CSTE 12th Annual CSTE Disaster Epidemiology Workshop
Summary of Sessions and Evaluation Results

Overview

The CSTE Disaster Epidemiology Workshop took place May 17-19, 2021 via Zoom (Virtual Meeting). A total of 383 participants registered for the workshop, and most sessions had approximately 100-150 participants in attendance. Peak attendance on Day 1 was 206 people, while peak attendance on Days 2 and 3 were 137 and 121 people, respectively.

Goals of the workshop were to: (1) Provide relevant, timely learning opportunities for epidemiologists, public health emergency preparedness coordinated, emergency managers, and academia in the field of disaster epidemiology; (2) learn from agencies about adapting fieldwork, sheltering plans, and disaster response efforts during the pandemic; (3) hear examples of identifying, tracking, and mitigating mental health impacts of disasters, including the effect of burnout on the public health workforce; and (4) better understand the role of health equity in vulnerable populations planning and response, including incorporating those with access and functional needs.

This document serves as a summary of workshop sessions and participant evaluation results.

Summary of Workshop Sessions

Day 1: May 17, 2021

Welcome and Opening Remarks

Day 1 began with a welcome from Tess Konen, Co-Chair of the CSTE Disaster Epidemiology Sub-Committee. During the welcoming remarks, Tess spoke about the workshop's theme, "Change. Adapt. Survive" and provided an overview of session content to participants. Tess encouraged participants to join CSTE and the CSTE Disaster Epidemiology Sub-Committee in particular.

Next Melissa Jordan from the CSTE Executive Board and state of Florida provided opening remarks for workshop participants. Melissa has been on the CSTE Executive Board for the past 3 years representing Environmental Health, Occupational Health, and Injury. Disaster and Climate Sub-Committees fall under her portfolio at CSTE. Melissa has worked with the Florida Department of Public Health for 18 years engaging in fieldwork around many areas of health and disaster epidemiology as well. Melissa reflected on the past year during COVID-19 and spoke to exciting work, including many projects that will highlighted in this workshop, which were implemented using a forward-thinking yet responsive approach. This year has highlighted the cross-cutting work in disaster epidemiologists and how we can look to experts in disaster epidemiology to inform all areas of public health response and surveillance during the pandemic. Melissa asked participants to think about what tools we need to address our changing public health landscape, whether that be data dashboards, GIS, or other areas of training.

Melissa spoke to the group about how the CSTE Steering Committee has adapted during the past year while looking forward to the future of public health. She noted the high participation rates at the start of the workshop and expressed excitement for the sessions ahead.

Amy Helene Schnall from the Centers for Disease Control and Prevention (CDC) provided additional opening remarks. Amy is lead of Disaster Epidemiology Training, and Community Assessment for Public Health Emergency Response (CASPER), and the National Chemical and Radiological Surveillance programs. Amy discussed the importance of disaster epidemiology: All areas are at risk for disaster, and disasters can happen at the same time as pandemics and chemical/nuclear emergencies. This means disasters overlay with many other competing public health issues that may require response. Disaster epidemiologists are required to think about the direct and indirect effects of disasters. For example, the pandemic had the direct effect of causing people to miss medical appointments. This this led to people missing several medical appointments, then not having medications, and indirectly in the long run, may have led to potentially larger impacts on public health. Disaster epidemiologists need to think about how to track, measure, and share information about these direct and indirect effects of the pandemic and other emergencies.

Amy shared that preparedness for disaster epidemiology includes training and drills/exercises. Responding includes syndromic surveillance, shelter surveillance, fatality surveillance, rapid needs assessment, CASPERs, all of which will be showcased during the workshop.

Finally Amy thanked the group for all the quick modifications made during the pandemic including modified safety protocols for door-to-door data collection (or a lack of on-the-ground data collection at all) and the development and provision of sheltering guidance to ensure surveillance within minimized risk to community members. Amy spoke about the importance of communication in making these modifications and encouraged the group to continue to look for innovative ways to communicate epidemiological findings to the public throughout the remainder of the pandemic.

Session 1.1: Fieldwork/CASPERs

This session included 4 presentations. Presenters first explained their fieldwork and implementation projects, and then the panel participated in a question and answer (Q&A) discussion with meeting participants. Each presentation is described briefly in the following text, as is the information from the panel Q&A.

Washington CASPER. Nancy Ortiz and Adela Hoffman from the CDC spoke about two concurrent CASPERs conducted in Washington State in a presentation titled “Mitigation Practices in a Rural Agricultural Community: Comparison of Hispanic and Non-Hispanic Populations.” Nancy is an Epidemic Intelligence Service Officer, and Adela is an Emergency Public Heath Epidemiologists. In the presentation, and they spoke about the CDC being invited to support the COVID-19 outbreak which was disproportionately affecting Hispanic/Latino (H/L) communities in Washington State (Chelan/Douglas County). Nancy and Adela reported that this area is populated by approximately 30% H/L persons, yet H/L persons had 8 times higher COVID-19 rates than non-H/L persons. A bilingual/bi-cultural team arrived in Wenatchee Washington September 2020 to assess differences in H/L and non-H/L households in the prevalence of

