
Products/Dissemination	# of stakeholder meetings	Written ConOps # of brochures disseminated	# of exercises on ConOps Reduction in amount of time to write and clear research protocols
Education/Training	# of meetings to discuss training needs	# of trainings conducted # of people trained # of field manuals disseminated	# of staff familiar with ICS # of people familiar with the research protocol Reduced injuries/illness during deployment
Capacity building	# of strategic planning meetings	Strategic Plan written Research agenda developed # of research staff hired	\$ of funding received # of staff promotions/tenure granted # of article published

MODEL FOR DISASTER RESEARCH PROGRAM DEVELOPMENT

The following table provides a template for disaster research leaders to measure their current level of program maturity and can be used by program leadership to identify gaps and focus development efforts. This table is not all-inclusive and can be modified by leaders to best suit their organizational environment. The table can be used to determine partnerships, as some programs may not be able to fill gaps internally, but could identify partners who could provide those particular competencies. It is important to note that programs that fall into the “developing” category may be fully capable of conducting disaster field research, however, there may be areas of growth for such programs that, if achieved, would enable them to conduct larger projects, perform simultaneous investigations, or engage in larger partnerships. The template is more importantly used as a means of self-assessment, rather than as a tool to compare programs to other programs.

	Nascent	Developing	Functional
Personnel Identified H&S program	Roster—No No program	Roster—Yes No program	Roster—Yes Program in-place
Training Trained on protocols Exercises conducted ICS training	No No No	Yes Yes No	Yes Yes Yes
Protocols ConOps IRB approval Data collection Data sharing Data protection	No Yes No No Yes	Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes
Integration Partnerships with responders Partnerships with community Partnerships with academics	No No Yes	No Yes Yes	Yes Yes Yes
Experience Supported disaster researchers Have conducted disaster research Published articles on disaster research	No No No	Yes No No	Yes Yes Yes
Funding Can write funding proposals Can accept and disperse funding Has funding for disaster research	Yes No No	Yes Yes No	Yes Yes Yes