August 4, 2023

Public Health Disaster Research Award Program

Program Evaluation

Special Call 1:
Research in U.S. Territories
(2020-21)
&
Special Call 2:
Strengthening Community Resilience in U.S. Territories
(2021-22)

Natural Hazards Center
Institute of Behavioral Science
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https://hazards.colorado.edu/

"This research was the most significant investigation I have done in my life. I'm now preparing communities to participate in the planning and preparation for disaster and hazards, and this work has its base in the trainings and research I did as part of this program."

–2020-21 PUBLIC HEALTH DISASTER RESEARCH PROGRAM AWARDEE

Between 2020 and 2022, the Natural Hazards Center issued two special calls through the newly established Public Health Disaster Research Award Program for research on public health preparedness, response, and resilience in the U.S. territories. With funding from the Centers for Disease Control and Prevention and the National Science Foundation, **$1,111,452.10** was awarded to **97 researchers**, representing **26 research teams** and **57 institutions**. This report showcases the program objectives, key findings, and future opportunities that emerged from our evaluation of the two special calls.

Key Findings and Strengths

The Natural Hazards Center's evaluation highlighted the following key findings and associated strengths of the Public Health Disaster Research Award Program:

- ***Establishing a shared goal and clear program objectives is vital for launching new funding opportunities.*** From the outset, the goal of this funding program has been to advance research on public health disaster preparedness, response, and resilience in historically understudied and underserved areas. The four primary objectives of the program are to: (1) teach, train, and mentor a diverse next generation of public health disaster researchers and practitioners; (2) advance novel public health and interdisciplinary disaster research; (3) build equitable collaborations between scholars and public health professionals; and (4) translate knowledge to practice. Establishing these overarching objectives has allowed us to anchor all program activities and to evaluate our progress using various metrics.
- ***A relatively small amount of funding goes a long way.*** Not only did the program meet each of the four objectives, but the research teams also went beyond the initial program requirements by producing additional publications, presenting at professional conferences/webinars, developing new academic courses and other training materials, and working with community partners to apply their research to practice.
- ***We are training a diverse next-generation public health workforce.*** The research projects involved students, early career researchers, investigators based in the U.S. territories, interdisciplinary teams, and members of historically underrepresented groups including women and people of color among other populations.
- ***We are advancing knowledge of how hazards and disasters affect the people and public health systems in the historically understudied U.S. territories.*** Led by multi- and interdisciplinary teams, the research projects brought new problem-focused and solutions-oriented perspectives to public health disaster research. These projects culminated in important findings concerning diverse population groups, numerous hazard types, and varying health outcomes in each of the inhabited U.S. territories.
- ***Awards are laying the groundwork for larger, longitudinal studies.*** Awardees are using the research and connections they have built during the Special Calls to develop new studies, grant proposals, and research applications.
- ***Awardees are translating their research into new public health tools, policies, and practices.*** Most of the research teams indicated that they had applied their findings to practice, including nearly half who are working with local collaborators to translate their findings into public health tools.

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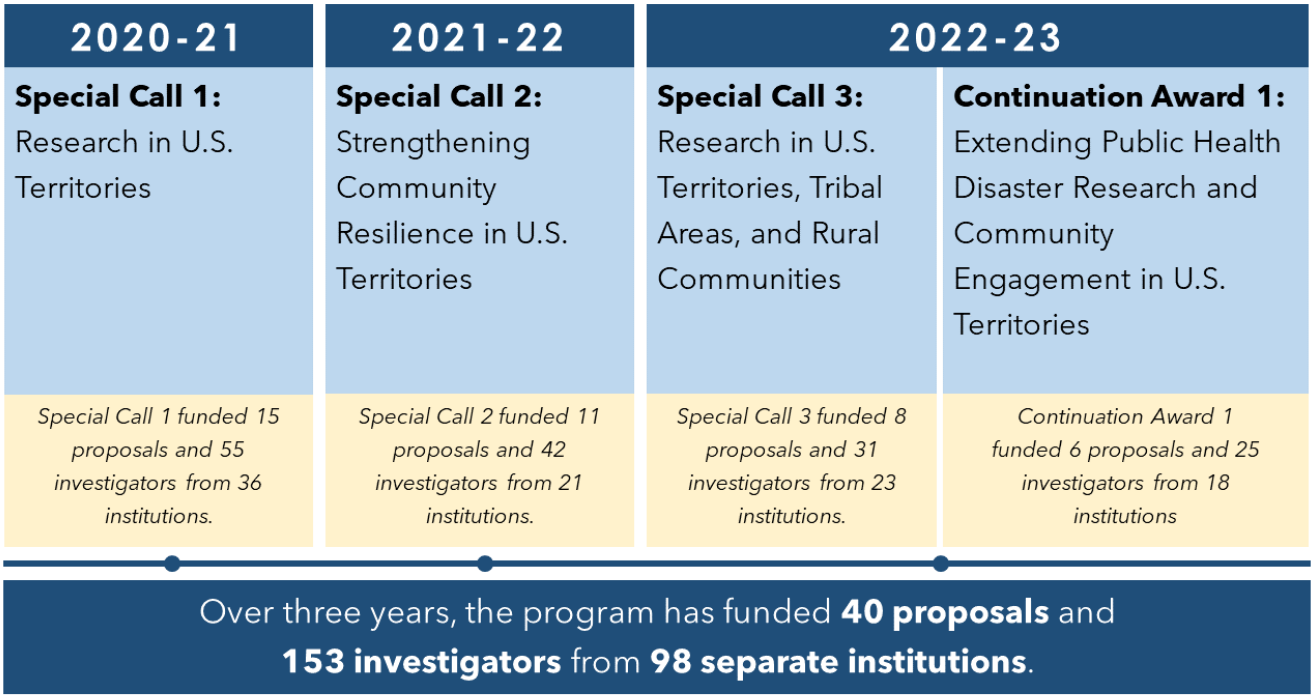
Introduction

Program Overview and History

In 2020, the Natural Hazards Center (NHC)—with funding support from the Centers for Disease Control and Prevention (CDC) and the National Science Foundation (NSF)—developed and began administering the **Public Health Disaster Research Award Program**. The goal of the program is to advance research on public health disaster preparedness, response, and resilience in historically understudied and underserved areas. Researchers and interdisciplinary research teams are eligible to apply for awards ranging from $10,000 to $50,000. In addition to financial support, awardees receive training, mentorship, and opportunities to publish and disseminate their findings.

Figure 1 provides an overview of the Special Calls for Proposals that the NHC issued between 2020 and 2023. The bottom boxes also highlight the number of proposals and investigators funded in each round. **This evaluation report focuses on the impacts of Special Calls 1 and 2**, although we include some relevant summary statistics for all special calls issued between 2020 and 2023. Special Call 3 and the Continuation Award are currently in progress; awardees will submit final reports and other products no later than August 2023.

Figure 1. Special Calls for Public Health Disaster Research, 2020-2023



Note. We used our administrative records to identify the number of funded investigators in this graphic. This number comes from the initial proposals submitted by the funded research teams. Over the 12-month award period, many of the teams expanded the number of investigators involved in their efforts. This became more evident in our evaluation. For example, as will be discussed more below, we found that 139 investigators participated in Special Calls 1 and 2, growing from the 97 identified in the initial proposal. This also helps to explain why the figures at the proposal stage do not always match the figures reported at the final evaluation stage.

The Public Health Disaster Research Award Program results from a longstanding commitment of both the NHC and the CDC to support research with strong potential for public health applications, while also training and mentoring a diverse workforce. The record-shattering 2017 hurricane season—which included Hurricanes Irma and Maria—provided special impetus for launching a public health-focused award program in the U.S. territories. Puerto Rico and the U.S. Virgin Islands, among other regions, were especially hard hit in terms of deaths, injuries, destruction of the built environment, and widespread community-level disruption. In these events, as with prior disasters, the hard-hit ***underserved communities*** were also ***understudied places***. We recognize that people and places already struck by disaster would remain vulnerable without investments in research and its applications.

Many scholars, students, and practitioners living in or with close ties to Puerto Rico or the U.S. Virgin Islands were firsthand witnesses to the disasters and were eager to use their research skills to help affected communities. Yet, many did not have pre-existing connections in the hazards and disaster field or lacked the time and capacity to apply for rapid funding in the immediate aftermath of the disasters.

In recognition of this gap and with this group of investigators in mind, the NHC launched the Public Health Disaster Research Award Program in 2020. With the support of the CDC, we actively reached out to researchers located within or with close ties to the U.S. territories who were interested in studying the public health impacts of disasters. Since the initial launch, we have expanded the program to include research in two other historically underserved areas—Tribal communities and rural regions.

Program Objectives

The Public Health Disaster Research Award Program revolves around four primary objectives:

1. ***Teach, train, and mentor*** a diverse next generation of public health disaster researchers and practitioners, with a special emphasis on students, early career scholars (i.e., those who are three or fewer years post-degree), and professionals who reside or work in historically underserved areas.
2. ***Advance public health and interdisciplinary research*** related to disaster preparedness, response, and community resilience in the U.S. territories, Tribal areas, and rural communities.
3. ***Build connections and collaborations*** between public health disaster researchers and representatives of public health agencies, community-based organizations, and other professional organizations.
4. ***Translate knowledge to practice*** through the development of public health tools, policies, programs, databases, and other applications.