employment services/ability to telework; adoption of prevention/mitigation strategies; and behaviors that increase COVID-19 risk. In order to meet these objectives, the CDC conducted 2 population-based rapid needs assessment of the H/L and non-H/L communities. CASPER methodologies were selected due to the utility of the tool during disaster response. The H/L CASPER sampling frames included Census blocks with >50% with at least one H/L household, and non-H/L sampling frame included Census blocks with <50% of households with at least 1 H/L house member. A Just-in-Time training was conducted the morning of data collection for the CASPER data collection team, and team were trained on the methodology and materials and safety and logistics. Data were collected in English and Spanish over 4 days (September 25-28, 2020). Major findings included that H/L households had lower income and owned homes at lower frequencies; had slightly larger household sizes; and higher percentages of essential workers than non-H/L households. Most H/L employment did not accommodate teleworking during the pandemic because jobs were agriculture-focused. People in H/L households avoided gatherings and other preventative measures at higher percentages but knew more people with COVID-19 (or had COVID-19 in the household) at higher frequencies than those in non-H/L households. Nancy and Adela shared that this CASPER suggested the importance of prevention planning, messaging, and implementation among essential-worker industries in particular.

Arizona CASPER. Dr. Megan Jehn from Arizona State University addressed the group about a CASPER conducted in Maricopa County, Arizona. The purpose of the CASPER was to estimate the prevalence of SARS-CoV-2 (coronavirus) antibodies. Dr. Jehn provided background on the CASPER including its methodology using systematic sampling of blood samples collected in the field between September 1-12, 2020. This projects utilized a large volunteer group of 225 people to staff the CASPER, as well as a Field Team (Interviewer, Nurse/Phlebotomist, Runner, Mobile Lab Tech, Clinical Preceptor/Faculty) and a Command Center (Project Lead, Zone Lead, Sample Manager, Data Manager, Translator). Residents over 6 years old within 30 randomly selected Census blocks (excluding Tribal lands) were invited to participate. A total of 169 households were reached in 29 neighborhoods, and 260 samples were collected for antibody testing. Findings indicated the estimates of 14.0% of the Maricopa population having detectible antibiotics was 4.5 times higher than reported cases in the region, meaning that more people were potentially immune than previously thought. Even if you adjust for sensitivity and specificity, about 15% crude estimate of seropositivity was found. This CASPER amplified the importance of this type of labor intensive-yet-extremely-valuable form of assessment.

Minnesota CASPER. Stephanie Yendell and Madison Kircher from the State of Minnesota spoke about a modified CASPER conducted in Minnesota. It was a seropositive study to detect the spread of COVID-19 because, at the time of the CASPER, testing was limited in the state. The CASPER had additional goals to identify seropositivity variances by region and group and improve public health messaging. A total of 6 CASPERs were conducted in Minnesota (30 Census tracts total x 7 households per cluster x 6 regions, n=1250 households) were the focus of the CASPER. There were also individual level questions and specimens, which is why this was a modified assessment from a standard CASPER. A nurse contractor and an interviewer went to each household. Interviewers were often PHAP, LPH, or MDH. The group also had a communications sub-team to develop awareness of the CASPER and appropriate messaging. This CASPER was in September 2020, right before the national election which contributed to the ending of the assessment due to hostility in the field toward public health staff and CASPER field teams. However, lessons were still learned by the CASPER team and presented. These include: Select and double check your

census tracks; a Tribal community was selected as a tract, even though the tribe was told no CASPER data collection would occur there-- it caused some political discord with Tribal partners. Contract nurses presented unique challenges because not all nurses were clear about what the project involved (time commitment, driving long distances, etc.) because they only communicated with a staffing agency prior to hiring (not the public health team). It was also more difficult for contractors to be flexible. There were also logistical challenges with gathering blood and nasal swabs and transporting back to the lab nightly. Stephanie and Madison highlighted the importance of CASPERs but also considered whether self-collection or a centralized site-study would've been more beneficial to complete this work given the issues of racism, staffing, and storing of samples that arose along the way.

Hurricanes. Ray Lopez, technical monitor for the CDC National Center for Environmental Health, spoke about his experiences with Hurricane Laura and his deployment with CAPT Troy Ritter, his team lead. This was Ray's first time deploying for a natural disaster, as he was deployed other times but not for non-disasters. Ray narrated his experience in this role, including in supporting data collection, assessment, and provision to the State of Louisiana for public health response and resources.

On Ray's first day being deployed, he went to Joint Field Office in Baton Rouge, Louisiana, to meet Branch Director for FEMA and key members of U.S. Army Corps of engineers. He and CAPT Troy Ritter secured a position on a task force for water assessments. Within first week, Ray and Troy worked with federal, state, and local partners to perform damage system assessments and performed 8 community water system and 4 waste water disposals system assessment in hopes of restoring vital water and sanitation systems for those affected by the hurricane. These were long days with 5 hours of commute plus 12 hours of work, totaling 16-17 hours all together. Private wells became a large focus of water quality assessments, and the group identified over 2,000 active domestic wells and overplayed these sites with the hurricane flooding dataset to identify wells most likely impacted by poor water quality and sanitation issues. The task force provided that data to the Louisiana Department of Public Health so they could dedicate resources in most affected areas. Ray and the task force then performed technical review and analysis of data collected from approximately 7,000 initial public water assessments and identified 48 public systems providing water to high risk populations (schools, dialysis centers, nursing homes), which the state could use to dedicate additional resources if desired. Ray also spoke about providing technical support to the EPA around testing procedures.

