

Concurrent Disasters Needs Assessment Report

2022



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Introduction

The Concurrent Disasters Project, led by the National Environmental Health Association (NEHA), with funding support from the Centers for Disease Control and Prevention (CDC) and Agency for Toxic Substances and Disease Registry (ATSDR), aims to: (a) identify gaps and challenges faced by local environmental and public health agencies when responding to concurrent disasters; (b) identify resources to address these challenges; and (c) develop tabletop exercises and other technical resources to support more effective and capable concurrent disaster planning, preparedness, and response activities in the future.

NEHA, in collaboration with CDC/ATSDR and the Concurrent Disasters Community of Practice (a recruited group of individuals with expertise and experience in emergency management), developed a needs assessment survey to find gaps and identify resources needed for responding to concurrent disasters. The Concurrent Disasters Needs Assessment survey was distributed to state, tribal, local, and territorial (STLT) jurisdictions. The survey targeted public health officers/directors, public health emergency preparedness (PHEP) coordinators, environmental health (EH) program directors, and asked them to share their experiences, facilitating factors, barriers, and challenges they have encountered during concurrent disasters.

The survey was open from July 2021 to October 2021. Invitations to complete the needs assessment were initially sent to 742 STLT jurisdictions. Other participant recruitment efforts included sharing information about the project at conference presentations, through webinars, and via NEHA's affiliates.

The following report summarizes the survey findings, identifies themes in respondents' comments, and outlines existing gaps and needs that may present challenges for jurisdictions to prepare for, respond to, and recover from concurrent disasters. The findings presented in this report will help inform the development of solutions to the unique obstacles created by concurrent disasters.

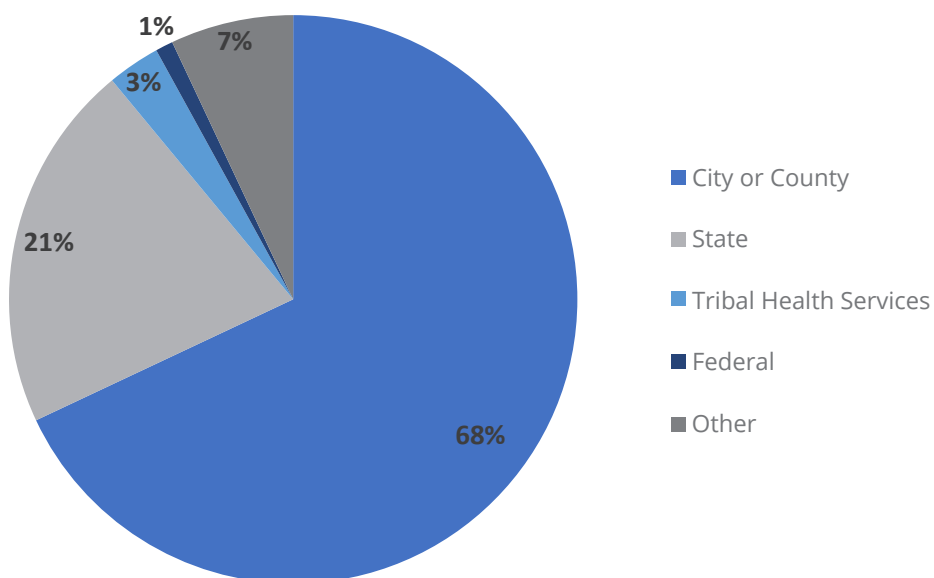
Concurrent disasters, for this project, are defined as natural disasters such as hurricanes, wildfires, and earthquakes etc., occurring at the same time as an infectious respiratory disease pandemic.

Survey Response

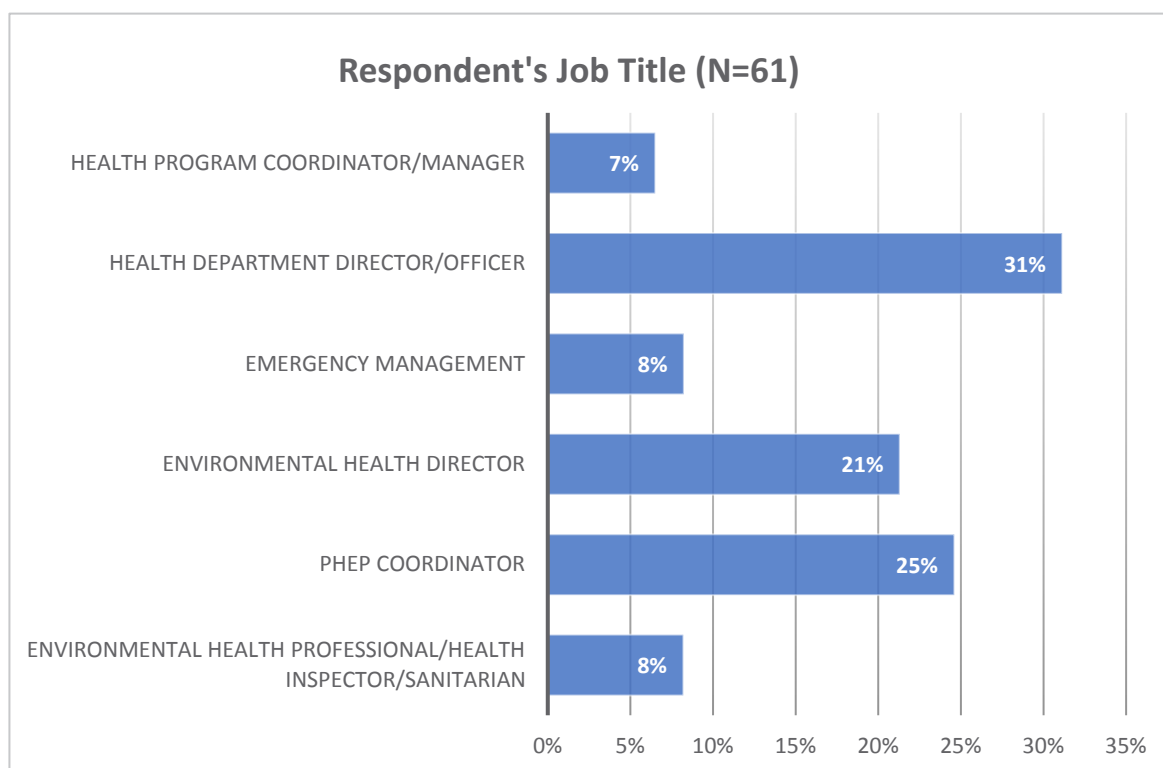
There was a total of 148 survey responses. Of these, 110 respondents indicated that their jurisdiction experienced a concurrent disaster between March 2020 and October 2021. (A concurrent disaster is defined as a natural disaster occurring simultaneously with the current pandemic.) The following summary report reflects responses from those respondents who experienced a concurrent disaster. It's important to note that some respondents did not answer all questions. The survey data has been aggregated and summarized for each survey question. See Appendix A for the full survey. The number of responses for each question are noted, as appropriate.

Demographics of Respondents

Over half of the respondents (68%) were from a city or county health department. Twenty-one percent (21%) were from a state health department, three percent (3%) were from tribal health services, and one percent (1%) were from a federal organization. The remaining seven percent (7%) were from regional health departments and one department of agriculture. See Figure 1 for more detail on the percentage of respondents from each type of jurisdiction.

Figure 1*Percent of Respondents by Type of Jurisdiction***Type of Jurisdiction (N=100)**

Thirty-one percent (31%) of the respondents identified their role as a health department director or health officer, 25% were PHEP Coordinators, and 21% were environmental health directors. A small percentage of respondents fell into the roles of emergency manager, health program coordinator, or environmental health professional. See Figure 2 for more detail on the percentage of respondents by job title. For most respondents (85%), their agency or organization has dedicated full-time staff supporting public health emergency preparedness and response.

Figure 2*Percentage of Respondents by Job Title*

Identified Disasters and Emergencies

Respondents were asked to select the disasters or emergencies that occurred across their jurisdiction since March 2020. Table 1 shows the emergencies or disasters that were reported; extreme heat and wildfires were the most common.

Table 1

Disasters Concurrent with the Pandemic Since March 2020

Type of Disaster Reported (N=100)	Percentage of Reported Responses
Extreme heat (i.e., extended period with unusually hot weather)	46%
Wildfire	43%
Flooding	29%
Severe storm	26%
Winter storm	23%
Hurricane/tropical storm	15%
Landslide/mudslide	10%
Tornado	10%
Infrastructure failure (e.g., bridge or dam collapse)	6%
Earthquake	5%
Nuclear/radiological incident	1%

Challenges Related to Concurrent Disaster Response

Responding to concurrent disasters posed unique challenges for jurisdictions since the start of the pandemic in the United States. Respondents were asked to describe the challenges they experienced in the context of concurrent disasters. Three-quarters of the respondents (74%) reported they experienced challenges responding to concurrent disaster events. Seven predominant themes emerged from comments associated with the challenges experienced across jurisdictions. Table 2 shows these seven themes and the percentage of responses associated with them.

Table 2

Type of Challenges Experienced Responding to Concurrent Disasters

Challenge (N=81)	Responses
Staffing	57%
Physical resources and funding	39%
Sheltering	35%
Communication and information sharing	19%
Mutual aid and partnerships	18%
Understaffed Emergency Operation Centers/Department Operations Centers (EOCs/DOCs)	11%
Conflicting guidance	11%

Staffing

The greatest challenge faced by respondents to the survey was staffing; over half of the challenges shared (57%) were associated with staffing. As one person summarized, “Environmental Health staffing levels and prioritization of tasks had to be focused on addressing the immediate issues of disease control, prevention, and disaster response.”

Staff challenges can be organized into four main categories: limited staffing, staff burnout/mental health, staff training, and concern for staff health and safety.

Limited staff challenges include:

- reduced number of available staff
- staff initially redirected to pandemic and then asked to also respond to other disaster
- regular staff duties on hold or delayed
- limited staff time to respond to multiple emergencies
- decreased availability of responders
- quarantined responders
- loss of staff due to illness/fatalities

Staff burnout/mental health challenges include:

- overtime hours
- same staff responding to both situations
- staff had to choose which disaster to focus on at any given time
- anxiety about exposure to COVID through assignments
- communities resisted health messaging, public health mandates, etc.
- public anxiety
- additional workload
- fatigue

Staff training challenges include:

- just-in-time training for REHS limited or not available
- staff learned as they went
- new/contracted staff did not receive needed training

Concerns for staff health/safety include:

- staff at risk of exposure to the disease while responding to the disaster
- lack of N95 masks and personal protection equipment (PPE)
- disease outbreaks among responders

Funding and Physical Resources

Just under half of the respondents (39%) cited barriers in acquiring the necessary physical resources and funding to respond to a disaster during the pandemic. These resources included PPE and other resources for disease control, including supplies/materials for testing, vaccination, isolation, and the funding to obtain necessary supplies. As one respondent stated, “PPE procurement was next to impossible for 8-10 months.”