Award Timeline, Inputs, and Outputs

The award period for each of the special calls has a 12-month timeline, which is divided into four research phases. **Figure 2** depicts the 12-month timeline and the specific inputs and outputs associated with each phase.

Phase 1: Proposal Selection and Funding. In mid-August, the NHC, after careful consultation with the CDC, issues a call for proposals on our website and promotes it extensively through our various networks and listservs. Each call for proposals remains open for up to eight weeks, during which we provide substantial support to potential applicants, including hosting a Q&A session. Starting with Special Call 2, we began requiring that all applicants meet with one of our staff members, an expert in public health, to receive feedback on their proposed research design and obtain advice on how to submit a successful proposal. We held **31 pre-proposal meetings** during Special Call 2.

Applicants are also required to complete the CDC-supported CONVERGE Public Health Implications of Hazards and Disaster Research Training Module so that they are prepared to translate their knowledge into actionable findings. The module offers original content and case studies that exemplify the relationship between public health and hazards and disaster research. All Special Call 2 report authors were required to complete the training module as part of their post-award deliverables. In total, **32 awardees provided certificates of completion**.

After the submission deadline passes, the NHC team—including all research associates and graduate research assistants—thoroughly review all proposals, assigning three reviewers to assess the proposal on key criteria and provide constructive feedback on the intellectual merit, methods, and broader public health implications of the proposed research. CDC researchers conduct a separate simultaneous review of all proposals. Once the NHC and CDC teams have finished their reviews, the NHC summarizes all reviews from both teams and prepares a spreadsheet ranking projects as "fund," "fund with modifications," and "do not fund." We send the spreadsheet to the CDC to consult about our selection and then the NHC makes the final selection of the proposals to be funded. All reviewer comments are vetted and shared with applicants, including those written for proposals that were not funded. We have received positive feedback—from both funded and non-funded applicants—on the proposal review process itself, with applicants appreciating the constructive feedback received from 4 reviewers (3 from the NHC and 1 combined review from the CDC team).

Figure 2. Award Timeline: Annual Cycle for Special Funding Calls

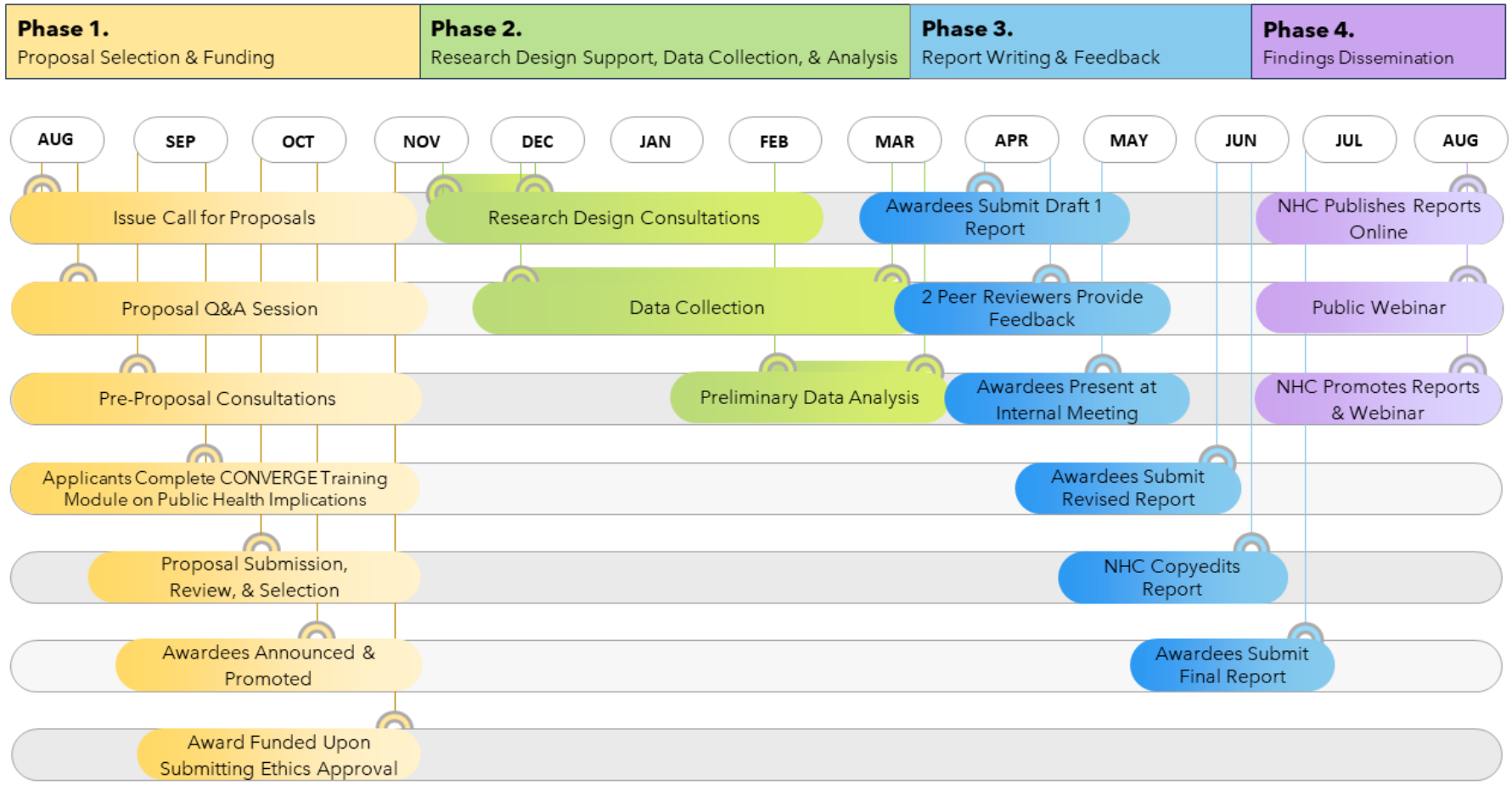


Table 1 provides an overview of the number of proposal submissions we received for each call and the final number selected for funding. As the table shows, we received **87 applications** and funded **40 proposals** between 2020 and 2022. Each research team received an average of $41,485 to support up to five investigators.

Table 1. Number of Proposals Submitted and Funded per Annual Cycle

Special Call	Proposals Submitted	Proposals Funded	Percent Funded	Total Dollars Awarded	Average Award Amount
Special Call 1	34	15	44%	$612,364	$40,824
Special Call 2	24	11	46%	$499,088	$45,372
Special Call 3	20	8	40%	$386,895	$48,362
Continuation Award	9	6	67%	$150,000	$25,000
TOTAL	**87**	**40**	**46%**	**$1,659,430**	**$41,486**

Phase 2: Research Design Support, Data Collection, and Analysis. After selecting the proposals, the NHC team provides awardees with mentoring and support designed to ensure that their research projects are rigorous and ethical. In some instances, we ask awardees to revise and resubmit their proposals in response to reviewer feedback. In other instances, we ask for a brief meeting to talk through specific design elements to help investigators focus and clarify their research questions or methodological approach. All awardees are required to receive approval by an ethics board at their respective institutions before funding is distributed and research can commence.

Starting with Special Call 2, we began requiring awardees to participate in at least one research design consultation with a public health expert at the NHC. These meetings sought to provide awardees with forms of mentorship and resources that improve both research design and the applicability of public health disaster research. During Special Call 2, we held **10 post-award research design consultations**.

Given the tight timeline of the award, teams only have 4-5 months for data collection. In order to ensure research teams succeed in the field, NHC staff members provide support by responding promptly to their queries about managing IRB or other bureaucratic delays, negotiating challenges in the field, adapting their research plans in response to emerging findings, among other requests for assistance. In addition to responding to all email inquiries through our dedicated award programs account, we are available to meet via phone or Zoom for additional troubleshooting and support throughout the award period.

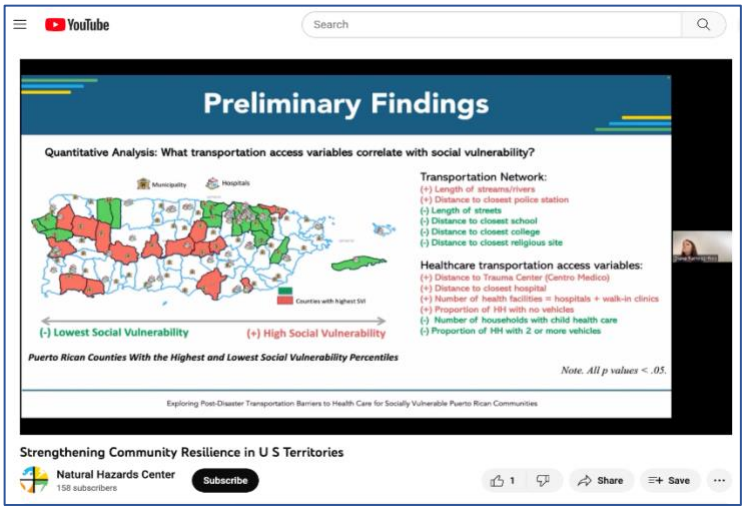
Phase 3: Report Writing and Feedback. After completing data collection and starting their analysis, awardees draft a 20-page, double-spaced report summarizing the preliminary results and the public health implications of their research. The NHC distributes the draft report to two anonymous peer reviewers who are experts in public health disaster research. Reviewers provide written feedback in an evaluation form, as well as inserted comments and edits with tracked

changes in the original document, with the intent of providing authors detailed recommendations for revision. The NHC award administration team reads all reviews and edits them for consistency and appropriateness before returning feedback to the authors.