Overall, Ray described the deployment as one which led to him meeting adventurous and kind and similar-minded people. His tips for anyone being deployed to a similar disaster were: (1) Be ready for anything. Hotels may be full due to all the people from many places deploying to this one place, and rental cars may not be available. Flights could be delayed due to weather of the disaster to which you are traveling. (2) The most successful deployers have grit- they are the people who take whatever they come across, not necessarily someone with all the technical knowledge. (3) Go in with an open mind. Figure out what niche you can fit into to share your expertise with the team. (4) Meet the right people and gain trust. It was possible to gain access to data and important decision-making tools using this approach.

Q&A with Panelists. To close out the session, participants asked several questions to panelist(s), including those presented in the text below.

Question: *What was one of the challenges in conducting 2 CASPERS at one time in Washington State?*

One of the challenges was the logistics. There were twice as many teams and double the forms, plus English and Spanish versions of all instruments. There was a desire to turn around findings as soon as possible to local partners; however, the large number of paper-based forms delayed data entry and analysis. There was also extensive planning around having Spanish and English speakers available to both CASPER teams and preparation for last-minute changes to interview teams if Spanish-speaking CASPER field team staff were needed. The presenters reported that communication with field teams by individuals stationed at "home base" helped to mitigate these challenges.

Question: *How did you set up your Incident Command for the Arizona CASPER so that your staff were embedded in process?*

The co-lead for the project was a Medical Epidemiologist from the Maricopa County health department. "While there are pros and cons of having co-leads of big projects, it was necessary so ASU's team could be as embedded in the ICS as possible." The Medical Epidemiologist co-lead was also present in the workshop and responded in the chat, "we leveraged the different sections of the public health ICS structure to recruit support from our operations and logistics teams. We also utilized personnel from several of our ICS sections to support in the field and at our base site in other roles."

Question: *How long did it take to recruit 200+ volunteers for the Arizona CASPER?*

We began volunteer recruitment about 2 weeks prior to field deployment. We also kept volunteer sign-ups open throughout our time in the field since many of our volunteers expressed interest in returning.

Question: *Can you speak to your choice not to include tribal jurisdictions in this particular CASPER? Might you include tribal lands in future assessments?*

Answer from Dr. Megan Jehn (Arizona CASPER): If tribal populations were included and best practices were followed, Tribal Council approval from all Tribes and training in cultural sensitivity would've been required for each team member. Best practice would also say members of the Tribe should be recruited and included in CASPER field teams. There were conversations with Tribal liaisons and whether it would be feasible to include the Tribe(s), but in this particular window of time, it was not feasible. Having those conversations with the Tribes in the region reaffirmed the importance of cross-jurisdictional (tribal and non-tribal) CASPER assessments. It is hoped that strengthened relationships from the Maricopa County CASPER will enable a different path moving forward, one in which Tribes will be included in the assessment.

Answer from Nancy Ortiz and Adela Hoffman (Washington CASPER): We need to have specific permission to work in tribal communities. Some of our tribes also have their own IRB that needs time to review any proposal. In our case, some tribes expressed general interest in a serosurvey but weren't ready to sign on at the time we were going to the field.

Follow-up Question: *Thank you for addressing this. Do you think this might pave the way for some of the cultural training/preparation in anticipation of a major crisis?*
Answer from Dr. Megan Jehn (Arizona CASPER): Yes, these relationships need to be developed and sustained long before a pandemic. In Arizona there is a field epidemiology team that has been deployed to one of our Tribal communities for the last nine months. It has been critically important for the team to have a continued presence in the community, to have all of our members undergo cultural sensitivity training and to have community members embedded in our team. It is hoped that successful partnerships such as these can be sustained so that project teams, including those for public health response and CASPERs, are in a better position moving forward.

Question: *For the Minnesota CASPER, did you consider field bases for your CASPERs so that teams didn't have to drive so far?*

Yes, there were a total of 7 regional bases to decrease driving time for teams. More bases could have reduced drive times further, but that was the limit that could be staffed with available employees. Most of the agency had already been reassigned to COVID roles and the staffing agency (for nurses) did not have additional people to support the project through contract work.

Question: *Staffing a CASPER is very complex. Presenters used community members, students, agency staff, CDC staff. How do you decide who to use to staff your CASPER?*

Answer from Stephanie Yendell and Madison Kircher (Minnesota CASPER): At first, internal CASPER teams were developed. However, the work became too expansive, and the group was short 15-17 individuals and there were no nurses that could do blood draws. At that point in the pandemic, through the incident command executive orders, the agency set up internal staffing unit for any COVID-19 staffing request. This internal staffing unit and its requests overrode all contracts and assignments. Approximately two-thirds of the agency was y re-assigned and could not support the CASPER due to these re-assignments. Therefore, internal resources were exhausted, and other state resources were exhausted for similar reasons. The CASPER team reached out to the community via public health entities and found a few volunteers, yet these individuals were overwhelmed which is why volunteer-only staffing was not feasible. The CDC sent PHAP staff to support interview teams, which was a large help, yet the CASPER teams were still shorthanded in terms of individuals that could draw blood. Medical Reserve Corp students were not an option as they required supervision that the CASPER team could not provide. Therefore, contract-based nurses were finally sought and hired for the CASPER assessments.