In a jurisdiction hit with flooding, landslides, and extreme weather, communities were isolated and did not have access to testing, vaccination, and isolation/quarantine supplies and facilities. Similarly in another jurisdiction, there were limited resources for firefighters in fire camps to conduct testing and determine isolation and quarantine needs. Others described inadequate resources for disease control in evacuation shelters.

Shelters, Housing, and Care Settings

One-third (35%) of respondents identified a challenge associated with congregate and non-congregate shelters, housing, and care settings. In a few cases, this included challenges with not only sheltering of humans but animals as well.

Specific challenges included:

- shelter requirements during the pandemic
 - how to screen individuals for COVID
 - how to handle COVID results (e.g., positive results, negative results but symptomatic)
 - quarantine/isolation protocols and setting
 - how to determine physical distancing, masking protocols, etc. in a shelter environment
- capacity issues
- pivoting from congregate to non-congregate sheltering
- limited time to plan
- inability to have congregate sheltering
- inability to use gyms and community centers as cooling centers due to pandemic closures
- a county's Alternate Care Site (ACS) was in an evacuation zone and had to be relocated to a different area

Communication and Information Sharing

Communication and information sharing was a challenge noted by 19% of the respondents. Communication was made difficult due to constant changes, misinformation, rumors impacting the public's trust, and information delays to the public because of a rapidly changing situation.

Additionally, jurisdictions had a difficult time getting information about the pandemic and other disasters to the public because there were no community town halls or forums. As one person stated, "Any and all of the disasters we had need personal face-to-face contact with those affected and adhering to covid protocols was difficult."

Therefore, jurisdictions had to consider newer, less familiar forms of communication with the public. Another barrier to getting messages to the public was the negative influence from the media, leading to inaccurate information, multiple interpretations of the issue, or a single focus on one disaster over the other.

Mutual Aid and Partnerships

Mutual aid and partnership challenges were cited by 18% of the respondents. This affected both communities requesting aid and those offering aid. For instance, there was often a lack of capacity for jurisdictions to provide staff to respond to another jurisdiction's mutual aid request. And when a jurisdiction was able to provide aid to another community, the deployment of their staff for mutual aid further reduced the staff left for normal operations. Similarly, normal backup options for communities from regional partners was not possible because they were also dealing with the pandemic. This limited available partners to assist with one or both disasters. One jurisdiction described how partner agencies cancelled contracts due to stress on their own public health system.

EOC and DOC Staffing

A small percentage of respondents (11%) spoke to challenges related to understaffed Emergency Operation Centers and Department Operations Centers (EOC/DOC). Available staff were fatigued and stretched thin. In addition, many EOCs/DOCs transitioned to virtual operations which brought new challenges with technology, access, and functionality. One jurisdiction mentioned they had to manage Incident Command (IC) meetings differently because of the virtual aspect. Another explained how their forest fires were under a different IC system and structure than the pandemic and this exacerbated communication and logistical issues in maintaining both disasters.

Guidance

Lastly, 11% of jurisdictions shared examples of the different, and sometimes conflicting health and safety guidance, and protocols for a disaster during the pandemic. For example, protocols for how to isolate and serve the infected, ensure compliance with public health control measures, and assure safety during the pandemic

conflicted with basic protections under wildfires. In one situation, the congregate housing and close-quarter working conditions in an agricultural area provided opportunities for respiratory disease spread among temporary workers during planting and harvesting season. Then, wildfires occurring concurrently with the pandemic further exacerbated environmental conditions for the farm laborers.

Another example of conflicting guidance between the pandemic and wildfires was the ways in which mitigating and addressing the pandemic (e.g., open windows and exercise outside) conflicted with wildfire limitations and measures. Moreover, one jurisdiction said pandemic protocols were sometimes simply overlooked during a disaster. Lastly, pandemic testing sites and programs were disrupted due to changing and evolving evacuation orders during wildfires or extreme heat events.

Environmental Health Response to Concurrent Disasters

To understand the role of EH in the response to concurrent disasters, respondents were asked if EH was involved in their agency/organization's response and to select the specific activities where EH was involved. Responses indicated that concurrent disaster response in their jurisdiction involved EH for 68% of respondents. Table 3 shows how EH was involved in a variety of activities.

Table 3

EH Involvement in Concurrent Disaster Response

EH Involvement (N=69)	Responses
Public relations and communication	62%
Engaged in the Emergency Operations Center	58%
Enhanced inspections and enforcement	58%
Provide food protection measures/safe food supply	54%
Decision or policy making efforts	54%
Administrative duties	52%
Contact tracing	48%
Ensure basic sanitation services	43%
Support in resolving conflicting health guidance/balancing disaster risks	41%
Sheltering in emergency response	39%
Ensure an adequate supply of safe drinking water	39%
Emergency response team	38%
Wastewater disposal	36%
Vaccination	36%
Vector control monitoring	36%
Infection Control Planning and response	35%
Determine risks to the community	35%
Responder safety and health	35%
Provide information to emergency managers to help assess the scale emergency	33%
Participation in a taskforce	32%
Determine how to help vulnerable populations (i.e., elderly, ill, children, pregnant)	32%
Deployed as part of environmental health strike team	30%
Determine exposure to biological, chemical, and radiological hazards	20%
Building assessments	20%
Infectious respiratory disease testing	17%
Crowd dispersal	7%
I don't know how environmental health was involved	3%

Another question (added later to the survey) asked respondents how shifts in organizational priorities due to concurrent disasters affected environmental health duties/responsibilities. As Table 4 shows, more respondents indicated there was increased workload on current staff with added pandemic-related tasks and modified duties to adjust for necessary disaster response work.

Table 4

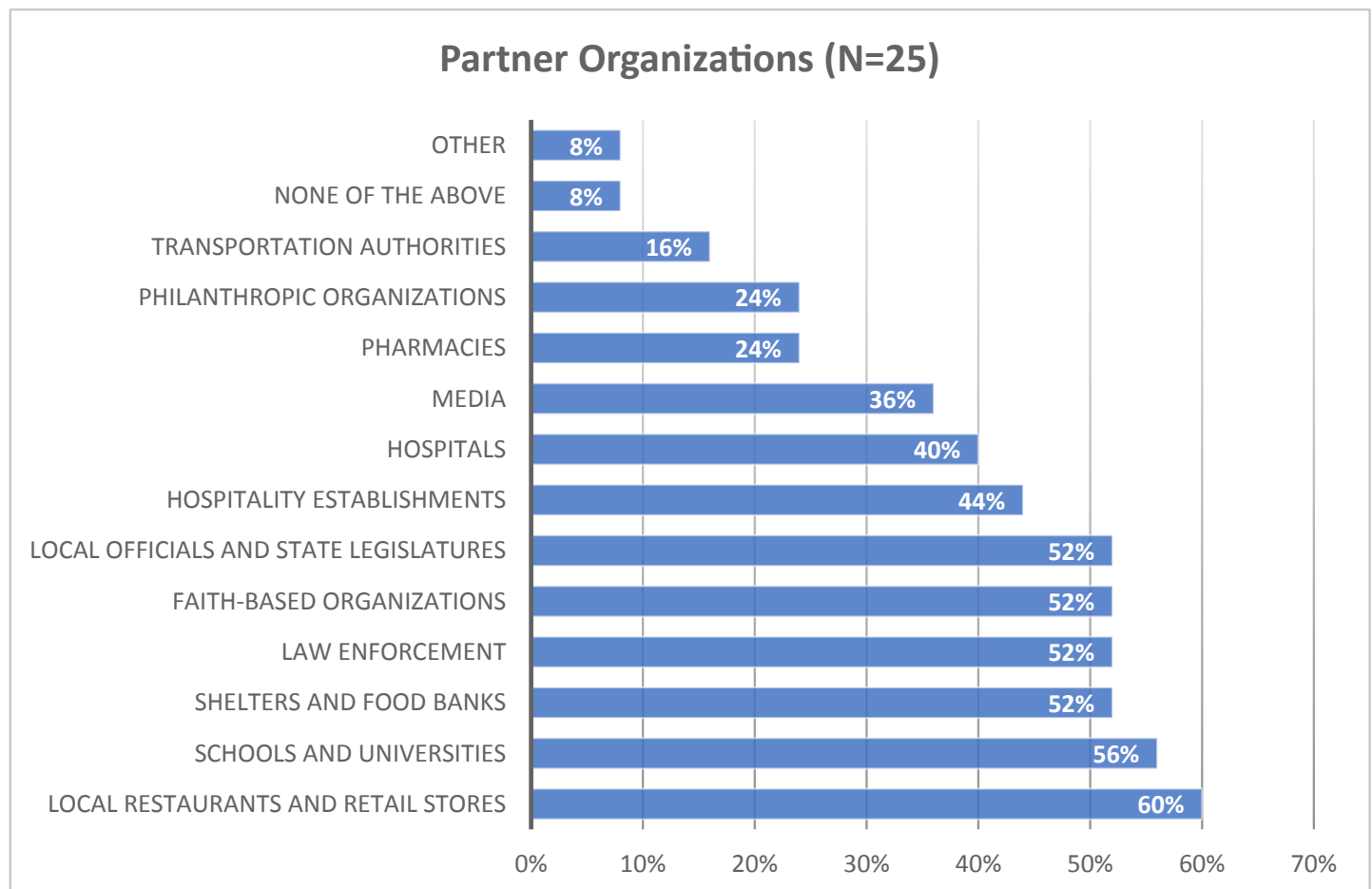
EH Impacts from Shift in Priorities Due to Concurrent Disasters

Impact on EH Duties/Responsibilities (N=27)	Responses
Projects and duties are ongoing with pandemic-related tasks added to the workload of current staff	78%
Duties have been modified to adjust for necessary disaster response work	63%
Previous projects and duties have been put on hold entirely to focus on the pandemic crisis	44%
My responsibilities have less of an environmental health focus	22%
Additional EH staff have been added to take on the increased pandemic related workload	15%
Other professionals understand or appreciate the work of EH more	7%
Other (staff member left)	7%

As part of any disaster preparedness and response, partners are essential, especially with jurisdictions facing concurrent disasters and limited resources. Respondents were asked to identify the cross-sector partner organizations their EH unit collaborated with during their concurrent disaster response efforts. This question was added later to the survey. Figure 3 shows the types of partnerships EH worked with the most. Local restaurants and retail stores, schools and universities, shelters and food banks, law enforcement, faith-based organizations, and local officials and state legislatures were the most recognized partners.