In early May of each annual cycle, all research teams attend a virtual Internal Meeting with other awardees, members of NHC staff, report reviewers, and representatives from the CDC. The purpose of the meeting is to give investigators an opportunity to present their preliminary findings and workshop the public health implications of their projects. One member of each research team gives a brief presentation describing their work. Then, following the presentation, other attendees are invited to ask questions and give suggestions about the public health implications of their research. In addition to the written reviews, awardees use feedback from the Internal Meeting to revise their reports and submit second drafts.

Phase 4: Research Dissemination. After a rigorous copyediting process, the final reports accepted for publication are released on the Center's website as part of our **Public Health Disaster Research Award Reports** collection. We share the reports via multiple outlets to reach a large multidisciplinary network of researchers, practitioners, policy makers, journalists, and educators. We first highlight the release of all reports on the main page of our website, followed by highlights of each individual report every three to five days after the initial announcement. We also share announcements via email to our subscribers, through our various social media platforms (LinkedIn, Twitter, Facebook, and Instagram), and by releasing an article in our online news publication, *DR—Disaster Research News You Can Use*. We encourage report authors to share the reports via their networks. These efforts ensure that the reports are widely accessible to decision makers from a vast range of organizations and with the potential to move research into action. As of May 2023, the main page for the Public Health Disaster Research Award program had been viewed **2,483 times**, and the reports main page had been viewed **2,155** times. We also recorded **17,097** cumulative views of each of the Public Health Disaster Research Award reports.

As a final culminating event for each funding cycle, the NHC hosts the **Public Health Disaster Research Webinar**. During this public event, awardees give presentations summarizing their research findings and, time permitting, take questions and comments from the audience. Between 150 and 400 people have registered for each of these webinars and the video recordings of the webinars continue to be widely viewed via the NHC's YouTube channel.



A YouTube recording of Special Call 2 Awardee Diana Ramirez-Rios presenting her research project's preliminary findings during the Public Health Disaster Research Webinar hosted on August 4, 2022.

Special Calls 1 and 2:
A Focus on U.S. Territories

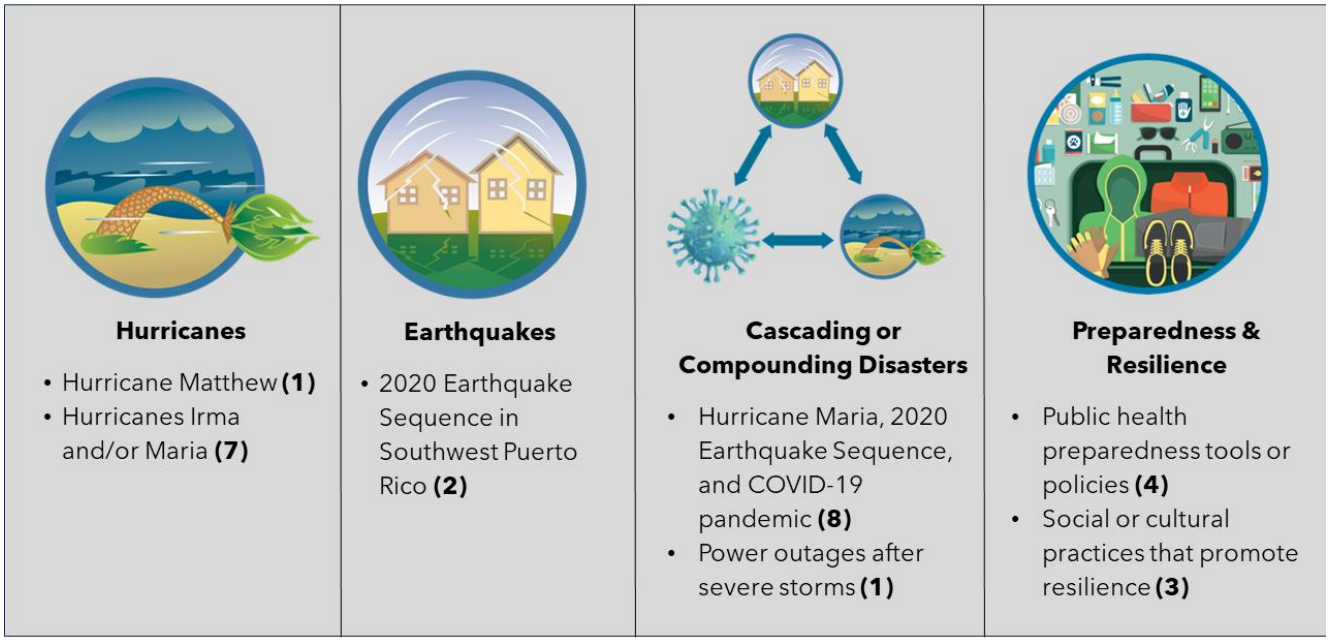
The remainder of this evaluation assesses the impacts of ***Special Call 1: Research in U.S. Territories*** and ***Special Call 2: Strengthening Community Resilience in U.S. Territories***, which were issued in 2020 and 2021, respectively. **Figure 3** displays the locations of the **26 projects** funded as part of Special Calls 1 and 2. As the figure illustrates, at least two research teams studied each of the five inhabited U.S. territories. Of the 26 funded projects, nine were based in multiple U.S. territories. Nearly 70% studied Puerto Rico, more than one-third examined the U.S. Virgin Islands, just over 11% studied the Northern Mariana Islands or Guam, and nearly 8% focused on American Samoa.

Figure 3. Number of Special Call 1 and 2 Projects in the U.S. Territories

Note. The numbers in the white boxes represent the number of projects in the corresponding U.S. territory. The numbers do not sum to 26 (the number of funded projects) because some of the research projects spanned more than one geographic location.

Figure 4 depicts some of the topics, and the range of hazards, studied by award recipients of Special Calls 1 and 2. In addition to wanting to shine a light on ***underserved communities*** and ***understudied places***, the Special Calls also prioritized research that focused on ***understudied topics***. Such topics included, for example, the effects of multiple disasters cascading or compounding during a short period of time or the longer-term efforts to build community resilience and public health preparedness systems.

Figure 4. Illustrative Topics and Hazards Studied During Special Calls 1 and 2



Note. The number of projects are in bold and parentheses.

By focusing on U.S. territories, the program was able to dedicate resources toward ***historically underrepresented*** and ***underfunded scholars.*** Investigators at academic institutions in U.S. territories are rarely the focus of special funding calls. Additionally, the U.S. territories represent distinct institutional arrangements and contexts that can influence the effects of and responses to disasters. Of the 97 investigators who received awards**, 57—or nearly 60%—worked at institutions in the U.S. territories** while many other investigators on the U.S. mainland trace their own roots to the territories. These and other details about the impacts of the awards are discussed in more detail below.

Evaluation Methods

This evaluation seeks to answer the following questions, which are drawn from the four program objectives described above:

1. ***Train a Diverse Public Health Workforce.***
   - How many core investigators were supported by an award?
   - Of these investigators, how many were students or early career scholars?
   - How many investigators were members of underrepresented groups and/or researchers based in U.S. territories?
   - Did the award foster interdisciplinary research collaborations?
   - What public health research capacities did awardees acquire?
2. ***Advance Public Health Disaster Research.***
   - How are awards advancing new public health knowledge in understudied areas?

- How are project findings being developed into peer-reviewed publications, scholarly presentations, or other academic or professional outputs?
- Are teams extending or expanding their initial projects? If so, how?

3. ***Build Equitable Collaborations.***
   - What collaborations did awardees establish with community partners or public health departments?
   - Have these collaborations been sustained and, if so, how?
4. ***Translate Research to Practice.***
   - How have awardees applied their findings to public health practice?
   - Did awardees develop new public health tools, programs, or policies?

To answer these questions, we analyze data from two primary sources: (1) program and administrative data collected and maintained by the NHC and (2) an online questionnaire distributed to the lead investigator of each project.

The online questionnaire included closed- and open-ended questions related to the research questions outlined above. We limited our sample to the 26 lead investigators from Special Calls 1 and 2. In the email explaining the purpose of the questionnaire and how to fill it out, we asked the lead investigators to coordinate with their core team members about post-award activities prior to submitting their responses so that they could answer on behalf of the entire team. We designed the questionnaire in Qualtrics and distributed it in April 2023. (The full questionnaire and instructions we sent via email are available upon request.)

Of the 26 projects for Special Calls 1 and 2, **23 lead investigators** submitted responses, which is an 88.5% response rate (22 fully completed the questionnaire and one partially completed it). We summarize our analysis of the available responses below.