Answer from Dr. Jehn (Arizona CASPER): In Arizona, we drew heavily on our university for volunteers. Students in many of our clinical programs (nursing and social work) were offered practicum credit.

Question: *How were stakeholders informed of findings from CASPER and other fieldwork?*

Answer from Nancy Ortiz and Adela Hoffman (Washington CASPER): Preliminary findings were shared with the Chelan-Douglas Health District and IMT as part of the out-brief presentation at the completion of the deployment. Later in the month there was a dedicated virtual presentation on CASPER findings and recommendations to the health district, IMT, community stakeholders, surveyor teams, and the general

community. The CDC also created a 2-page Fact Sheet that summarized the key findings to be disseminated within the Chelan-Douglas community.

Answer from Dr. Megan Jehn (Arizona CASPER): Findings were shared in many ways. There was project debrief meeting with all partners and results of the analysis were shared. The County Health Director held a press conference to publicly release the findings and several interviews with local TV stations were completed. Community members could receive project results via email if they were interested. Each participating organization (ASU, Mayo Clinic, Maricopa County) shared the results through the partners' distribution channel(s) (social media, newsletters, etc.) using mutually agreed upon talking points. There was a page on the County's website with highlights from the project. Finally, the CASPER team worked with a consulting firm to interview different stakeholders and to draft an after-action report of lessons learned to share with colleagues.

Answer from Stephanie Yendell and Madison Kircher (Minnesota CASPER): There were press releases when the CASPER study ended. Internally, ICS leadership were briefed on the project. There are a number of additional ideas for sharing lessons learned from the project with external partners, but these are still in progress.

Answer from Ray Lopez (Hurricanes): SITREP bullets of daily activities were provided to leadership which in turn was incorporated into Assistant Secretary for Preparedness and Response's daily SITREP report that was shared with stakeholders possibly ranging from the White House to Louisiana state and county officials.

Session 1.2: IRB Considerations for Disaster Epidemiology

This session included 4 presentations from individuals representing federal, state, and academic perspectives about Institutional Review Boards (IRBs).

National Institute of Environmental Health Sciences. Dr. Joan Packenham presented about the ethics of disaster research on behalf of the National Institute of Environmental Health Sciences (NIEHS), National Institutes of Health. A summary of presentation content is provided below.

Human Subjects Research: Human subjects research involves obtaining data through intervention (e.g., drawing blood) or interaction (e.g., communication, interpersonal contact). Or human subjects research is identifiable data/specimens, wherein one or more data elements can be combined with other information (e.g., Social Security Number) to identify an individual. It is important to note that coded data or specimens are considered identifiable if the investigator or any member of the research team has access to the code book.

Importance of Disaster Research: NIEHS has played major role in IRB reviews, response, and research efforts in many of the recent disasters including 9-11, the Ebola crisis, Flint Michigan water crisis, World Trade Center disasters, California wildfires, Hurricane Sandy, COVID pandemic, and many more. As the list of recent emergencies grows, it challenges national resiliencies, so governments are increasing funding

and prioritizing projects focusing on disaster epidemiology. This includes the need for high quality and timely disaster research: Timely disaster research is critical to determine impacts of emergencies on human health and to prepare for future disasters. It also helps us discover risk factors for recovery and resiliency, especially among vulnerable populations. Despite its value, there have been missed opportunities in performing time-critical disaster research. Dr. Packenham believes this is because emergencies can be defined by chaos, while research is defined by imposed order and methodology, which is why there can be some disconnect between the two.

Now that disaster research has increased, Institutional Review Boards (IRBs) are responsible for ethical protections from research-related harms of impacted populations. However, there are many challenges in this work. Some of them include: (1) a lack of best practices and guidance for IRBs in the review of disaster related protocols; (2) the realization that research conducted in the aftermath if disasters is not "business as usual" – there may be special considerations required; (3) there could be interference of research in disaster response and the provision of aid. (4) there are concerns regarding participant vulnerability after a disaster and a lack of understanding about participant burden and fatigue; and (5) there is a lack of defined safety and training of researchers for disaster-related studies.

NIEHS Work Group and Tools: With these challenges in mind, NIEHS developed a national working group in 2014. Its purpose was to discuss human research protections issues in the context of disaster research. It included 70 members from 23 states across multiple disciplines. One outcome of the group was the establishment of 15 recommendations with 5 overarching themes for the review of disaster research protocols. These theme, which are further outlined in the full publication are:

- IRB preparedness
- Participant vulnerability
- Contextual understanding of pre- and post- disaster local community and environment
- IRB responsibilities and review processes in relation to disaster research
- Timely dissemination of research

Resource: The NIEHS workgroup guidance related to disaster research is available via the Environmental Health Perspectives website: https://ehp.niehs.nih.gov/doi/10.1289/EHP2378

Based on the workgroup recommendation, the NIEHS Disaster Research Response Program and National IRB Preparedness Program were also established. Programmatic goals include engaging with IRBs, investigators, communities, federal agencies, disaster managers and survivors by providing prep tools, resources, and trainings to protect human subjects. Some of the tools highlighted in Dr. Packenham's presentation include the Disaster Research Critical IRB Review Factors Model, which is a practical approach to review criteria relevant to human subject protections and research; the Post Disaster Research Review Template for investigators to add contextual information concerning a disaster; and the NIEHS Disaster Research Review Checklist for IRBs to consider as they review disaster research protocols.