Figure 3

Partner Organizations in Concurrent Disaster Response



Needs, Gaps, and/or Issues from Concurrent Disasters

To further understand the general needs, gaps, and issues faced by jurisdictions during a concurrent disaster, an additional survey question asked respondents to rate each listed need, gap, or challenge on a scale from “1 - not a problem” to “5 - very problematic.” Table 5 below shows how respondents rated each item. Feelings of stress and burnout, increased workload, and changing information were rated the most problematic, while limited virtual capabilities was the least problematic.

Table 5
Needs, Gaps, and Challenges Responding to Concurrent Disasters

Needs, Gaps, Challenges (N=86)	Average Rating of Problem
Feelings of stress, overwork, and/or burnout	4.0
Tasks added to the workload of current staff	3.9
Changing guidance and information	3.8
Staffing shortages	3.7
Allocating scarce resources	3.5
Mental health of workforce	3.5
Staff redirected to other duties	3.5
Previous projects and duties have been put on hold	3.3
Shifting priorities of your organization	3.3
Conflicting health and safety guidance between the disaster and infectious respiratory disease outbreak	3.3
Budget, supplies, and other resource shortages	3.2
Staff turnover	3.1
Lack of funding/funding shortages	3.0
Outdated technology	2.8
Lack of guidance for concurrent disasters	2.7
Lack of training/cross discipline training to provide adequate response	2.7
Lack of awareness/understanding of organization roles (e.g., Public Health vs EH) in disaster preparedness, response, and recovery	2.6
Willingness to respond (staff fearful to respond)	2.5
Limited cross-sector collaboration	2.4
Lack of communication with other organizations	2.3
Limited virtual capabilities	2.1

Routine Functions Interrupted

Concurrent disaster response caused jurisdictions to change many roles and responsibilities within their staff, programs, and departments. Respondents were asked to think about this in two ways. What were the routine functions and/or programs they needed to stop in order to *respond to the pandemic* and what were the routine functions and/or programs they needed to stop in order to *respond to a disaster* during the pandemic?

Due to Pandemic

Most respondents (105) answered the open-ended question, “What routine functions and/or programs were paused or reduced to *respond to the pandemic*?” Respondents indicated that day-to-day core functions and programs, routine inspections (retail food, restaurant, pool, septic system, salon, medical waste, etc.), and communicable/enteric disease investigations were interrupted, paused, or stopped altogether. Some jurisdictions moved to virtual inspections and others were able to maintain some but not all inspection services. Fifty percent (50%) of respondents said that programs and services were interrupted or stopped, including:

- non-mandatory services
- environmental health animal management
- opioid and tobacco cessation programs
- teenage pregnancy prevention programs
- clinic operations (e.g., immunizations and sexual health)
- injury prevention programs
- dental programs
- health education programs
- community services programs (e.g., WIC, senior services, feeding programs, career services, etc.)
- medication home visiting programs/home visits
- chronic disease prevention services
- counter services
- school-based public health nursing
- housing programs
- vital statistics programs
- grant-funded outreach programs
- childhood lead prevention programs

According to 39% of respondents, inspections were either stopped altogether or slowed, including inspections for:

- health facilities
- retail food
- restaurants
- recreational water/pools
- septic systems
- medical waste
- salons
- lodging
- hazmat facilities
- body art
- camping and RVs

Six percent (6%) of respondents mentioned how their communicable/enteric disease investigations were interrupted or paused. Additional impacted tasks included planning activities for emergencies and disasters, use of volunteers, staff training, drills, and partner meetings. Of the programs and services that were able to function, many of the in-person meetings, in-person site visits, and in-person appointments were changed to virtual ones.

Due to Pandemic and Disaster Response

Respondents were then asked to answer the question, “What routine functions or programs in their organization were negatively impacted or paused due to a *disaster response during the pandemic*?” This open-ended question was answered by 89 respondents. Almost one-third (30%) of the respondents explained they

did not perceive further impacts on their routine functions and programs when faced with a disaster event in addition to the pandemic, mostly because numerous functions or programs were previously stopped or reduced because of the pandemic alone.

Of the respondents who experienced additional impacts on routine functions due to their response to a disaster event during the pandemic, one-third (33%) of the respondents cited a lack of staff. In many cases, this was due to staff being re-assigned to pandemic roles. In some circumstances, staff were pulled back from their pandemic role to help support the disaster response. As one jurisdiction described, at the peak of the pandemic case surge, more than half of the health department staff were directed to pandemic response. All staff involved in the pandemic response were then divided to assist with wildfire response on a limited basis, resulting in staff shortages for both responses. Additional staff from other departments were pulled in to assist as well. It stretched limited resources even further and paused the ability to continue moving other projects forward.

Another jurisdiction was constrained because the staff contracted for the pandemic response were only allowed to help with pandemic response work; therefore, the regular, full-time staff were managing two responses, the pandemic, and a disaster. This also left new and contracted staff on their own to figure out how to respond to the pandemic because there was a lack of training and internal staff were not available to provide guidance and support. Jurisdictions had to continually assess and alter how to proceed with staffing for their concurrent responses because of the prolonged and sustained need to staff the Emergency Operations Center (EOC) and/or the Department Operations Center (DOC), manage volunteers, and address concerns regarding staff exposure to the disease during a disaster response. These staffing issues were tied to burnout, stress, and fatigue.

Like the routine functions and programs impacted by the pandemic alone, 32% of the respondents said their day-to-day routine work was impacted due to the disaster response during the pandemic. Similarly, inspections were slowed or stopped, and programs were paused or services were reduced. As one person stated, "Staff were required to handle it all at one time and begin with routine program work while still working to deal with outbreak/disaster work." Jurisdictions had to stop regularly planned disaster training and there was a temporary disruption of referrals to programs.

With regards to pandemic-related activities during the concurrent disaster response, some pandemic testing sites were moved or closed temporarily. For example, in one jurisdiction, some of the pop-up pandemic-testing programs were cancelled in locations where there were evacuation orders due to the disaster. In other cases, test event locations had to be paused and relocated due to weather (e.g., blizzard, extreme heat, wildfire smoke).

New Roles and Functions

Just as concurrent disasters forced some operations to stop, new priorities required jurisdictions to take on different roles and functions to address the needs for a concurrent disaster response. Respondents were asked to describe the new roles, functions, or programs they needed to take on outside their normal duties to respond to the pandemic and a disaster event during the pandemic.

Due to Pandemic

Ninety-three (93) responses were submitted to this open-ended question, "What new or additional roles/functions did your organization take on *due to the pandemic*?"

New roles and functions primarily were related to testing, screening, vaccinations, contact tracing, and setting up isolation and quarantine facilities for shelters and other housing needs (73%). Another new function during the pandemic was the enforcement of pandemic restrictions and public health orders, including complaint and disease investigations (28%). Communication, including the development of guidance documents to rectify pandemic guidance with disaster-related guidance, and information sharing became a large responsibility of jurisdictions (14%). This involved call centers and hotlines; community roundtables; epidemiological data collection; data dashboards; website communications; acting as a liaison for long term care facilities, shelters, unhoused population centers, schools, etc.; and other public information responsibilities.

For some jurisdictions, staff were assigned to new roles, such as those deployed to an EOC/DOC, or an Incident Command Center (14%). For instance, a jurisdiction had staff involvement at the county and state EOCs. Another

jurisdiction explained how staff were deployed to multiple locations throughout the state (e.g., quarantine sites, State Operations Center, Medical and Health Coordination Center, and multiple Task Forces.) This expanded responsibility was new to some jurisdictions. As one person stated, “Our organization was required to take on a logistical function, a behavioral health response function, an isolation and quarantine function, and a COVID complaint function that our agency didn’t previously have as part of our structure.”

Moreover, 10% of the respondents discussed the different avenues taken to bring on staff, such as the creation of new positions, employing contracted staff, or using available internal staff to help with additional roles and responsibilities. Increasing staff, though needed, created a ripple effect of additional workload for jurisdictions. For instance, the large number of staff hired for testing and vaccination roles generated a higher workload for human resources to onboard new staff. For another jurisdiction, PHEP, EH program staff, and leadership staff filled critical command and general staff positions in Unified Command, and in other cases it was necessary to involve staff from divisions and programs that are not normally involved in emergency response.

Mentioned only a few times, but still important, were the new functions around the organization and procurement of supplies for pandemic related activities. The logistics and staff to manage the high demand for supplies, from tracking down and obtaining the supplies, to distributing the supplies was time consuming. Lastly, some respondents explained that they didn’t necessarily take on new roles or functions, but their normal day-to-day workload significantly increased in addition to responding to the pandemic. Additional tasks/workload included:

- rapid turnaround times
- higher volume of work
- lab testing
- human resource functions
- public information
- contract management
- complaint management

Due to Disaster Response During the Pandemic

The survey asked a similar question from a different perspective by asking, “What new or additional roles/functions did your organization take on due to *disaster response during the pandemic*?” Most respondents reiterated the new functions and roles due to the pandemic, as previously described. Above and beyond the new functions and roles due to the pandemic, 43 respondents mentioned a variety of new or increased responsibilities because of their disaster response during the pandemic.

About 23% of the respondents said normal functions were increased, including compliance inspections and responding to complaints. For instance, the process for complaint response and investigation became broadened to include complaint responses concerning social distancing at events and mass gatherings, restaurants, workplace settings, and food facilities. Both pandemic and disaster-related data management, data collection, and surveillance activities were also increased, as mentioned by 14% of respondents.

The involvement in and staffing of an EOC and DOC was mentioned by 21% of the respondents. One person explained: “In our region, Public Health has never taken a lead role at Emergency Operations Centers. This was a new role that we had trained for and were able to step into fairly easily. We had mostly good cooperation from other agencies participating in joint response.”