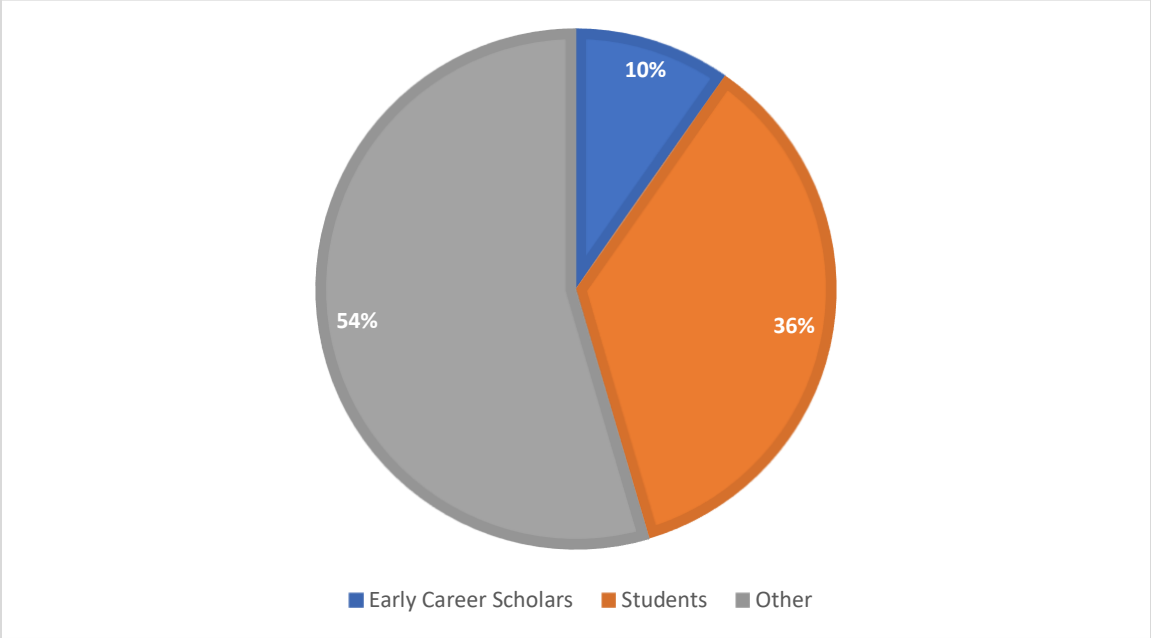
Findings

1. Training a Diverse Public Health Workforce

When asked how many core research team members—which include the lead investigator, co-investigators, and students—were directly involved in the research projects, the lead investigators of the 23 groups for which we have data identified a total of **139 core researchers** (this number is higher than the number of researchers identified at the proposal stage because the teams expanded as funding was awarded and the projects progressed). In this section we describe their professional and social backgrounds, their disciplines and institutions, and the skills that they acquired over the course of the award.

Students and Early Career Scholars. As shown in **Figure 5**, **55 students** and **13 early career scholars** served as core researchers, which means that 46% were young professionals being supported at a critical point in their career.

Figure 5. Students and Early Career Scholars Supported by an Award



Note. N=139. The "other" category includes academics who are more than three years post-degree and other practitioners or professionals who work outside of academia.

Three-quarters of lead investigators said that they used award funding to train students or other co-investigators during the course. Students used this training and the data their team collected to write **five doctoral dissertations** and **one master's thesis**. Post-award, 13% of lead investigators had used project findings to develop a traineeship (e.g., internship, research assistantship, postdoc, etc.) for a student or early career scholar to continue working on the project after the award ended.

Four Ph.D. students and five early career scholars also served as lead investigators for their projects. These awardees described how the opportunity to develop and lead their own projects at this early stage in their professional development launched their careers ahead, giving them much needed new skills, self-confidence, and professional connections. As one student and one early career scholar said:

> *This award allowed me as an early career disaster researcher during my PhD studies to develop my own research project, write a grant, and get funded to do a lot of interesting work that I am still presenting and writing about. I don't know if I would have had the opportunity to do this type of work through a different funding mechanism with my minimal experience, so I am incredibly grateful to the award for trusting early career researchers to do this work.*
>
> *- Ph.D. Student, Special Call 1 Awardee*

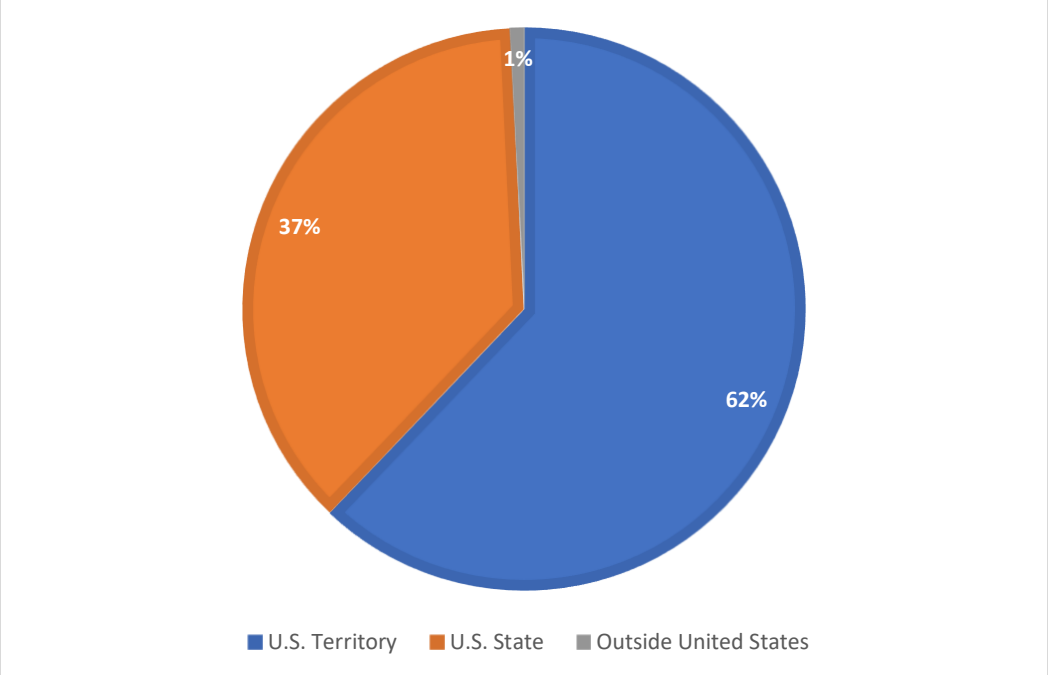
This was my first grant as a Principal Investigator and it really opened the doors [for me] as a young researcher. For this, I am truly grateful to the Natural Hazards [Center] team for granting me this opportunity. I gained so much insight and much more energy to continue to do research in this field.

– Early Career Scholar, Special Call 2 Awardee

Investigators from Historically Underrepresented Groups and Underserved U.S. Territories. According to our administrative data, all 26 of the funded projects included at least one member from an underrepresented group. Our definition of an underrepresented group was based on NSF criteria for underrepresentation in science and engineering in education and employment (https://ncses.nsf.gov/pubs/nsf19304/), which includes members of communities of color, women, and persons with disabilities.

The questionnaire revealed that Special Calls 1 and 2 funded **82 investigators that reside or work in U.S. territories** (again, this number is higher than the number of researchers in the U.S. territories identified at the proposal stage because the teams expanded as funding was awarded and the projects progressed). This survey finding indicates that 62% of awardees are based in historically underserved areas that often struggle to receive funding from federal institutions (**Figure 6**).

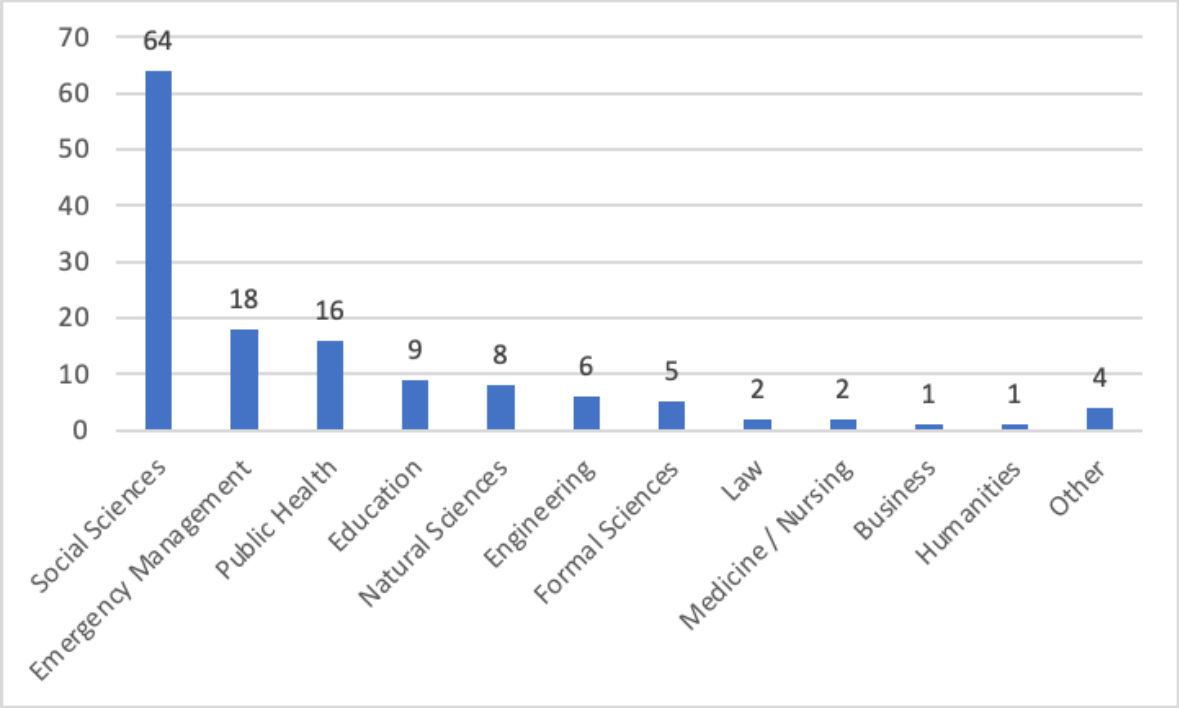
Figure 6. Residential Location of Core Researchers



Note. N=132.