Investigators, IRBs, public health staff, and more can contact NIEHS to gain access to these tools, trainings, resources, and support.

Colorado Department of Public Health and Environment Institutional Review Board. Joni Koenig is the Administrator for the State of Colorado Department of Public Health and Environment (CDPHE) IRB. The CDPHE IRB primarily reviews and has oversight of public health research and routinely determines whether projects are "human subjects research" or "public health surveillance" activities as defined by

the Revised Common Rule. This largely hinges on if the information will be for generalizable knowledge. As a public health IRB, the IRB will often reference that a project is not public health research because of one of the 4 exceptions to research. If a project is determined to be human subjects research, then the public health IRB looks at its involvement in the project. If the CDPHE is only providing data and that is the only involvement, then the entity is determined as "not engaged" in the project, and anything beyond data provision-only means CDPHE is engaged in the work. Existing policies and procedures and resources with the Office for Human Research Protections (OHRP) help guide this involvement.

Resource: Revised Common Rule definition and public health surveillance activities are found under 45 CFR 46.102 (l) at https://www.hhs.gov/ohrp/regulations-and-policy/regulations/45-cfr-46/revised-common-rule-regulatory-text/index.html#46.102

Note: Full Common rule definitions and descriptions are provided at the end of this section of the meeting summary.

Resource: OHRP Activities Deemed Not to Be Research: Public Health Surveillance 2018 Requirements, which states that "[p]ublic heath surveillance uses information and biospecimens from a variety of sources, including mandatory reporting of certain conditions, routine monitoring, vital records, medical records, medical billing records, clinical specimens, and public health investigations. Further, it often uses the same analytical and laboratory techniques as epidemiological research." The principal difference between surveillance and research is one of purpose; for surveillance, it is "to inform the decisions or actions that must be made by a public health authority." There are limits to the kinds of surveillance activities that will be deemed not to be "human subjects research": the activities must be those necessary to allow a public health authority to identify, monitor, assess, or investigate potential public health signals, onset of disease outbreaks, or conditions of public health importance." https://www.hhs.gov/ohrp/regulations-and-policy/requests-for-comments/draft-guidance-activities-deemed-not-be-research-public-health-surveillance/index.html#:~:text=In%20general%2C%20public%20health%20surveillance,protect%20and%20promote%20public%20health

Resource: Secretary's Advisory Committee on Human Research Protections (SACHRP) Interpretation of Public Health Authority and Public Health Surveillance Activities, which also provides context to this topic: https://www.hhs.gov/ohrp/sachrp-committee/recommendations/attachment-public-health-authority-and-surveillance-activities/index.html

Public health IRBs range in how they define public health practice. On one side, it may need to be listed in state statutes as a public health activity to be considered "practice". Other IRBs classify anything associated with public health to be practice. Once the revised common rule came into practice in 2019, the CDPHE IRB started meeting more often to become consistent about when a project is public health

surveillance or public health practice. The group is about 2 years in and many more projects are getting the same determination (of non-research or research). The CDPHE IRB has found it is doing both activities excusive of one another. Therefore, the CDPHE IRB falls somewhere in the middle of the range of defining public health practice and would say it is great to have a statute that can be referenced, but there is also flexibility in how projects are determined.

Most recently the CDPHE IRB came up with a Memo document to make a self-determination about what a project is. Investigators are able to use the Memo to make their own determination, but the Administrator works with investigator to make sure they understand the ramification of making their own determination. This helps the creator of the memo (the program) to argue the case for when a project is not human subjects research, specifically usually "not research." This Memo utilizes a similar approach to the tool provided by Joan Pettit in the presentation from Johns Hopkins University (below).

Avoiding IRB Review/Approval if Conducting Public Health Surveillance: It is important to understand the revised Common rule and understand the word research. If actual human subjects research is involved, an IRB application/process **must** occur. Then, if an investigator is not conducting research, they should not utilize words like research, investigation, study, enrolling participants, study of participants, etc. When you avoid "research-y" language, it will make it less confusing to an IRB reviewer and also ensure investigators are prepared to utilize language like public health surveillance in presentations and papers if, indeed, that is what the project entails.

Triggers for IRB Review: If another IRB has determined a project to be human subjects research, it likely will need to be reviewed by a public health IRB too. It may not be determined research by the public health IRB, but it helps everyone pause and consider large scale determinations of why something is or is not research. If projects involve a vulnerable population, it often goes to an IRB, in a full review or "look over" by those with expertise in these areas. There are persons on the CDPHE IRB that represent vulnerable populations in their expertise(s). These individuals review memos for anything involving a vulnerable population, just to ensure the project(s) are not research. Finally a funding requirement may say an IRB must review a project, and those projects will go to the IRB because of that requirement.