In one jurisdiction, they assisted with both the health department’s DOC and county DOC for the pandemic, as well as with wildfire DOCs at the health department and county level. Another person explained they needed to make sure that the logistics for vaccination events didn’t interfere with the wildfire EOC. About 16% of the responses discussed providing support and guidance for the community, facilities, businesses, and schools, including new guidance to address health advice for the respiratory outbreak and the concurrent disaster. Another 16% of the respondents noted new responsibilities for evacuation shelters during a disaster, such as the need to adhere to pandemic protocols, provide congregate setting surveillance, and provide other public health functions in shelters for disease prevention.

During a disaster, 14% of respondents reported new functions related to debris clean-up and management and disaster assessments. New functions related to the distribution of PPE during the disaster was reported by 9% of respondents, and 7% reported isolation and quarantine functions, and involvement with re-entry protocols and water testing.

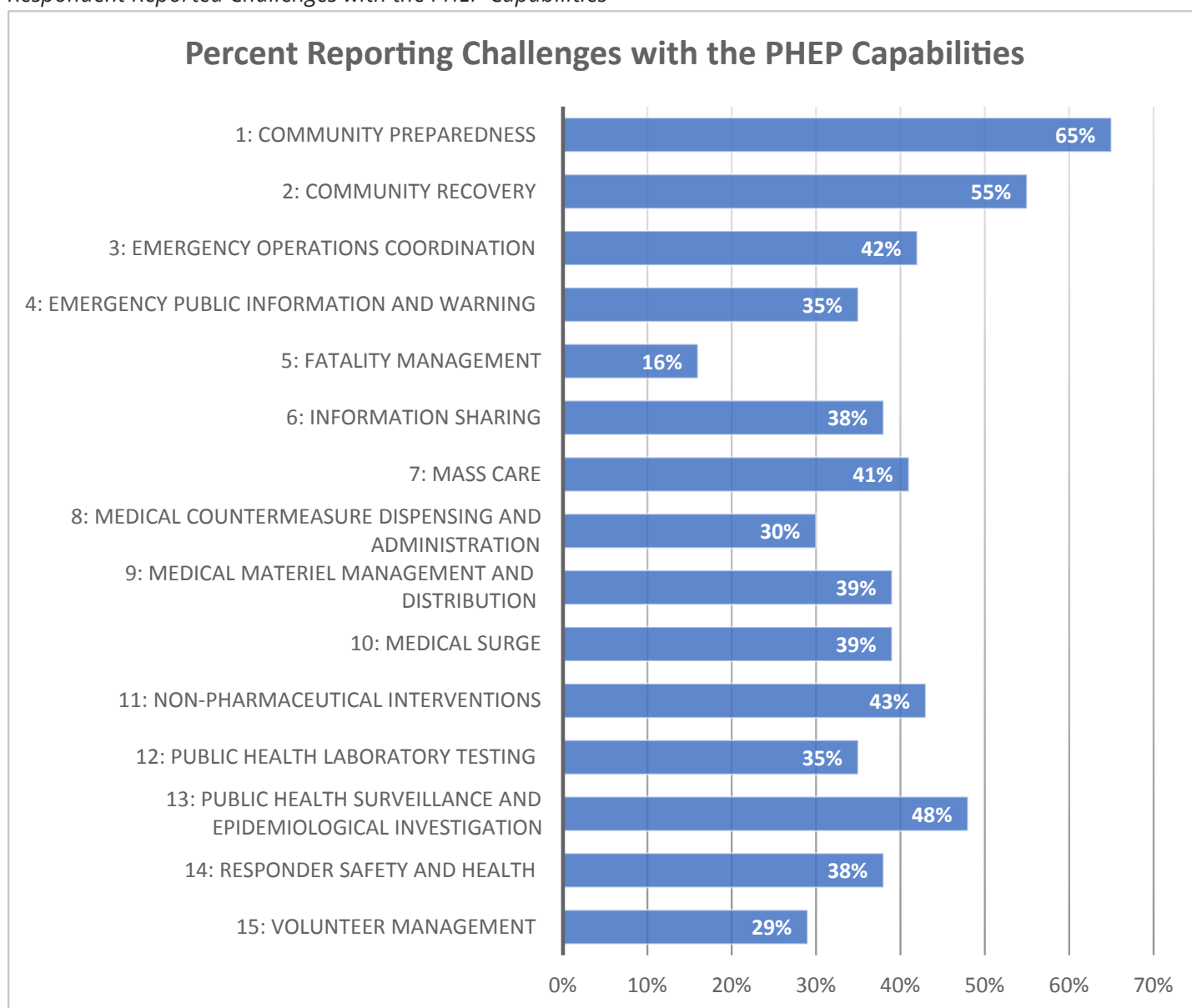
Public Health Emergency Preparedness (PHEP) Capabilities and Functions

Recognizing the national standards for preparedness planning, response, and recovery, respondents were asked whether each of the 15 PHEP Capabilities were impacted by concurrent disasters. If they responded yes, they were asked to identify the functions impacted under that specific capability.

More than half of the respondents said they had challenges with PHEP Capability 1: Community Preparedness (65%) and PHEP Capability 2: Community Recovery (55%). Fewer respondents indicated challenges with PHEP Capability 5: Fatality Management (16%) and PHEP Capability 15: Volunteer Management (29%). See Figure 4 for the percentage of responses for all 15 capabilities.

Figure 4

Respondent Reported Challenges with the PHEP Capabilities



Respondents shared accounts and specific examples of challenges in the comments under each PHEP Capability. The responses show the variety of difficulties faced by jurisdictions during concurrent disasters and the impact on day-to-day operations related to the PHEP Capabilities and Functions. The following are some examples of what respondents cited as challenges under each PHEP Capability. Table 6 also shows more information about the challenges faced by jurisdictions within each PHEP Capability.

PHEP Capability 1: Community Preparedness. Respondents noted the most difficulties with this PHEP Capability. Partner and community meetings were put on hold. Public health resources were depleted, forcing jurisdictions to focus on high priority activities and populations. Planning efforts that include determining risks and strategies, especially for at-risk populations, were postponed or put on hold. There was simply a lack of infrastructure for jurisdictions to prepare for concurrent disasters. Staff were unprepared, and there was also a lack of time and resources to coordinate the training of community partners and personnel.

PHEP Capability 2: Community Recovery. Within this PHEP Capability, there was limited engagement from community partners who would normally assist but were themselves inundated with their own pandemic activities. Due to the extended and complex response to the pandemic, recovery from other disasters was impacted, including the inability to assess and monitor community needs. Resource and staff shortages exacerbated challenges for recovery activities because staff were allocated to the pandemic. Communities lacked mental health resources and services.

PHEP Capability 3: Emergency Operations Coordination. Concurrent disasters involved multiple layers and activation of emergency management. With this activation came many challenges related to staff shortages and burn-out. It was difficult to maintain a public health response and mobilize staff for an extended period. Another challenge was the lack of trained personnel. Staff were unfamiliar with National Incident Management System (NIMS), Incident Command System (ICS), and Emergency Operations Center (EOC) structures and processes, and there was a general lack of understanding about emergency management. There was an absence of coordination between state and local efforts. There were instances where emergency systems, processes, and functions were not followed as planned or ignored.

PHEP Capability 4: Emergency Public Information and Warning. The most common themes under this PHEP Capability were challenges associated with the coordination of messaging, the politics and polarization of the messages, and incomplete information/content shared. The lack of coordination of messages between the state and local levels, as well as multiple partners sending alerts and notifications caused mixed messages and, sometimes, misinformation. Public health messages were not as effective because of the underlying politics and public mistrust of information when it was perceived to come from government organizations. There was difficulty keeping all stakeholders on the same page, providing the most up-to-date information, and sometimes critical subject matter experts were not asked to contribute to the information that was shared.

PHEP Capability 5: Fatality Management. While this PHEP Capability was less of a challenge overall compared to the others, respondents shared that the provision of and resources for mental and behavioral health services is lacking for those in the community impacted by fatalities. In addition, capacity issues with morgues and mortuaries were a challenge. In some cases, the planning for mass casualty events was paused, and in another case, existing plans for fatality management were not followed.

PHEP Capability 6: Information Sharing. Like Emergency Public Information and Warning, issues of a constantly changing operating picture, finding a common operational structure across multiple disasters, and misinformation were experienced under this PHEP Capability. Different staff working on multiple disasters and parallel EOC/DOC structures led to delayed or siloed information. Information overload was problematic, the accuracy of shared data between state and local governments was in question, and in some cases, political factions in a county were not supportive or did not acknowledge the public health messages.

PHEP Capability 7: Mass Care. Public health was understaffed and it was difficult to prioritize and fill roles that were needed. The pandemic contributed to many challenges in mass care because of additional safety and health requirements (masking, sanitizing, distancing, capacity limits). It was extremely challenging to locate, resolve, and deploy resources across the state when local resources had been largely exhausted on a mass scale. In addition, shelters were short staffed, and sheltering and mass care protocols had to change due to space and infection

control restrictions. As one respondent explained, because of the need for more space, evacuated persons were forced to shelter in place in their cars instead of in cleaner air shelters. Also, hotels were heavily occupied by COVID quarantine/isolation persons. Lastly, as with some of the other capabilities, a lack of public mental and behavioral health resources impacted mass care activities and services.

PHEP Capability 8: Medical Countermeasure Dispensing and Administration. The greatest challenge under this PHEP Capability was with the COVID-19 vaccines. At first, shortages of the vaccines were problematic, and decisions needed to be made about how to prioritize who received the vaccine. This required intensive engagement and prioritization efforts in partnership with other government agencies and community sectors. Once vaccines were available, new complexities arose such as how to store the vaccine and how to manage testing and mass vaccination supplies and equipment. In addition, training an already exhausted and depleted staff to learn about new and highly complicated vaccine handling and storage requirements presented jurisdictions with increased challenges. Because of increased demand, the need to scale up vaccine clinics created ongoing challenges with conducting vaccination efforts in the field while maintaining vaccine integrity, data accuracy, cooler inventory, etc. Vaccine clinics were at times closed or moved because of evacuation orders due to another disaster. There were difficulties getting buy-in from extended care facility staff to get vaccinated and inadequate protection of that population.