Diverse Disciplinary and Institutional Backgrounds. Our administrative data shows that 83% of funded projects were led by interdisciplinary teams. The questionnaire showed that most recipients were social scientists, and nearly all research teams included members from a variety of disciplines (**Figure 7**).

Figure 7. Number of Core Researchers by Their Primary Discipline



Note. N=136.

A total of **58 institutions** were represented among awardees, hailing from academia (67%), the non-profit or voluntary sector (14%), and government agencies (14%). Table 2 (see next page) contains a list of the institutions represented in Special Calls 1 and 2.

Acquiring Skills to Do Research with Public Health Impact. When we asked the lead researchers to rank their level of agreement that *participation in the project increased their ability to do research with implications for public health*, all principal investigators agreed with the statement (with 78.2% endorsing "strongly agree"). All principal investigators also agreed with the statement that *the award increased the ability of their core team members to do research with implications for public health* (with 70% endorsing "strongly agree").

Table 2. Institutions Represented in Special Calls 1 and 2

Special Call 1	Special Call 2
Agenda Ciudadana Foundation	Arizona State University
City University of New York	California State University, Sacramento
Columbia University	Center for Habitat Reconstruction
Florida International University	Connecting Paths
Guam Bureau of Statistics and Plans	Hispanic Federation
Houston Independent School District/ West Indies	Independent Researcher
Inter American University of Puerto Rico	Mariana Islands College
Metrika Inc.	National Center for Atmospheric Research
National Oceanic and Atmospheric Administration	Ponce Neighborhood Housing Services
Pennsylvania State University	Rensselaer Polytechnic Institute
Ponce Health Sciences University	San Juan Bautista School of Medicine
Pontifica Universidad Católica de Puerto Rico	University at Buffalo
Puerto Rico Public and Applied Social Sciences Workshop	University of Colorado School of Medicine
Puerto Rico Science, Technology, & Research Trust	University of Hawaii at Manoa
re+connect	University of Maryland, Baltimore County
The George Washington University	University of Puerto Rico Río Piedras
U.S. Geological Survey	University of Puerto Rico
U.S. Virgin Islands Department of Health	University of the Virgin Islands
University of Colorado Boulder	University of Utah
University of Guam	University of Virgin Islands
University of Hawaii at Manoa	U.S. Virgin Islands Department of Planning and Natural Resources
University of Hawaii	
University of Massachusetts Amherst	
University of Michigan	
University of North Carolina at Chapel Hill	
University of Phoenix	
University of Puerto Rico Humacao	
University of Puerto Rico-Río Piedras	
University of Puerto	
University of South Florida	
University of the Virgin Islands	
University of Toronto	
University of Utah	
Virgin Islands Territorial Emergency Management Agency	
Wheaton College, Massachusetts	
Winthrop University	

Research Team Highlight

Studying Abandoned Spaces Through an Interdisciplinary Lens

Alvarado, Carrasquillo, Gallardo, and Chopel (2022) received a Public Health Award for their project on the public health implications of abandoned spaces in Puerto Rico. Their interdisciplinary research team exemplified the type of convergence research the Public Health Disaster Research program aims to fund. All four team members live in Puerto Rico and are practitioners in addition to serving as academics. Two team members—Michelle Alvarado and Luis Gallardo—are lawyers and the leading experts in Puerto Rico on the issue of space abandonment and form part of the **Centro para la Reconstrucción del Hábitat** (in English, the Center for the Reconstruction of the Habitat), the only nonprofit in Puerto Rico dedicated to identifying and transforming abandoned spaces. David Carrasquillo is a geographer and urban planner who utilizes Geographic Information Systems in scholarship and activism. Alison Chopel is a public health scholar, applied disaster researcher, program designer, and evaluator. Their team developed a groundbreaking exploration of how the post-Maria proliferation of abandoned buildings, houses, and other spaces affected public health and the ways communities and their municipal governments are coming together to fight the problem. The project revealed an association between abandonment and several environmental health risks, including higher levels of contaminated water, soil, and air; an increase in mosquitos and other disease vectors; public illicit drug activity; and other unwanted activities that threaten public health and safety. Their findings also suggest that participating in collective action to transform abandoned properties can benefit community members by improving physical and mental health.

Team members meet with community participants to discuss abandonment in their municipality. Source: *Centro para la Reconstrucción del Hábitat.*

Alvarado, M., Carrasquillo, D., Gallardo, L., & Chopel, A. (2022). The Public Health Implications of Abandoned Spaces in Post-Maria Puerto Rico. *Natural Hazards Center Public Health Disaster Research Report Series, 25.*

2. Advancing Public Health Disaster Research

In this section, we describe how core researchers use their awards to generate new knowledge. We also detail the ways that they disseminate what they learn through publications, presentations, and expanded research agendas.

Advancing Knowledge of Hazards and Disasters in Understudied Areas. Respondents expressed an appreciation in their written responses for the unique opportunity to study geographic and cultural spaces affected by multiple hazards and compounding disasters, but which often go unstudied due to their marginalization. In one awardee's words:

> *This award provided the opportunity for my team to expand our U.S. mainland centered work to the U.S. territories and we would have only been able to do this research with the assistance of this award.*
>
> *- Special Call 1 awardee*

Our novel funding mechanism allowed awardees to generate groundbreaking advances that may not have otherwise been possible. For example, two project teams produced the first-ever Social Vulnerability Indexes (SVI) for Guam and the U.S. Virgin Islands. As the awardees stated:

> *We are grateful for this funding as it allowed our Guam team to produce the first SVI estimates for our island.*
>
> *– Special Call 1 Awardee*

> *This award had a great impact to finally be able to start a discussion about social vulnerability and its health impacts in the USVI. There are many other next steps possible, but the most important thing was to start a dialogue with public authorities. We also expanded our network of collaborators with whom we are now entertaining additional project ideas/follow up ideas.*
>
> *- Special Call 2 Awardee*

Awardees also appreciated how the Public Health Disaster Research Award program has emphasized the unique historical, cultural, and social contexts of the U.S. territories. When discussing the U.S. territories in relation to Hawaii, a Special Call 1 lead investigator said, the Public Health award has brought "recognition that the needs and interests of the island and territories are different."

The unique contexts of the U.S. territories mean that the disaster events that they experience—as well as their preparedness, response, and recovery needs—differ from other parts of the United States and often fail to reach public health research agendas. Special Call 1 and 2 awardees are helping to fill that gap. Through their research, they have produced new knowledge of understudied and underserved people in the U.S. territories, including socially vulnerable

populations such as older adults and children, breast cancer survivors, and public housing residents. They have also described the relationship between public health and institutions (e.g., schools) and explored other understudied topics. For example, interdisciplinary research teams have brought new lenses to understanding the public health implications of disasters, including how abandoned infrastructure affects community health, how transportation barriers impede healthcare access, and how public health workers are affected by burnout.

Scholarly Publications and Presentations. Table 3 shows how core researchers used their findings to develop **60 original publications**, including 22 peer-reviewed journal articles (published or in preparation). This was quite impressive given the limited time between the end of Call 1 and Call 2 and when we distributed the questionnaire in April 2023 (19 months and 7 months, respectively). The full list of publications is available upon request. In addition to publications, most research teams (78.3%) have also disseminated their findings post-award through professional presentations or webinars.

Table 3. Publications Developed From Project Findings

Publication Type	Number
Journal article(s) in preparation	17
Journal article(s) in press or published	5
Book(s) (including edited volumes)	1
Book chapter(s)	6
Report or white paper	15
Newspaper op-ed(s)	5
Blog post(s) or other online publication(s)	1
Master's thesis	1
Doctoral dissertation	5
Other	4

Note. The questionnaire asked lead investigators to report the number of publications that they and/or their team members had developed using the findings from their Public Health Disaster Research Award project (Public Health Report not included).

Educational and Training Materials. In addition to publications, more than one-third (34.8%) of research teams have used their findings to develop a new academic course or other training materials. The following examples are illustrative of these outputs:

> *Our team was able to provide recommendations for updating the curriculum for the National Disaster Preparedness Training Center's FEMA-certified course Natural Disaster Awareness for Caregivers (AWR-308). This course focuses on*

disaster awareness and preparedness for caregivers working with and for those with access and functional needs.