Office of Scientific Integrity in the Office of Science at the Centers for Disease Control and Prevention. Micah Bass is the Deputy Director of the Office of Scientific integrity in the Office of Science at the CDC. As an important function of the CDC is to be action oriented, respond to emerging threats, and to put science and technology into action to prevent disease and improve health and safety. The CDC is also tasked with training a public health workforce to help investigate and diagnosis the ills of the public/population. This means the vast majority of what CDC does is public health practice and what would be considered surveillance not research. However, there is human research and research that falls into the CDC's portfolio, and there is an IRB made up of 16 Centers, Institutes, and Offices with designated individuals to help review protocols and use federal regulations and corresponding guidance to decide when various regulations apply to projects. The primary resources used by the CDC are those presented by Dr. Packenham's (above, Common Rule and exemptions to Rule published in 2018) to help determine what is public health surveillance versus research.

Other resources include:

Resource: The Belmont Report, which elaborates on practice related to who benefits from specific work and clarifies that intervention provided to one individual may provide broader benefits to others: https://www.hhs.gov/ohrp/regulations-and-policy/belmont-report/index.html

Resource: CDC's Operational Policy 557 which reflects CDC's historical approach to determining when the Common Rule (45 CFR 46) applies. This guidance is subject to revision to reframe the guidance and expressly incorporate the public health surveillance exclusion: https://www.cdc.gov/os/integrity/docs/cdc-policy-distinguishing-public-health-research-nonresearch.pdf

Resource: CSTE, Hodge & Gostin Public Health Practice vs. Research: A Report for Public Health Practitioners Including Cases and Guidance for Making Distinctions: http://www.cste2.org/webpdfs/cstephresrpthodgefinal.5.24.04.pdf

Resource: World Health Organization (WHO) guidelines on ethical issues in public health surveillance: The WHO generally defines surveillance as "the continuous, systematic collection, analysis and interpretation of health-related data needed for the planning, implementation, and evaluation of public health practice." Examples of such data include information about:

- The spread and control of communicable diseases
- Injuries and conditions
- Population vital statistics
- Tracking of health risk factors and outcomes
- Monitoring of environmental hazards and conditions that threaten access to safe workplaces and housing, and clean air, water, and uncontaminated food sources.
- To be considered a public health surveillance activity, these data must be collected, shared and used for health-related policy making, advocacy, and to prepare system responses to new threats.

http://apps.who.int/iris/bitstream/handle/10665/255721/9789241512657-eng.pdf;jsessionid=BB26350E0CCD7C7A9A1629B3CF9062F0?sequence=1

Resource: Council for International Organizations of Medical Science guidance that activities routinely carried out by public health agencies should be considered practice, even though it may produce data that could contribute to generalizable public health knowledge: https://cioms.ch/wp-content/uploads/2017/01/WEB-CIOMS-EthicalGuidelines.pdf

Resource: Unpublished OHRP draft (contact Micah for more information), which offers definition of public health practice. Does understand/accept that it is a wide range of activities, including surveillance, evaluation, and emergency response.

Johns Hopkins University. Joan Pettit is the Executive Director of the Johns Hopkins University (JHU) Bloomberg School of Public Health IRB Office and spoke about public health research through the lens of an academic institution. At JHU there are two IRBs, one that is a minimal risk IRB and one that is a convened IRB. The JHU IRB also has reliance agreements with other IRBs, such as the CDC IRB to facilitate collaboration across agencies and avoid duplication of IRB reviews. The focus of the JHU IRBs involve ensuring investigators know how to utilize the IRB to determine if studies are public health surveillance or research. Thus, the IRBs will make the determination of whether an activity constitutes a public health surveillance activity because, as the OHRP guidance acknowledges, "the line between public health surveillance activities and research activities can be difficult to draw." The IRBs will ask investigators for information to determine whether the activity qualifies as a public health surveillance activity. This may include:

- Whether the activity is necessary to allow a public health authority to identify, monitor, assess, or investigate potential public health signals, onset of disease outbreaks, or conditions of public health importance. (Note: It is unlikely that an activity meeting the definition of "clinical trial" would fall into this category.)
- Whether there a direct link between the surveillance activity and the decision-making and action by a public health authority.
- Whether the activity will be conducted by a public health authority [e.g. the public health authority will participate directly in the collection, testing, analysis or use of the information/biospecimens].
- Whether the activity will be supported by a public health authority [e.g. through a grant or contract].
- Confirmation that the relevant public health authority is responsible for public health matters as part of its official mandate.

If the JHU IRB makes a "public health surveillance/not research" determination, it may also advise the investigator to adhere to relevant ethical guidelines for the conduct of the surveillance activity (such as the WHO Guidelines).

Resource: Public health surveillance tool for investigators to upload with research application: https://www.jhsph.edu/offices-and-services/institutional-review-board/_pdfs-and-docs/Public%20Health%20Surveillance%20Determination_2Dec2019.doc

Q&A with Panelists. To close out the session, participants asked several questions to panelist(s), including those presented in the text below.

Question: *In 2020, the National Academies of Sciences, Engineering, and Medicine released a report, "Evidence-Based Practice for Public Health Emergency Preparedness and Response", and a part of that report was recommending the creation of a national public health emergency preparedness and response research framework - so that research can occur in real-time as a part of disaster response and recovery activities. How might this report fit into the NIEHS report and curricula?* https://www.nationalacademies.org/our-work/evidence-based-practices-for-public-health-emergency-

preparedness-and-response-assessment-of-and-recommendations-for-the-field?mc_cid=591a77298c&mc_eid=7331362e8f

The NIEHS recommendations works side-by-side with the guidance in this report. NIEHS is the federal partner for this report.