PHEP Capability 9: Medical Materiel Management and Distribution. In the beginning of the pandemic, there were supply issues: personal protection equipment (PPE), gowns, gloves, testing equipment, etc. were difficult to obtain. Once supplies and materials were available, there were problems with the lack of existing workforce in the health department to conduct distribution operations. The demands on those in charge of logistics increased as well as requests for PPE, testing kits, hygiene supplies, etc., from agencies and partners. To intensify some of these challenges, some jurisdiction's software systems for material ordering, distribution, and tracking was inadequate. Furthermore, due to multiple emergencies taking place, it was difficult to maintain an accurate inventory of material received in response to each disaster. Another challenge was that facilities and employers who don't normally require medical supplies needed hand sanitizer, masks, etc., and this caused confusion around which department was responsible for supporting these needs. With some concurrent disasters, the transportation of supplies and materials were impacted by evacuation orders and road closures.

PHEP Capability 10: Medical Surge. The pandemic overwhelmed healthcare systems. The day-to-day needs of the healthcare system, coupled with needs due to the pandemic, depleted healthcare staff and resources. It was also challenging for public health to support those agencies that oversee this capability and the activation of medical surge due to the pandemic. With concurrent disasters, health care facilities and emergency medical services were heavily taxed by the pandemic, so dealing with evacuations and the health effects from other disasters were a physical and psychological burden, and difficult to manage. Furthermore, the draw on resources from concurrent events, and lack of additional mutual aid resources made supporting medical surge difficult. The lack of communication from some healthcare providers and hospitals to the health department made it difficult to obtain situational awareness.

PHEP Capability 11: Non-pharmaceutical Interventions. Lack of PPE was common across jurisdictions, especially at the beginning of the pandemic. There were supply chain issues and simply not enough supplies to meet the demand. In addition, there was a lack of public cooperation, confidence, and buy-in related to PPE use, social distancing, and restrictions on gatherings and school and business closures. This was worsened by the polarizing views of some social media influencers and elected officials.

PHEP Capability 12: Public Health Laboratory Testing. Both state and local labs were overwhelmed, and local labs especially were short of supplies and lacked updated technology to meet the testing needs of the pandemic. In addition to low supplies, labs were lacking PPE for staff. The scope of the response needed from labs was vast, resulting in less timely lab results, and other lab tests needed to be put on hold to keep up with pandemic testing. Some labs were not set up for the reporting of results to patients or electronically to the state. Setting up these systems took time and required resources and staffing. The demand for testing exceeded labs' capacity, and in some cases contracted lab partners were utilized.

PHEP Capability 13: Public Health Surveillance and Epidemiological Investigation. Lack of staff was the greatest challenge with this PHEP Capability. As one person commented, “We are chronically under-resourced in many areas of local public health, including Epi.” The pandemic brought this issue to the forefront. Issues with constantly adjusting staffing levels and a lack of qualified personnel were cited. These positions were hard to fill, and existing epidemiologist and communicable disease investigators were quickly overwhelmed by the numbers of cases that needed to be evaluated. Many departments, divisions, programs, and other organizations were asked to assist, or private agencies were contracted to help with the workload. Normal epidemiological and surveillance operations were not performed at a high level because resources were utilized for the pandemic response. As other events emerged, it was challenging to conduct public health surveillance around those events. Lastly, outdated IT systems and reporting systems were not equipped to handle the magnitude of data the concurrent events required.

PHEP Capability 14: Responder Safety and Health. Obtaining PPE for responders was difficult, especially at the onset of the pandemic. Responders and staff in the field were stressed about becoming infected. The logistics and organization of the large influx of responders from multiple agencies and locations were difficult to manage. Mental health was a concern, especially for staff when they were in the field. There were instances where the politicization of the pandemic response put nurses and environmental health professionals in positions where they were verbally assaulted and received threats from business owners or individuals.

PHEP Capability 15: Volunteer Management. The challenges around volunteer management crossed both extremes. Some jurisdictions did not have enough volunteers to support the response and others had more volunteers than staff could manage. For example, when healthcare volunteers were needed, most healthcare volunteers are retired elderly. This demographic was the most at risk and therefore the least able to volunteer. And in another jurisdiction, the numbers of volunteers went from over 8,000 to over 35,000. With limited systems and coordinated plans in place, it was a challenge to utilize that kind of number of volunteers in an effective and coordinated manner.

Table 6

PHEP Capability (# of responses)	% who reported capability challenges	Functions	% who reported challenge w/function
1: Community Preparedness (N=71)	65% (N=46)	Function 1: Determine risks to the health of the jurisdiction	35%
		Function 2: Strengthen community partnerships to support public health preparedness	46%
		Function 3: Coordinate with partners and share information through community social networks	37%
		Function 4: Coordinate training and provide guidance to support community involvement with preparedness efforts	72%
2: Community Recovery (N=69)	55% (N=38)	Function 1: Identify and monitor community recovery needs	50%
		Function 2: Support recovery operations for public health and related systems for the community	68%
		Function 3: Implement corrective actions to mitigate damage from future incidents	61%

PHEP Capability (# of responses)	% who reported capability challenges	Functions	% who reported challenge w/function
3: Emergency Operations Coordination (N=69)	42% (29)	Function 1: Conduct preliminary assessment to determine the need for activation of public health emergency operations	24%
		Function 2: Activate public health emergency operations	31%
		Function 3: Develop and maintain an incident response strategy	48%
		Function 4: Manage and sustain the public health response	79%
		Function 5: Demobilize and evaluate public health emergency operations	38%
4: Emergency Public Information and Warning (N=69)	35% (N=24)	Function 1: Activate the emergency public information system	13%
		Function 2: Determine the need for a Joint Information System	33%
		Function 3: Establish and participate in information system operations	33%
		Function 4: Establish avenues for public interaction and information exchange	58%
		Function 5: Issue public information, alerts, warnings, and notifications	63%
5: Fatality Management (N=69)	16% (N=11)	Function 1: Determine the public health organization role in fatality management	45%
		Function 2: Identify and facilitate access to public health resources to support fatality management operations	0%
		Function 3: Assist in the collection and dissemination of antemortem data	9%
		Function 4: Support the provision of survivor mental/behavioral health services	55%
		Function 5: Support fatality processing and storage operations	18%

PHEP Capability (# of responses)	% who reported capability challenges	Functions	% who reported challenge w/function
6: Information Sharing (N=69)	38% (N=26)	Function 1: Identify stakeholders that should be incorporated into information flow and define information sharing needs	38%
		Function 2: Identify and develop guidance, standards, and systems for information exchange	46%
		Function 3: Exchange information to determine a common operating picture	65%
7: Mass Care (N=68)	41% (N=28)	Function 1: Determine public health role in mass care operations	43%
		Function 2: Determine mass care health needs of the impacted population	43%
		Function 3: Coordinate public health, health care, and mental/behavioral health services	79%
		Function 4: Monitor mass care population health	46%
8: Medical Countermeasure Dispensing and Administration (N=67)	30% (N=20)	Function 1: Determine medical countermeasure dispensing/administration strategies (N=14)	45%
		Function 2: Receive medical countermeasures to be dispensed/administered	55%
		Function 3: Activate medical countermeasure dispensing/administration operations	55%
		Function 4: Dispense/administer medical countermeasures to targeted population(s)	60%
		Function 5: Report adverse events	35%

PHEP Capability (# of responses)	% who reported capability challenges	Functions	% who reported challenge w/function
9: Medical Materiel Management and Distribution (N=67)	39% (N=26)	Function 1: Direct and activate medical materiel management and distribution	31%
		Function 2: Acquire medical materiel from national stockpiles or other supply sources	62%
		Function 3: Distribute medical materiel	42%
		Function 4: Monitor medical materiel inventories and medical materiel distribution operations	50%
		Function 5: Recover medical materiel and demobilize distribution operations	15%
10: Medical Surge (N=67)	39% (N=26)	Function 1: Assess the nature and scope of the incident	27%
		Function 2: Support activation of medical surge	58%
		Function 3: Support jurisdictional medical surge operations	65%
		Function 4: Support demobilization of medical surge operations	15%
11: Non-pharmaceutical Interventions (N=67)	43% (N=29)	Function 1: Engage partners and identify factors that impact nonpharmaceutical interventions	41%
		Function 2: Determine nonpharmaceutical interventions	24%
		Function 3: Implement nonpharmaceutical interventions	62%
		Function 4: Monitor nonpharmaceutical interventions	48%
12: Public Health Laboratory Testing (N=65)	35% (N=23)	Function 1: Conduct laboratory testing and report results	78%
		Function 2: Enhance laboratory communications and coordination	65%
		Function 3: Support training and outreach	4%

PHEP Capability (# of responses)	% who reported capability challenges	Functions	% who reported challenge w/function
13: Public Health Surveillance and Epidemiological Investigation (N=65)	48% (N=31)	Function 1: Conduct or support public health surveillance	71%
		Function 2: Conduct public health and epidemiological investigations	90%
		Function 3: Recommend, monitor, and analyze mitigation actions	55%
		Function 4: Improve public health surveillance and epidemiological investigation systems	55%
14: Responder Safety and Health (n=64)	38% (N=24)	Function 1: Identify responder safety and health risks	12%
		Function 2: Identify and support risk-specific responder safety and health training	18%
		Function 3: Monitor responder safety and health during and after incident response	18%
15: Volunteer Management (N=65)	29% (N=19)	Function 1: Recruit, coordinate, and train volunteers	15%
		Function 2: Notify, organize, assemble, and deploy volunteers	10%
		Function 3: Conduct or support volunteer safety and health monitoring and surveillance	8%
		Function 4: Demobilize volunteers	3%

Resource Needs

Respondents were asked a series of questions about their resource needs to improve and better prepare and respond to concurrent disasters. Resources to address stress, resilience, and mental health are most needed, followed by guidance and training on concurrent disasters preparedness and response activities, and established policies and procedures for concurrent disasters. In comments, one person specified the need for a better emergency preparedness framework for pandemic or prolonged incident response. Others brought up needs around communication, such as improved interagency communication and understanding, interagency operability, and communication amongst community partners. Table 7 shows the resources of most interest.