– Special Call 2 Awardee

The data set [that we] generated was merged with other local data and used for student projects under the NIH Pacific STEP-UP Program.

- Special Call 1 Awardee

Extending and Expanding Research. Post-award, 65.2% of the teams reported either extending or expanding their initial research projects or developing a related study. This finding shows how researchers are using their awards to lay the groundwork for larger, longitudinal studies and future grant proposals. Using their project findings and the connections they made during the award period, several teams have already written successful grant proposals and secured additional funding to expand their research. For example, one awardee said:

During the project's fieldwork, I was able to connect with several organizations… which support community leaders to deal with evolving challenges of the most socially vulnerable. Through these connections, we were able to reconnect and work with additional communities [to apply] for the NSF RAPID grant… [We] secured an NSF Rapid grant to study the transportation infrastructure [and] critical infrastructure and its failures after Hurricane Fiona. [In] the... [initial] project [we had] identified vulnerabilities in the transportation infrastructure.

- Special Call 2 Awardee

Several respondents also mentioned promising projects that are currently in development. Two awardees, for example, described the following efforts:

We are seeking funding from NSF to fund a collaboration with the CDC to modify the CDC vulnerability index and develop standards for vulnerability index construction in U.S. territories and majority-minority regions.

- Special Call 2 Awardee

[We] expanded research with new 2020 data just released and more to be released in July… and economic data for the USVI. [We have] incorporated the results in climate projects that the government is working on for the USVI… and applied to DoD Minerva grant with Brown University… We also have had lots of discussion and a site visit with NOAA NCOOS, who is scoping a project … to expand upon our work.

- Special Call 2 Awardee

Research Publication Highlight

Advancing Knowledge of Hurricane Evacuation and Sheltering During COVID-19 in Puerto Rico and the U.S. Virgin Islands

Collins, et al. (2021) studied how COVID-19 affected the views of residents in Puerto Rico and the U.S. Virgin Islands on public shelter safety and evacuation plans during the 2020 hurricane season. After publishing their report, the team continued their analyses and found something staggering: Nearly half of their respondents did not feel that shelters could protect them from harm, and three-quarters felt staying at home during a hurricane was safer than going to public shelters. Several factors contributed to these perceptions, although COVID-19 concerns were the most prominent force at this point in the pandemic. The team quickly pulled together their analysis and in 2022, published their findings in a respected scholarly journal—*Weather, Climate, and Society*—read by policymakers, academics, and others who work in emergency management. According to the journal's metrics, the team's article abstract has been viewed 702 times and the full article downloaded 216 times in just one year.

Collins, J., Polen, A., Dunn, E., Maas, L., Ackerson, E., Valmond, J., Morales, E., & Colón-Burgos, D. (2022). Hurricane Hazards, Evacuations, and Sheltering: Evacuation Decision-Making in the Prevaccine Era of the COVID-19 Pandemic in the PRVI Region. *Weather, Climate, and Society, 14*(2), 451–466. https://doi.org/10.1175/WCAS-D-21-0134.1

Collins, J., Polen, A., Dunn, E., Maas, L., Ackerson, E., Valmond, J., Morales, E., & Colón-Burgos, D. (2021). Compound Hazards, Evacuations, and Shelter Choices: Implications for Public Health Practices in the Puerto Rico and the U.S. Virgin Islands. *Natural Hazards Center Public Health Disaster Research Report Series, 6*.

3. Building Equitable Collaborations

The NHC's decades-long history of administering quick response research awards has demonstrated that the most successful and valuable studies start by establishing strong ties to the local community. Based on this experience, we encouraged applicants of both Special Calls 1 and 2 to have local collaborators and to describe these relationships in their proposals. Special Call 2 specifically listed cross-sector engagement and collaboration as a focus area in the proposal call and proposal evaluation rubric.

Beyond these initial connections at the proposal stage, the Public Health Disaster Research Award Program also aims to build ***equitable and enduring*** collaborations between public health disaster researchers and practitioners at public health agencies, community-based organizations, and other relevant organizations in disaster-affected areas. In this section, we describe how core researchers used their awards to build and sustain strong collaborations and community partnerships.

Building Collaborations During the Award. At the proposal phase, **82.6%** of lead investigators reported that they had ***established relationships*** with local partners to inform research design. Core researchers reported on the post-award questionnaire that they maintained these relationships in several ways over the course of the project, including by sharing results and working to develop new public health tools, as we discuss further in subsequent sections.

Lead investigators also reported developing ***new*** partnerships or collaborations during the project. The most common of these new partnerships was collaboration between awardees and other researchers outside the core team—**56.5%** of investigators reported this type of new collaboration. Lead investigators also reported establishing new relationships with local practitioners, with **39.1%** of lead investigators developing new collaborations with community-based organizations and **26.1%** creating new partnerships with public health agencies.

Awardees expressed that building these community relationships was incredibly rewarding. As a Special Call 2 Awardee said, "the best thing that came out of this research was collaborations with other non-profits." As mentioned in other parts of this report, new collaborations and connections have enabled awardees to develop additional research proposals and effectively translate their research into practice.

Sharing Findings With Community Partners and Other Interested Parties. Another way that research teams established relationships with local partners was by actively sharing their research findings. As shown in **Figure 8** (see next page), research teams shared their findings with a variety of local partners, including universities or colleges in U.S. Territories (**81.8%**), community members (**68.2%**), and community-based organizations (**68.2%**).

Because rapid researchers in other programs have been critiqued for not returning findings to local partners and research contributors, this is an important finding that demonstrates that our awardees are actively working to ensure that findings are widely disseminated.

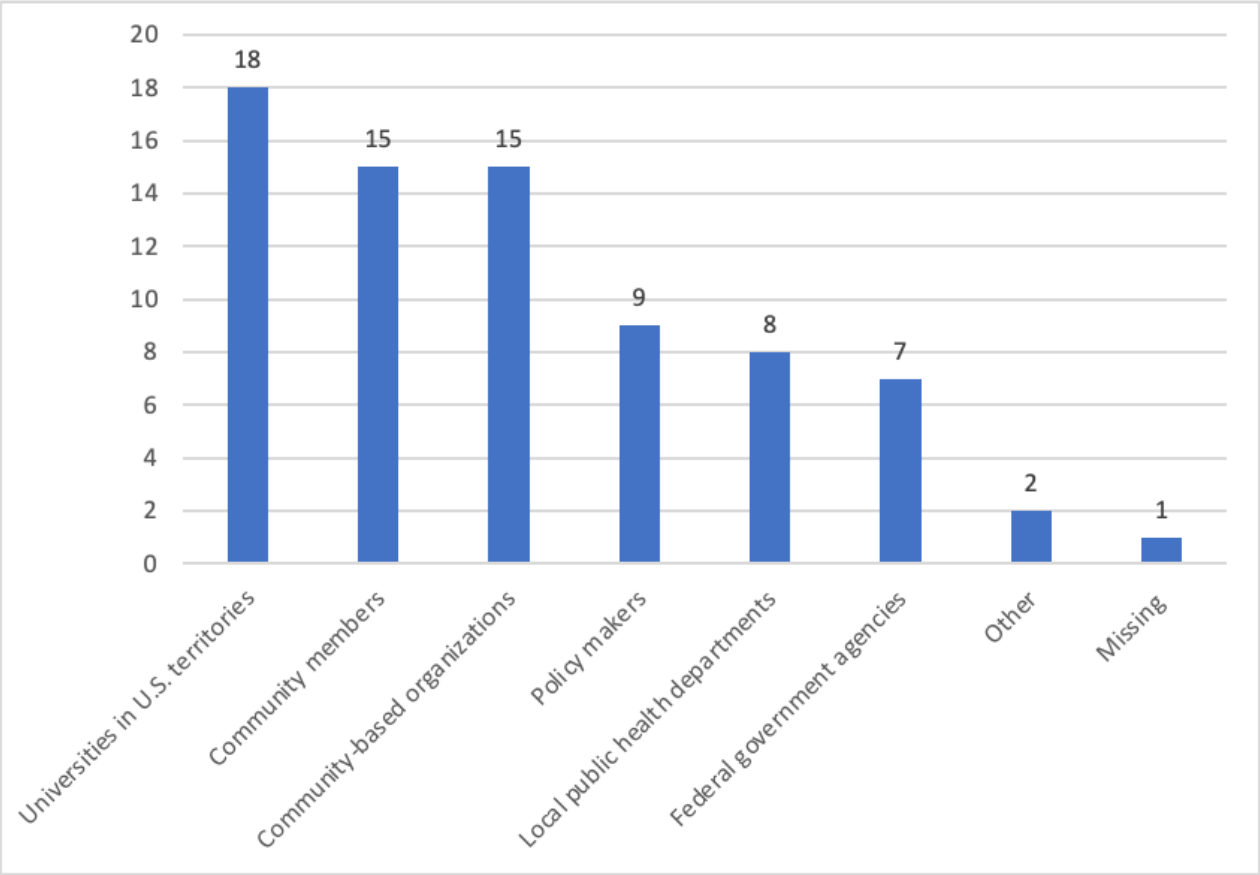
Moreover, those Special Call 1 and 2 awardees who shared their findings with policymakers and other decision makers described these meetings as highly productive. They also emphasized their interest in using their fundings to push for institutional and policy changes. The following two quotes are illustrative:

> *One of the most significant collaboration activities [that I did as part of this project] was [a presentation] with the Vice President of the University of Puerto Rico (UPR), who coordinated with me [to present] the research findings to the 11 student deans of the 11 campuses of the UPR system. It was an achievement because they made commitments to implement some of the research recommendations for the university students. They also shared the report and presentation [with] the 11 chancellors of the UPR System.*
>
> *- Special Call 1 Awardee*

Prior to the policy seminar, [we] shared the report with FEMA Puerto Rico, COR 3, Director of the Health Commission in the PR Senate, [and] Dr. Linda Colón, expert on poverty and inequality in PR. Each party presented their feedback at the seminar. [We] invited and shared information with Rep. Jennifer González and PR Secretary of Health, but they did not attend the seminar. [We] met with [the] mayor of one of the study sites in September 2021. Town hall meetings in the 2 study sites [were also] held in September 2021. [We] translated [the] original report and posted presentations used in all dissemination activities [to] www.prpassworskhop.org. [We provided a] handout with [a] summary of recommendations at each town hall meeting and the policy seminar.