Question: *If a local public health department is partnering with an academic institution on what is clearly "public health practice", how would they go about navigating an academic IRB which might not be as familiar with "practice"?*

Get involved with Human Subjects Protection program ahead of time. It's not just about the actual IRB. Human Subjects Protection program can help lead in the right direction and assist in formulating requirements when IRB time comes. Don't let IRB to be the last thought.

Question: *Rapid needs assessments must be conducted quickly during response phase of a disaster. They often involve face-to-face interaction with the affected community members; sometimes, there may PII collected. Challenge - there is no time for IRB. How do public health agencies prepare for such a situation? Is there a rapid approval? Or is there a process for future activities pre-approval?*

Needs assessments, if conducted with standard tools that have previously been validated, may not constitute "research" because there is no research question. It is critical to consider the purpose or intent of the needs assessment in determining whether it is human research or not. Where PII are collected, that will not make it research in and of itself but it will warrant data protections and may be subject to other federal or state privacy protections. Navigating protections and requirements of the federal and state regulations is really important. Some institutions have rapid pre-approval IRB. They keep protocols open ahead of time; then projects can submit an amendment with the specifics. Strategize before the project starts what can be approved ahead of time and amend when get specifics. The CDC has "just in case protocols" and ability to do rapid review within 48 hours when needed.

Comprehensive List of Resources from Session about IRB Considerations

Resource: Revised Common Rule definition and public health surveillance activities are found under 45 CFR 46.102 (l) at https://www.hhs.gov/ohrp/regulations-and-policy/regulations/45-cfr-46/revised-common-rule-regulatory-text/index.html#46.102

Resource: OHRP Activities Deemed Not to Be Research: Public Health Surveillance 2018 Requirements, https://www.hhs.gov/ohrp/regulations-and-policy/requests-for-comments/draft-guidance-activities-deemed-not-be-research-public-health-surveillance/index.html#:~:text=In%20general%2C%20public%20health%20surveillance,protect%20and%20promote%20public%20health

Definitions from the 2018 OHRP Guidance

Public Health Authority: An agency or authority of the United States, a state, a territory, a political subdivision of a state or territory, an Indian tribe, a foreign government, or a person or entity acting under a grant authority from or contract with such public agency, including the employees or agents of such public agency or its contractors or persons or entities to whom it has granted authority, that is responsible for public health matters as part of its official mandate. Please Note: The definition of a "public health authority" requires that an agency's official mandate include the responsibility for public health matters. The mandate can be responsibility for public health matters, generally, or it can be for specific public health programs. Furthermore, an agency's official mandate does not have to be exclusively or primarily for public health. Therefore, to the extent a government agency is responsible for public health matters as part of its official mandate, OHRP considers that, for purposes of this guidance, it qualifies as a public health authority.

Public Health Surveillance Activity: There is no formal regulatory definition for public health surveillance activities. In general, public health surveillance involves collecting, testing, analyzing, and using information or biospecimens to improve public health and prevent disease. It provides timely and useful evidence, and it enables public health authorities to be more effective in their efforts to protect and promote public health. Thus, public health surveillance is an important element of public health practice. Public health surveillance uses information and biospecimens from a variety of sources, including mandatory reporting of certain conditions, routine monitoring, vital records, medical records, medical billing records, clinical specimens, and public health investigations. Further, it often uses the same analytical and laboratory techniques as epidemiological research. However, the difference between public health surveillance and research in this context is that the purpose of the surveillance is to inform the decisions or actions that must be made by a public health authority. The direct link to decision making and action by a public health authority is a hallmark of public health surveillance. In the context of public health surveillance, the collection, management, analysis, and interpretation of surveillance information or biospecimens is designed to inform a public health authority, and generally is followed by public health action or by the dissemination of information to public health programs and others to stimulate public health action. Surveillance activities that are not undertaken for the purpose of directly informing public health decision making or action generally will not be considered public health surveillance, even if they might be considered surveillance for other purposes.

Conducted by a Public Health Authority: An activity is "conducted" by a public health authority when the public health authority participates directly in the collection, testing, analysis, or use of the information or biospecimens, or funds these uses through a contract.

Supported by a Public Health Authority: An activity is supported by a public health authority when the activity is funded through a grant or cooperative agreement. Activities that are requested, ordered, required, or authorized by a public health authority also may be "supported by a Public Health Authority", even if they are carried out by an entity.