Table 7

Resource Needs Identified by Respondents

Resources (N=83)	Responses
Stress, resilience, and mental health training and resources	71%
Guidance/training on concurrent disasters preparedness planning	64%
Guidance/training on concurrent disasters response activities	61%
Development of policies and procedures for concurrent disasters	61%
Strategies to gain support with key policy and decision makers	58%
Guidance/training on concurrent disasters recovery activities	52%
Grant opportunities	51%
Guidance/training on risk communication and messaging	46%
Preparedness evaluation for program improvement	43%
Dedicated concurrent disasters website with links to guidance, reports, and resources	42%
Guidance for After Action Reports to inform and improve plans	37%
Access to preparedness community forum to learn from others	36%
Identify key partnerships to maintain and/or develop	33%

Additionally, respondents were asked to identify the activities, equipment, and tools they need to improve emergency preparedness and response to better manage a concurrent disaster. Respondents identified the following areas for improvement:

- Communications technology
 - Support for more coordinated communication
 - Develop a long-term, standardized information sharing and resource requesting platform used at all levels of the public health and medical system
 - Improved informatics and information sharing systems
- IT, software, and technology upgrades
 - GIS software and expertise
 - Inspection software with remote connectivity
 - Update records retention schedules to allow digital form storage and digital signatures
- Staffing
 - Subject Matter Experts (SME) on staff
 - DOC staffing support
 - Permanent staff positions
 - Dedicated Health Public Information Officer (PIO) position
- Funding
 - Funding with fewer restrictions from federal guidelines to manage disasters more freely and effectively
 - Instead of short-term buckets of funding in response to a crisis, steady funding over time to ensure jurisdictions have adequate resources to respond efficiently when a crisis occurs
 - Sustained investment from state government
 - Widen scope of allowable purchases to respond

- Training Topics
 - What does a DOC look like in overlapping disasters
 - Incident management personnel
 - Just In Time training
 - Response roles and response leadership
 - Emergency management
 - More virtual training options
- Other Needs
 - Collaborative planning with shelter partners
 - Vaccine management equipment
 - Vehicles and equipment for extending the agency's reach
 - Go Kits
 - Pre-approved FEMA compliant contracts

Lessons Learned

Jurisdictions are still on the front lines of environmental public health response, recovery, and services delivery related to concurrent disasters that have affected their communities. As described in this report, jurisdictions face a wide range of environmental health and public health challenges during concurrent disasters. From these ongoing experiences, there are lessons to be learned and recommendations for future changes.

First, lobby for and prioritize new funding to support and plan for hiring new staff and providing adequate training. There needs to be an increased focus on collaboration with partners to address concurrent disasters. A better emergency preparedness framework is needed for concurrent disasters to address the extended response needed for the pandemic, improved and defined leadership roles, and a shared vision for the response. It is vital to update current workflows and add virtual and improved technology and capabilities. Rather than creating new policies specific to the disaster of the moment, public and environmental health departments should work within existing policies to incorporate appropriate functions and responses for concurrent disasters.

Respondents emphasized leveraging all opportunities to collaborate prior to an event with private or public organizations to acquire the human and material resources needed for a concurrent disaster response and improve the communication among stakeholders. One respondent shared, “[Our HD] was fortunate to have good working relationships with our local hospitals, Chief Medical Officers (CMOs), long-term care facilities, schools, city and county officials, and various industrial facilities. These relationships have assisted us in making connections and bringing services when need to the community. Fostering those relationships is key.”

Staffing was a common theme throughout responses. EH is already often understaffed and underfunded, making it is essential to have a strong EH workforce in place before concurrent disasters ever strike. In addition, jurisdictions need a plan in place to hire and train new staff, access temporary staff, hire consultants, etc.

When staffing resources are limited, it is important to monitor the existing workforce for mental health difficulties and burnout. Provide them resources and communicate expectations that include the message that “doing the best we can is okay.” Be prepared for staff to have unexpected absences. One jurisdiction addressed a variety of staff concerns and developed just-in-time trainings, provided mental health resources and debriefing sessions, and ensured staff had some days off each week.

Another lesson from the field was to make sure staff become knowledgeable of NIMS (National Incident Management System) and IC (Incident Command) policies and procedures, shared responsibilities, and cross-trained all staff. Take advantage of the emergency response functions that are activated for one disaster to support response to the other one (i.e., don’t build separate response structures for each one).

Lastly, several respondents shared specific examples and changes they have made to better prepare for concurrent disasters:

- One jurisdiction engaged in collaborative planning with shelter partners in the county to revise a Medical/Health Shelter Field Operations Guide adapted to COVID-19. They are working on issuing a Request for Proposal (RFP) for medical/health support to disaster shelters and purchased additional supplies (disaster shelter kits) to support partners that they deploy to shelters.
- A jurisdiction stated they found additional efficiencies in their response structures during concurrent events, built new relationships, and expanded relationships with key partners for additional support during multiple events.
- To support public communication, a jurisdiction implemented an online resource request platform for the public to access.
- In one state, the State Emergency Operations Center was activated, allowing for additional resources, staff, and coordination with other state agencies and hospitals. Anytime the health department had capacity issues, state partners stepped up by providing staff and/or resources.
- A jurisdiction fostered existing relationships with local hospitals, CMOs, long-term care facilities, schools, city and county officials, and various industrial facilities. These relationships assisted them in making connections and bringing services to the community during concurrent disasters.

Complexity of Concurrent Disasters

Traditionally, guidance for disaster response, including disaster plans, operation structures, response plans, training plans and similar are designed to address single incidents or multiple small incidents. Jurisdictions typically have not planned for concurrent disasters on the scale of what the United States experienced in 2020-2021 amidst the ongoing duration of the pandemic. Multiple disasters strain response and slow recovery. They add additional complexities that impact effective disaster response. The co-occurrence of disasters requires a double response, one that must be adjusted to address the critical life-safety issues of both disasters.

Managing a disaster response while addressing pandemic restrictions (social distancing, infection control, air exchange, etc.) showcased the need to both broaden and refine disaster planning. Response to a concurrent/overlapping disaster is complicated by competing priorities, including funding, equipment, and personnel – all of which are stressed when performing disaster double-duty.

The lack of plans that directly address concurrent disaster management impede a coordinated response. The realities of one disaster amplified by the additional complexity of another requires adjusted decision making, staffing resource allocation, and nimble disaster management strategies. The adaptation of plans and strategies, consideration of PHEP capabilities, and effectively mitigating amplified risks are all critical components to strengthening future concurrent disaster response.

Issues experienced when responding to disasters during a pandemic underscore the challenges of environmental exposures and the need for specialized scientific based guidance, environmental interventions, and infection control to limit the spread of disease. Further identifying specific capabilities and functions across the public health workforce, including PHEP engagement, is crucial to addressing gaps and enhancing response performance in the future. Improving concurrent disaster response requires solutions that are adept and nimble enough to address the challenges while leveraging a diversity of skill sets.

EH Engagement in Concurrent Disasters

Effective emergency response requires a multi-faceted, cross-sector, collaborative approach, of which environmental health professionals are key players. A concerted focus on collaborative planning and robust communication between environmental health, public health, private sector, and other partners to address the environmental health hazards inherent in emergency response and recovery is core to the disaster management cycle. It is essential for emergency planners to have environmental health professionals at the table to provide expert perspectives on how environmental exposures impact disease spread or influence population exposures, to identify environmental health disparities, and to provide strategic guidance on targeted and appropriate response during pandemics and natural or man-made disasters.

In addition, environmental health professionals have a critical role in responding to the hazards inherent in concurrent disasters. They hold specialized competencies for risk analysis and can provide direction on the role of non-pharmaceutical interventions as an essential component of disease prevention. This sector of the public health workforce includes specialized experts who are essential to include in departmental level emergency operations centers (DOCs), or in absence of a DOC, close engagement with the public health representative at the emergency operations center (EOC).

Recommendations

Training

The concurrent disasters in 2020-2021 uncovered the need for both adequate staffing to respond to concurrent disasters and also for an adequately trained workforce to do so. To assure targeted and appropriate preparedness, mitigation, response, and recovery to concurrent disasters, it is essential to build and maintain a skilled state and local environmental health workforce. Developing routine trainings to immerse environmental health professionals in disaster response, as well as cross training staff to broaden expertise creates a staff that is flexible and an asset to a range of roles within the disaster cycle.

As jurisdictions begin to experience disasters new to their geographic location, there is an identified need for the environmental health profession to develop expertise in wildfires and extreme heat, inclusive of re-occupancy of fire damaged communities. Comprehensive training in areas such as emergency communications and public relations, and crisis policy development and decision making are also needed.

In addition, just-in-time training on critical aspects of concurrent disaster response should be created and made easily available to the workforce. Guidance about how to maximize resources, a decision matrix for concurrent disasters staff assignments, and considerations for surge capacity and relief resources are essential needs in planning for future disaster response.

Lastly, all jurisdictions should conduct periodic response evaluations, hot washes, and after-action reports to pinpoint challenges and identify best practices. Model practices should be shared widely to enhance future responses to concurrent disasters.

Communications

Accurate communications are essential in every disaster response. Addressing concurrent disasters amplifies the critical necessity for regular, coordinated, situational guidance and communication. The changing and developing nature of emergencies underscores the priority need for effective, timely, and accurate communications, particularly to prevent misinformation.

In concurrent disasters, situational guidance can change and even contradict previous communication as more is learned and understood about the situation, hazards, and impacts. To be able to respond effectively, the workforce needs access to methodologies on how to evaluate and approach conflicting guidance when handling concurrent disaster situations that are in contrast (e.g., pandemic guidance to open windows for air circulation vs. guidance to close windows due to wildfire air quality). Considerations also need to be given to communicating with other disaster response professionals who have different job experiences and are unfamiliar with terminology or use different terms.

In addition, because protecting the public is the primary function of emergency response, the workforce needs experience and training using effective strategies to communicate with the public, especially during quarantine. Training should include approaches to overcoming inaccurate information and assuring messages appropriately address both concurrent disasters. Further, there is a need to cultivate innovative strategies for mutual aid and partnerships, including collaboration and how partners can assist with one or both disasters. Response planning needs to build stakeholder infrastructure, as well as assure inclusiveness and equity with underserved communities.

Mental Health

The impact of the pandemic and subsequent disasters on the workforce, and the requirement for adaptability at work, at home, and in communities is significant. The stressors to the environmental public health profession were unprecedented, yielding high levels of burnout and physical and emotional exhaustion. Naturally, a workforce under pressure can be ineffective if they aren't able to practice self-care or resilience strategies.

To protect the workforce, and assure ongoing capabilities in response, mental health resources must be developed and made widely available. This includes direct intervention training to learn skills to manage stress and increase resilience and support backup and relief processes for roles where stress is more likely to have greater mental and system-level impacts. In addition, creating specific resources, technical assistance, and training to help with crisis management, coping, and combating fatigue as well as identifying actionable steps to prioritize mental health are vital to supporting resilience and a mentally fit environmental health workforce.