- Special Call 1 Awardee

Figure 8. Research Teams Sharing Findings with Community Partners and Other Groups



Note. N=22

Research Collaboration Highlight
Collaborating Through Community-Based Participatory Research

In their research exploring the relationships between social capital, community health resilience, and compounding hazards in the community of Corcovada in Puerto Rico, **Roque, Shah, Tormos-Aponte, and Quintana Torres (2022)** employed community-based participatory research methods to engage their partners. Sixteen community leaders, including community board representatives, local committee members, and business owners attended two workshops where they provided input on how hazards and disasters impact food, energy, and water (FEW) systems security. The community leaders participated in group discussions, community mapping of local FEW resources, and the development and validation of a co-created FEW assessment tool. By partnering with local stakeholders throughout the research process, this project helped identify context-specific community-level risks and effective approaches to problem-solving that would not have been possible through more traditional top-down approaches to research and project implementation.

Research team members and workshop participants in Corcovada, Puerto Rico.
Photo Source: Research team

Roque, A., Shah, S., Tormos-Aponte, F., & Quintana Torres, E. (2022). **Social Capital, Community Health Resilience, and Compounding Hazards in Corcovada, Puerto Rico.** *Natural Hazards Center Public Health Disaster Research Report Series, 26.*

Sustaining Collaborations Post-Award. The questionnaire revealed that awardees are sustaining their collaborations post-award in multiple ways. For example, core team members from **87%** of the projects continue to collaborate with each other since the end of the formal research award period. Half of the lead investigators are also working with partners to develop public health tools (these tools are described further in the next section). One awardee described the ongoing collaborations established through the program:

> *[I used] the research project to help [my two] nonprofit collaborators in Puerto Rico to develop training modules when delivering health services to [breast cancer survivors] on the island.*
>
> *- Special Call 2 Awardee*

4. Translating Research to Practice

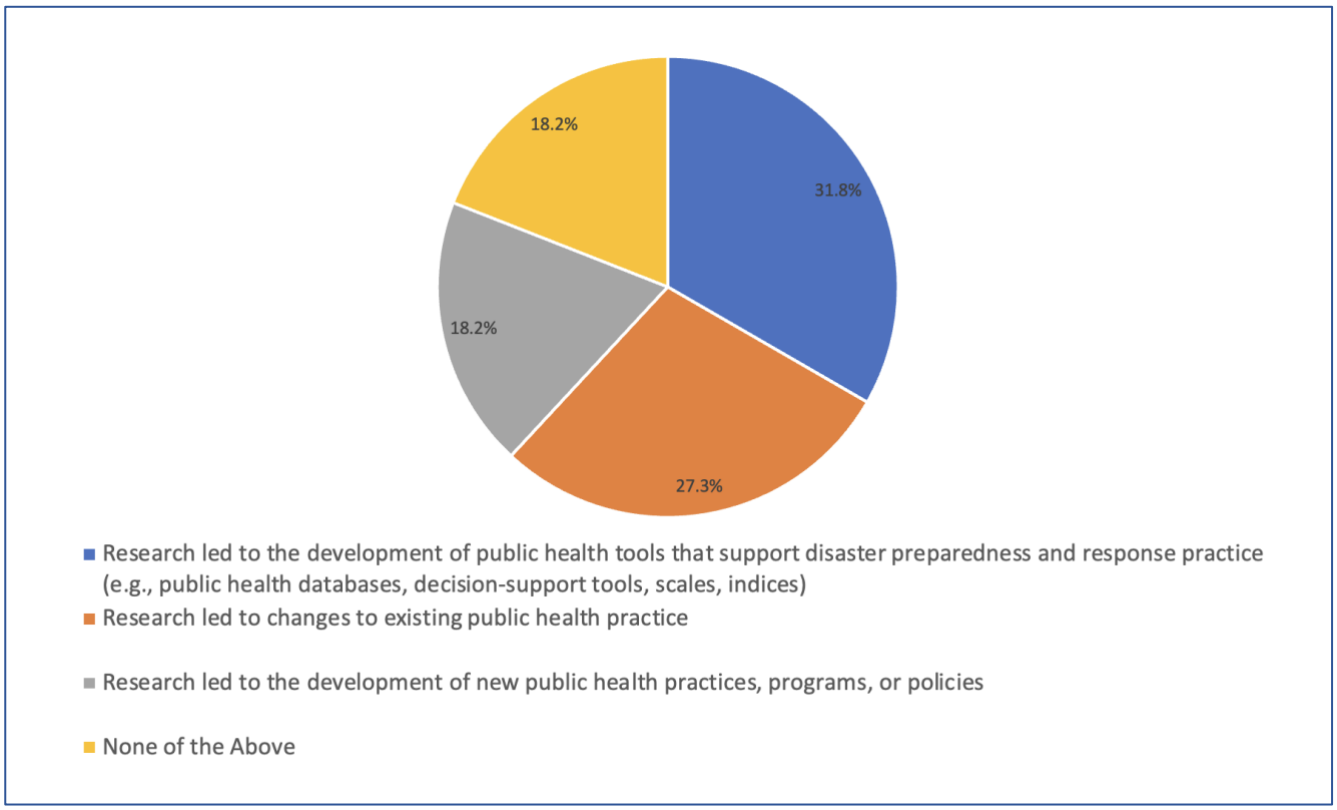
The fourth objective of this award program is to translate knowledge to practice through the development of public health tools, policies, programs, databases, and other applications. The two special calls emphasized this objective, as with the other objectives, in the announcement for proposals. Special Call 1 and 2 required applicants to provide a broader impacts statement where they described the potential of the proposed activity to benefit public health practice through the achievement of specific, desired public health applications. Proposal reviewers considered broader impacts as one of the main criteria of evaluation, and expert consultations and the internal webinar also focused on broader implications for public health practice.

Special Call 2 Awardee Todd Miner teaches disaster first aid skills in the Northern Mariana Islands. He and his team are using their project findings to develop a new disaster first aid curriculum that is more accessible to women, young people, and other vulnerable groups in the Northern Mariana Islands with less access to these types of courses. *Photo Source:* Todd Miner.

As shown in **Figure 9**, more than **80**% (n=18) of respondents indicated that they had applied their findings to practice. The most common form of translation was the development of public health tools, with nearly one-third of respondents indicating they had engaged in this form of translation (n=8). Some examples of the tools include two social vulnerability indexes, a pre- and post-disaster risk assessment, a school preparedness planning tool, a first aid training, and an updated preparedness curriculum. Several of the research teams also indicated that their findings led to changes in existing public health practice (n=6) and the development of new public health practices, programs, or policies (n=4). Some examples of these translation activities included changes to policy at certain hospitals in Puerto Rico and guiding local nonprofit organizations to develop new policies and tools when delivering services to people in a disaster context. For example, as one awardee described:

> *[Our findings] proposed changes to public health practices at some of the hospitals we interviewed. We are in the process of connecting with the Secretary of Health to see if we can promote policy change.*
>
> *- Special Call 2 Awardee*