Conclusion

As our nation is addressing the emergent and long-term challenges of disasters such as wildfires, derechos, and hurricanes, it is critical for environmental health officials to be part of the planning, response, and recovery activities at local, state, and national levels in order to bring their specialized competencies to anticipate, recognize, and respond to many issues. Environmental health professionals have the skillset to ensure that basic community necessities like clean air, potable water, and safe food, etc., are met as well as to manage other critical functions such as emergency response, vector control, sewage sanitation, ensuring safe and healthy building environments, hazardous material handling, and more.

While the EH workforce has the important responsibility of identifying, investigating, and controlling harmful environmental hazard exposures to prevent related illness and injury to responders and communities, addressing concurrent complex and multifaceted public health threats provides unique challenges that have not previously been studied or addressed. NEHA's work with state, tribal, local, and territorial (STLT) jurisdictions to identify and help mitigate critical gaps related to concurrent disasters will chart a path forward to support the development of more timely, effective, and targeted response to environmental health hazards in disasters and strengthen response capabilities for future disaster events.

Appendix A

Concurrent Disaster Needs Assessment Questions

1. Please check all the emergencies/disasters that have occurred in your jurisdiction since March 2020.
 - ☐ Aviation accident
 - ☐ Blizzard
 - ☐ Drought
 - ☐ Earthquake
 - ☐ Environmental health problem/pollution
 - ☐ Extreme cold
 - ☐ Extreme heat
 - ☐ Flooding
 - ☐ Hurricane/tropical storm
 - ☐ Industrial accident
 - ☐ Infrastructure failure (e.g. bridge or dam collapse)
 - ☐ Landslide/mudslide
 - ☐ Mass gatherings
 - ☐ Nuclear/radiological incident
 - ☐ Riot/civil unrest
 - ☐ Severe storm
 - ☐ Ship/marine accident
 - ☐ Terrorism
 - ☐ Tornado
 - ☐ Train/railroad accident
 - ☐ Tsunami
 - ☐ Volcano
 - ☐ Wildfire
 - ☐ Other
2. Did your organization experience any challenges responding to the concurrent disasters (a disaster/emergency event and the infectious respiratory disease outbreak)?
3. What routine functions or programs in your organization did you need to stop to respond to the pandemic?
4. What routine functions or programs in your organization did you need to stop due to the respiratory infectious disease outbreak and a concurrent disaster?
5. What functions did your organization/unit have to take on outside of normal function/duties due to the respiratory infectious disease outbreak?
6. What functions did your organization/unit have to take on outside of normal function/duties due to the respiratory infectious disease outbreak and a concurrent disaster?

Role Of Environmental Health

1. Did the concurrent disasters experienced in your jurisdiction involve response by Environmental Health?
 - ☐ Yes
 - ☐ No
2. If yes, what activities did your Environmental Health Unit engage in during the concurrent disasters? Check all that apply
 - ☐ Deployed as part of environmental health strike team
 - ☐ Engaged in the Emergency Operations Center Emergency response team
 - ☐ Decision or policy making efforts
 - ☐ Public relations and communication

- Enhanced inspections and enforcement
 - Participation in a taskforce
 - Administrative duties
 - Determine how to help vulnerable populations (elderly, ill, children, pregnant)
 - Contact tracing
 - Infectious respiratory disease testing
 - Vaccination
 - Crowd dispersal
 - Determine risks to the community
 - Support in resolving conflicting health guidance/balancing disaster risks
 - Ensure an adequate supply of safe drinking water
 - Provide food protection measures/Safe food supply
 - Ensure basic sanitation services
 - Wastewater disposal
 - Vector control monitoring
 - Infection Control Planning and response
 - Determine exposure to biological, chemical, and radiological hazards
 - Responder safety and health
 - Provide information to emergency managers to help assess the scale emergency
 - Building assessments
 - Sheltering in emergency response
 - I don't know how environmental health was involved
3. How have shifts in organizational priorities due to concurrent disasters affected environmental health duties/responsibilities? Check all that apply.
- Previous projects and duties have been put on hold entirely to focus on the pandemic crisis
 - Projects and duties are ongoing with pandemic related tasks added to the workload of current staff
 - Duties have been modified to adjust for necessary disaster response work
 - Additional EH staff have been added to take on the increased pandemic related workload
 - My responsibilities have less of an environmental health focus
 - Other professionals understand or appreciate the work of EH more
 - Other
4. Which of these cross-sector partner organizations has your Environmental Health Unit collaborated with during concurrent disaster response efforts? Check all that apply.
- Shelters and food banks
 - Local restaurants and retail stores
 - Law enforcement
 - Hospitals
 - Pharmacies
 - Philanthropic organizations
 - Faith-based organizations
 - Transportation authorities
 - Media
 - Hospitality establishments
 - Schools and universities
 - Local officials and state legislatures
 - Other (please specify)
5. What concurrent disaster response lessons-learned would you share with other Environmental Health professionals working in similar capacities throughout the country?

PHEP Considerations

This next section will ask you questions about the Public Health Emergency Preparedness and Response Capabilities. These are National Standards for State and Local planning and serve as a framework to structure emergency preparedness planning and response in partnership with emergency management agencies.

1. Did your organization experience any challenges within the PHEP Capability 1 (see definition below) during a concurrent disaster this last year?

Capability 1: Community Preparedness - Community preparedness is the ability of communities to prepare for, withstand, and recover from public health incidents in both the short and long term through engagement and coordination with a cross-section of state, local, tribal, and territorial partners, and stakeholders.

- Yes
- No
- Not applicable to my organization

2. If yes, please identify the Function(s) within the PHEP Capability where your organization experienced the greatest challenge(s) related to concurrent disasters. Check all the functions impacted.

Capability 1: Community Preparedness

- Function 1: Determine risks to the health of the jurisdiction
- Function 2: Strengthen community partnerships to support public health preparedness
- Function 3: Coordinate with partners and share information through community social networks
- Function 4: Coordinate training and provide guidance to support community involvement with preparedness efforts
- Please explain:

3. Did your organization experience any challenges within the PHEP Capability 2 (see definition below) during a concurrent disaster this last year?

Capability 2: Community Recovery - Community recovery is the ability of communities to identify critical assets, facilities, and other services within public health, emergency management, health care, human services, mental/behavioral health, and environmental health sectors that can guide and prioritize recovery operations. Communities should consider collaborating with jurisdictional partners and stakeholders to plan, advocate, facilitate, monitor, and implement the restoration of public health, health care, human services, mental/behavioral health, and environmental health sectors to at least a day-to-day level of functioning comparable to pre-incident levels and to improved levels, where possible.

- Yes
- No
- Not applicable to my organization

4. If yes, please identify the Function(s) within the PHEP Capability where your organization experienced the greatest challenge(s) related to concurrent disasters. Check all the functions impacted.

Capability 2: Community Recovery

- Function 1: Identify and monitor community recovery needs
- Function 2: Support recovery operations for public health and related systems for the community
- Function 3: Implement corrective actions to mitigate damage from future incidents
- Please explain:

5. Did your organization experience any challenges within the PHEP Capability 3 (see definition below) during a concurrent disaster this last year?

Capability 3: Emergency Operations Coordination - Emergency operations coordination is the ability to coordinate with emergency management and to direct and support an incident or event with public health or health care implications by establishing a standardized, scalable system of oversight, organization, and supervision that is consistent with jurisdictional standards and practices and the National Incident Management System (NIMS)

- Yes
- No
- Not applicable to my organization

6. If yes, please identify the Function(s) within the PHEP Capability where your organization experienced the greatest challenge(s) related to concurrent disasters. Check all the functions impacted.

Capability 3: Emergency Operations Coordination

- Function 1: Conduct preliminary assessment to determine the need for activation of public health emergency operations
- Function 2: Activate public health emergency operations
- Function 3: Develop and maintain an incident response strategy
- Function 4: Manage and sustain the public health response
- Function 5: Demobilize and evaluate public health emergency operations
- Please explain:

7. Did your organization experience any challenges within the PHEP Capability 4 (see definition below) during a concurrent disaster this last year?

Capability 4: Emergency Public Information and Warning - Emergency public information and warning is the ability to develop, coordinate, and disseminate information, alerts, warnings, and notifications to the public and incident management personnel.

- Yes
- No
- Not applicable to my organization

8. If yes, please identify the Function(s) within the PHEP Capability where your organization experienced the greatest challenge(s) related to concurrent disasters. Check all the functions impacted.

Capability 4: Emergency Public Information and Warning

- Function 1: Activate the emergency public information system
- Function 2: Determine the need for a Joint Information System
- Function 3: Establish and participate in information system operations
- Function 4: Establish avenues for public interaction and information exchange
- Function 5: Issue public information, alerts, warnings, and notifications
- Please explain:

9. Did your organization experience any challenges within the PHEP Capability 5 (see definition below) during a concurrent disaster this last year?

Capability 5: Fatality Management - Fatality management is the ability to coordinate with partner organizations and agencies to provide fatality management services.

- Yes
- No
- Not applicable to my organization

10. If yes, please identify the Function(s) within the PHEP Capability where your organization experienced the greatest challenge(s) related to concurrent disasters. Check all the functions impacted.

Capability 5: Fatality Management

- Function 1: Determine the public health organization role in fatality management
- Function 2: Identify and facilitate access to public health resources to support fatality management operations
- Function 3: Assist in the collection and dissemination of antemortem data
- Function 4: Support the provision of survivor mental/behavioral health services
- Function 5: Support fatality processing and storage operations
- Please explain:

11. Did your organization experience any challenges within the PHEP Capability 6 (see definition below) during a concurrent disaster this last year?

Capability 6: Information Sharing - Information sharing is the ability to conduct multijurisdictional and multidisciplinary exchange of health-related information and situational awareness data among federal, state, local, tribal, and territorial levels of government and the private sector. This capability includes the routine sharing of information as well as issuing of public health alerts to all levels of government and the private sector in preparation for and in response to events or incidents of public health significance.

- Yes
- No
- Not applicable to my organization

12. If yes, please identify the Function(s) within the PHEP Capability where your organization experienced the greatest challenge(s) related to concurrent disasters. Check all the functions impacted.

Capability 6: Information Sharing

- Function 1: Identify stakeholders that should be incorporated into information flow and define information sharing needs
- Function 2: Identify and develop guidance, standards, and systems for information exchange
- Function 3: Exchange information to determine a common operating picture
- Please explain:

13. Did your organization experience any challenges within the PHEP Capability 7 (see definition below) during a concurrent disaster this last year?

Capability 7: Mass Care - Mass care is the ability of public health agencies to coordinate with and support partner agencies to address, within a congregate location (excluding shelter-in-place locations), the public health, health care, mental/behavioral health, and human services needs of those impacted by an incident. This capability includes coordinating ongoing surveillance and public health assessments to ensure that health needs continue to be met as the incident evolves.

- Yes
- No
- Not applicable to my organization

14. If yes, please identify the Function(s) within the PHEP Capability where your organization experienced the greatest challenge(s) related to concurrent disasters. Check all the functions impacted.

Capability 7: Mass Care

- Function 1: Determine public health role in mass care operations
- Function 2: Determine mass care health needs of the impacted population
- Function 3: Coordinate public health, health care, and mental/behavioral health services
- Function 4: Monitor mass care population health
- Please explain:

15. Did your organization experience any challenges within the PHEP Capability 8 (see definition below) during a concurrent disaster this last year?

Capability 8: Medical Countermeasure Dispensing and Administration - Medical countermeasure dispensing and administration is the ability to provide medical countermeasures to targeted population(s) to prevent, mitigate, or treat the adverse health effects of a public health incident, according to public health guidelines. This capability focuses on dispensing and administering medical countermeasures, such as vaccines, antiviral drugs, antibiotics, and antitoxins.

- Yes
- No
- Not applicable to my organization

16. If yes, please identify the Function(s) within the PHEP Capability where your organization experienced the greatest challenge(s) related to concurrent disasters. Check all the functions impacted.

Capability 8: Medical Countermeasure Dispensing and Administration

- Function 1: Determine medical countermeasure dispensing/administration strategies
- Function 2: Receive medical countermeasures to be dispensed/administered
- Function 3: Activate medical countermeasure dispensing/administration operations
- Function 4: Dispense/administer medical countermeasures to targeted population(s)
- Function 5: Report adverse events
- Please explain:

17. Did your organization experience any challenges within the PHEP Capability 9 (see definition below) during a concurrent disaster this last year?

Capability 9: Medical Materiel Management and Distribution - Medical materiel management and distribution is the ability to acquire, manage, transport, and track medical materiel during a public health incident or event and the ability to recover and account for unused medical materiel, such as pharmaceuticals, vaccines, gloves, masks, ventilators, or medical equipment after an incident.

- Yes
- No
- Not applicable to my organization

18. If yes, please identify the Function(s) within the PHEP Capability where your organization experienced the greatest challenge(s) related to concurrent disasters. Check all the functions impacted.

Capability 9: Medical Materiel Management and Distribution

- Function 1: Direct and activate medical materiel management and distribution
- Function 2: Acquire medical materiel from national stockpiles or other supply sources
- Function 3: Distribute medical materiel
- Function 4: Monitor medical materiel inventories and medical materiel distribution operations
- Function 5: Recover medical materiel and demobilize distribution operations
- Please explain:

19. Did your organization experience any challenges within the PHEP Capability 10 (see definition below) during a concurrent disaster this last year?

Capability 10: Medical Surge - Medical surge is the ability to provide adequate medical evaluation and care during events that exceed the limits of the normal medical infrastructure of an affected community. It encompasses the ability of the health care system to endure a hazard impact, maintain or rapidly recover operations that were compromised, and support the delivery of medical care and associated public health services, including disease surveillance, epidemiological inquiry, laboratory diagnostic services, and environmental health assessments.

- Yes
- No
- Not applicable to my organization

20. If yes, please identify the Function(s) within the PHEP Capability where your organization experienced the greatest challenge(s) related to concurrent disasters. Check all the functions impacted.

Capability 10: Medical Surge

- Function 1: Assess the nature and scope of the incident
- Function 2: Support activation of medical surge
- Function 3: Support jurisdictional medical surge operations
- Function 4: Support demobilization of medical surge operations
- Please explain:

21. Did your organization experience any challenges within the PHEP Capability 11 (see definition below) during a concurrent disaster this last year?

Capability 11: Nonpharmaceutical Interventions - Nonpharmaceutical interventions are actions that people and communities can take to help slow the spread of illness or reduce the adverse impact of public health emergencies. This capability focuses on communities, community partners, and stakeholders recommending and implementing nonpharmaceutical interventions in response to the needs of an incident, event, or threat.

- Yes
- No
- Not applicable to my organization

22. If yes, please identify the Function(s) within the PHEP Capability where your organization experienced the greatest challenge(s) related to concurrent disasters. Check all the functions impacted.

Capability 11: Nonpharmaceutical Interventions

- Function 1: Engage partners and identify factors that impact nonpharmaceutical interventions
- Function 2: Determine nonpharmaceutical interventions
- Function 3: Implement nonpharmaceutical interventions
- Function 4: Monitor nonpharmaceutical interventions
- Please explain:

23. Did your organization experience any challenges within the PHEP Capability 12 (see definition below) during a concurrent disaster this last year?

Capability 12: Public Health Laboratory Testing - Public health laboratory testing is the ability to implement and perform methods to detect, characterize, and confirm public health threats. It also includes the ability to report timely data, provide investigative support, and use partnerships to address actual or potential exposure to threat agents in multiple matrices, including clinical specimens and food, water, and other environmental samples. This capability supports passive and active surveillance when preparing for, responding to, and recovering from biological, chemical, and radiological (if a Radiological Laboratory Response Network is established) public health threats and emergencies.

- Yes
- No
- Not applicable to my organization

24. If yes, please identify the Function(s) within the PHEP Capability where your organization experienced the greatest challenge(s) related to concurrent disasters. Check all the functions impacted.

Capability 12: Public Health Laboratory Testing

- Function 1: Conduct laboratory testing and report results
- Function 2: Enhance laboratory communications and coordination
- Function 3: Support training and outreach
- Please explain:

25. Did your organization experience any challenges within the PHEP Capability 13 (see definition below) during a concurrent disaster this last year?

Capability 13: Public Health Surveillance and Epidemiological Investigation - Public health surveillance and epidemiological investigation is the ability to create, maintain, support, and strengthen routine surveillance and detection systems and epidemiological investigation processes. It also includes the ability to expand these systems and processes in response to incidents of public health significance.

- Yes
- No
- Not applicable to my organization

26. If yes, please identify the Function(s) within the PHEP Capability where your organization experienced the greatest challenge(s) related to concurrent disasters. Check all the functions impacted.

Capability 13: Public Health Surveillance and Epidemiological Investigation

- Function 1: Conduct or support public health surveillance
- Function 2: Conduct public health and epidemiological investigations
- Function 3: Recommend, monitor, and analyze mitigation actions
- Function 4: Improve public health surveillance and epidemiological investigation systems
- Please explain:

27. Did your organization experience any challenges within the PHEP Capability 14 (see definition below) during a concurrent disaster this last year?

Capability 14: Responder Safety and Health - Responder safety and health is the ability to protect public health and other emergency responders during pre-deployment, deployment, and post-deployment.

- Yes
- No
- Not applicable to my organization

28. If yes, please identify the Function(s) within the PHEP Capability where your organization experienced the greatest challenge(s) related to concurrent disasters. Check all the functions impacted.

Capability 14: Responder Safety and Health

- Function 1: Identify responder safety and health risks
- Function 2: Identify and support risk-specific responder safety and health training
- Function 3: Monitor responder safety and health during and after incident response
- Please explain:

29. Did your organization experience any challenges within the PHEP Capability 15 (see definition below) during a concurrent disaster this last year?

Capability 15: Volunteer Management - Volunteer management is the ability to coordinate with emergency management and partner agencies to identify, recruit, register, verify, train, and engage volunteers to support the jurisdictional public health organization's preparedness, response, and recovery activities during pre-deployment, deployment, and post-deployment.

- Yes
- No
- Not applicable to my organization

30. If yes, please identify the Function(s) within the PHEP Capability where your organization experienced the greatest challenge(s) related to concurrent disasters. Check all the functions impacted.

Capability 15: Volunteer Management

- Function 1: Recruit, coordinate, and train volunteers
- Function 2: Notify, organize, assemble, and deploy volunteers
- Function 3: Conduct or support volunteer safety and health monitoring and surveillance
- Function 4: Demobilize volunteers
- Please explain:

Other Challenges and Resources Needed

1. How much of a problem have the following needs, gaps, and/or issues been due to concurrent disasters?
Not a problem, problematic, extremely problematic
 - Allocating scarce resources
 - Lack of training/Cross discipline training to provide adequate response
 - Lack of guidance for concurrent disasters
 - Budget, supplies, and other resource shortages
 - Staffing shortages
 - Staff turnover
 - Staff redirected to other duties
 - Changing guidance and information
 - Conflicting health and safety guidance between the disaster and infectious respiratory disease outbreak
 - Lack of communication with other organizations
 - Lack of awareness and understanding of organization roles (e.g., Public Health vs Environmental Health) in disaster preparedness, response, and recovery
 - Limited cross-sector collaboration
 - Outdated technology
 - Limited virtual capabilities
 - Shifting priorities of your organization
 - Previous projects and duties have been put on hold
 - Tasks added to the workload of current staff
 - Feelings of stress, overwork, and/or burnout
 - Lack of funding/funding shortages
 - Mental health of workforce
 - Willingness to respond (staff fearful to respond)
 - Other, please specify

2. What would help your organization to make these improvements to prepare and respond to concurrent disasters?
 - Guidance/training on concurrent disasters preparedness planning
 - Guidance/training on concurrent disasters response activities
 - Guidance/training on concurrent disasters recovery activities
 - Access to preparedness community forum to learn from others
 - Dedicated concurrent disasters website with links to guidance, reports, and resources
 - Stress, resilience, and mental health training and resources
 - Guidance/training on risk communication and messaging
 - Strategies to gain support with key policy and decision makers
 - Development of policies and procedures for concurrent disasters
 - Guidance for After Action Reports to inform and improve plans
 - Preparedness evaluation for program improvement
 - Identify key partnerships to maintain and/or develop
 - Grant opportunities
 - Equipment/tools
 - Other, please specify _____
 - Please explain your answers(s). Be specific and describe the topics/information you would like training, resources, tools and/or guidance to cover.
3. What has your organization done to try and address or resolve the needs, gaps, and/or issues caused by concurrent disasters?
4. What actions, equipment, and/or tools are needed to improve emergency preparedness and response to better manage a concurrent disaster?



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