Figure 9. How Teams Translated Research to Practice

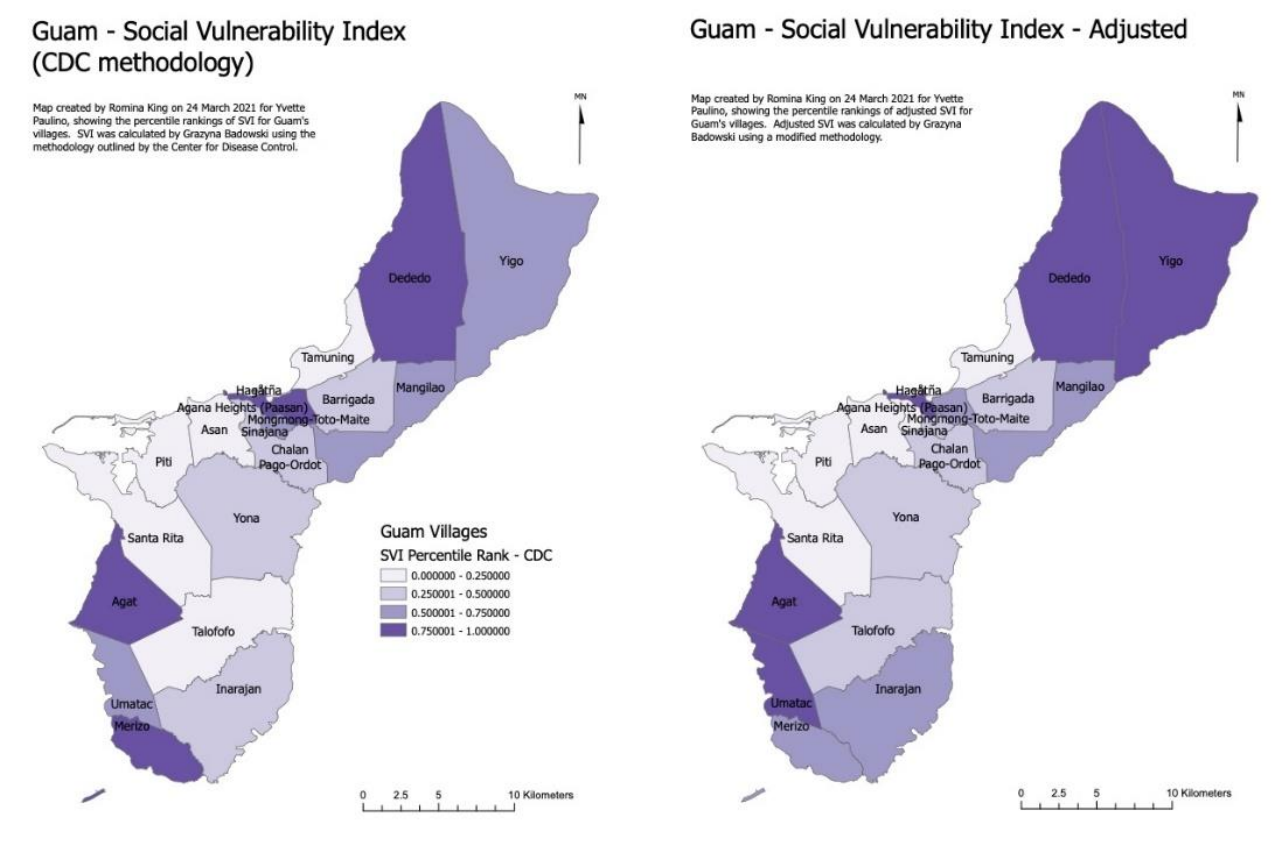


Note. N=22

Research Translation Highlight
A New Social Vulnerability Index for Guam

To address gaps in data availability, **Paulino et al. (2021)** developed the CDC's Social Vulnerability Index (SVI) for the U.S. territory of Guam. Using the CDC methods and data from the 2010 Guam census, they calculated SVI to rank and identify the most vulnerable communities on the island. They also calculated a second set of adjusted SVI that incorporated additional Guam-specific characteristics on housing structure, communication capacity, and other relevant indicators.

This new tool can help local leaders, clinicians, and other community stakeholders identify vulnerable communities and inform strategies for disaster management. Importantly, the adapted SVI developed in this project later informed the CDC response to Hurricane Mawar in Guam in 2023.



Map produced by Paulino et al. (2021) using their project findings. The map depicts the Social Vulnerability Index (SVI) for the 19 municipalities in Guam.

Paulino, Y., Badowski, G., Chennaux, J., Guerrero, M., Cruz, C., King, R., & Panapasa, S. (2021). **Calculating the Social Vulnerability Index for Guam.** *Natural Hazards Center Public Health Disaster Research Report Series, 12.*

Conclusions:
Program Strengths and Opportunities

In bringing this report to a close, we want to emphasize the importance of stepping back and evaluating the Public Health Disaster Research Award Program. To the best of our knowledge, this work represents the first such academic-federal funding program mechanism in the public health and disaster research field. Because of its novelty and the large number of researchers and research institutions funded by this program, it was important to systematically evaluate what works, identify early successes, and recognize room for continued progress. Therefore, in this closing section, we offer reflections on the greatest strengths and areas for improvement.

Strengths

A relatively small amount of funding goes a long way. This program successfully meets each of the program objectives (teaching, training, and mentoring a diverse public health disaster research and practice workforce; advancing public health and interdisciplinary research in U.S. Territories; building collaborations and partnerships; and translating knowledge to practice). The benefits of this program also stretch far beyond the initial requirements placed on the researchers related to producing a final report. For example:

- The research projects led to the development of 60 publications including the preparation (n=17) and publication (n=5) of peer-reviewed journal articles and 1 book.
- Over 78% of the research teams disseminated their findings through professional presentations or webinars.
- The findings informed the development of 8 new academic courses or other training materials.

We are training a diverse next-generation public health workforce. Special Calls 1 and 2 supported 139 investigators, providing them with new knowledge and skills to produce research with public health impact. Of these investigators, 55 were students and the data that they collected has already contributed to five doctoral dissertations and one master's thesis. Thirteen early career scholars also received awards that they have used to successfully advance their research agendas and careers. Moreover, the awards supported 82 investigators based in the historically underserved U.S. territories. We are also supporting cross-training within and across demographically and functionally diverse teams. For example, interdisciplinary teams involving two or more distinct disciplines led 92.3% of funded projects and all projects included at least one woman, person of color, or other member of a historically underrepresented group.

We are advancing knowledge of how hazards and disasters affect the understudied U.S. territories. Through their research, the awardees shed light on understudied places that are at risk for multiple hazards and compounding disasters. The projects covered a diverse geography of U.S. territories, including 18 located in Puerto Rico, 9 in the U.S. Virgin Islands, 3 in Guam, 3 in the

Northern Mariana Islands, and 2 in American Samoa. Awardees also studied a diversity of hazards, and some teams examined the compounding effects of disasters, such as hurricanes, earthquakes, and the COVID-19 pandemic. The research projects brought new perspectives to public health disaster research by examining such varied topics as infrastructure abandonment, transportation barriers to healthcare access, and worker burnout. Furthermore, many of the projects focused on socially and medically vulnerable populations (e.g., older adults, children, breast cancer survivors) and understudied and underfunded institutions (e.g., schools).

Awards are laying the groundwork for larger, longitudinal studies. The Public Health Disaster Research Awards are relatively small, but their impact is substantial. The evaluation showed awardees are using the research and connections they built during their projects to develop new studies and grant proposals. Post-award, 65% of Special Call 1 and 2 researcher teams have extended or expanded their initial research projects or developed a related study.

Awardees are translating their research into new public health tools, policies, and practices. More than 80% of respondents indicated that they had applied their findings to practice, with the development of tools being the most common form of translation. Creating tools was also largely collaborative with one-half of lead investigators working with local collaborators on their development. Several of the research teams also used their findings to guide changes in existing public health practice and develop new public programs and policies.

Opportunities

The NHC and CDC should promote investigators' post-award publications. At present, the primary requirement for investigators is to produce a report reviewed and published online via the NHC website. While our administrative data revealed that the reports have been viewed tens of thousands of times, there is an opportunity to continue to promote the additional outputs from the awardees. Indeed, the large number of publications, doctoral dissertations, trainings, and other outputs from the researchers represents an opportunity to, for example, partner with journal editors or book publishers to produce a special collection. The NHC and CDC could also showcase how awardees translated past reports into journal articles as well as public-facing outputs such as op-eds and blog posts.

The NHC and CDC should synthesize, in a research article, the lessons learned administering this program and guiding researchers. The NHC and CDC teams have a unique vantage point on this program in that we both bring a research and program administrative lens. We can document important lessons regarding the *evolution* of this program that other funders could learn from and likely implement in their own programs. Further, research teams have generated *ethical, methodological, and empirical insights* that the NHC and CDC should synthesize and share.

The NHC, together with the CDC, should explore ways to expand the research timeline. The NHC and CDC teams are aware that the condensed one-year timeline makes it challenging for researchers to complete all project activities before deliverable due dates. We addressed this in

part in 2022 when we offered a Continuation Award special call only open to Round 1 and Round 2 recipients. We believe we should continue with such an award, while also doing everything we can to work with the CDC to release future funding calls as early as possible so that teams have as much time as possible to conduct the research.

The NHC and CDC should provide awardees with more support for sharing their findings with public health departments and other policymakers. The evaluation revealed that only one-third of teams shared their findings with local public health departments. We feel we should work with the CDC or other partners to develop resources—such as a new CONVERGE Training Module or check sheet—to provide awardees with guidance about how to share their findings with public health officials and institutions. With the recent directive from the White House Office of Science and Technology Policy to make all federally funded research accessible to the American public for free, we need to make sure that public health disaster research is available to public health agencies, so they can make critical decisions and drive more equitable outcomes in disaster preparedness, response, and recovery.

In closing, while we recognize there are opportunities for further improvement with the program, we are also heartened by the impact that this funding mechanism has had on the career trajectories and scholarly and applied outputs of the investigator teams. The research produced by these investigators is already making an impact, and we look forward to continuing to support this work.

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