Resource: The NIEHS workgroup guidance related to disaster research is available via the Environmental Health Perspectives website: https://ehp.niehs.nih.gov/doi/10.1289/EHP2378

Resource: Secretary's Advisory Committee on Human Research Protections (SACHRP) Interpretation of Public Health Authority and Public Health Surveillance Activities, which also provides context to this topic: https://www.hhs.gov/ohrp/sachrp-committee/recommendations/attachment-public-health-authority-and-surveillance-activities/index.html

Resource: The Belmont Report, which elaborates on practice related to who benefits from specific work and clarifies that intervention provided to one individual may provide broader benefits to others: https://www.hhs.gov/ohrp/regulations-and-policy/belmont-report/index.html

Resource: CDC's Operational Policy 557 which reflects CDC's historical approach to determining when the Common Rule (45 CFR 46) applies. This guidance is subject to revision to reframe the guidance and expressly incorporate the public health surveillance exclusion: https://www.cdc.gov/os/integrity/docs/cdc-policy-distinguishing-public-health-research-nonresearch.pdf

Resource: CSTE, Hodge & Gostin Public Health Practice vs. Research: A Report for Public Health Practitioners Including Cases and Guidance for Making Distinctions: http://www.cste2.org/webpdfs/cstephresrpthodgefinal.5.24.04.pdf

Resource: World Health Organization (WHO) guidelines on ethical issues in public health surveillance: The WHO generally defines surveillance as "the continuous, systematic collection, analysis and interpretation of health-related data needed for the planning, implementation, and evaluation of public health practice." Examples of such data include information about:

- The spread and control of communicable diseases
- Injuries and conditions
- Population vital statistics
- Tracking of health risk factors and outcomes
- Monitoring of environmental hazards and conditions that threaten access to safe workplaces and housing, and clean air, water, and uncontaminated food sources.
- To be considered a public health surveillance activity, these data must be collected, shared and used for health-related policy making, advocacy, and to prepare system responses to new threats.

http://apps.who.int/iris/bitstream/handle/10665/255721/9789241512657-eng.pdf;jsessionid=BB26350E0CCD7C7A9A1629B3CF9062F0?sequence=1

Resource: Council for International Organizations of Medical Science guidance that activities routinely carried out by public health agencies should be considered practice, even though it may produce data that could contribute to generalizable public health knowledge: https://cioms.ch/wp-content/uploads/2017/01/WEB-CIOMS-EthicalGuidelines.pdf

Resource: Unpublished OHRP draft (contact Micah for more information), which offers definition of public health practice. Does understand/accept that it is a wide range of activities, including surveillance, evaluation, and emergency response.

Resource: Public health surveillance tool for investigators to upload with research application: https://www.jhsph.edu/offices-and-services/institutional-review-board/_pdfs-and-docs/Public%20Health%20Surveillance%20Determination_2Dec2019.doc

Day 2: May 18, 2021

Session 2.1: Major Disasters

Day 2 began with four presentations about major disasters, and presentations ranged from general disaster utilization of social science and public health researchers to winter storm, wildfire, and hurricane response.

Natural Hazards Center at the University of Colorado Boulder. Lori Peek from the State of Colorado spoke about mobilizing science and public health researchers in major disasters. She defined the common goal of post-disaster research as collecting perishable data, which is data that will become non-existent at some point after the emergency (blood specimens with toxins, food debris, etc.). From days to 2 weeks, research focuses on early reconnaissance. Emergency response and early recovery lasts from days to about 3 months. Research on short term and longer-term recovery and reconstruction occurs between 3 months and 2 years and 2 to 10 years, respectively. This type of research is extremely important because it has helped multiple generations of the hazards and disasters workforce.

The National Hazards Center offers a quick response research award program for public health and disaster researchers, which can be accessed at hazards.colorado.edu/research/quick-response . Thee research award program was established 35 years ago with funding from the National Science Foundation and offers small awards, between $2000 and $5000 to fund rapid collection of perishable data. Currently there are over 320 reports related to rapid research resulting from this award. The program supports students and early career researchers, as well as more seasoned professionals. Awards predominantly focus on advancing social and behavioral science research.

Starting in 2020, the National Hazards Center began funding larger awards in collaboration with NOAA and the CDC. These awards are more geared toward establishing actionable summaries focused on public health implication and peer reviewed publications.

Other important resources for public health and disaster resources include the Converge Program where public health and disaster researchers can join one of 90 workgroups with more than 1300 researchers globally to develop research agenda papers. More information on the Converge program can be found here: https://converge.colorado.edu/signup

Texas Department of State Health Services. Haylea Stuteville provided an overview of analysis of Texas Poison Center Network (TPCN) Data during 2021 winter storm Uri. Winter Storm Uri occurred between Saturday, February 13, 2021 and Wednesday February 17, 2021. Major outcomes of the storm were ice (hazardous road conditions) and record-breaking low temperatures. These two factors contributed to a combination of power outages, loss of water, and food shortages for Texas residents. Disaster epidemiologists utilized several data sources to assess carbon monoxide exposure and reported a total of 516 calls during a 10 day window leading up to, during, and after the storm. The majority of calls involved individuals being taken to a health care facility with moderate or minor medical outcomes. About 40% of the affected individuals were children. Next analyses will include analysis of carbon monoxide exposures during public health emergencies, like the pandemic. Haylea emphasized the importance of considering position control data sources in conducting surveillance during major disasters.

National Center for Environmental Health. Dr. Ambarish Vaidyanathan from the National Center for Environmental Health within the CDC spoke about CDC's activities in tracking wildfire activity and the Real-Time Smoke Vulnerability Assessment tool, which can be accessed at https://ephtracking.cdv.gov . Dr. Vaidyanathan also spoke about deployment as an Air Resource Advisor supporting the Interagency Wildland Fire Air Quality Response Program (IWFAQRP). Part of his work with this team involved smoke exposure assessments using various data sources, such as real-time smoke images (webcams); active fires/hot spot maps; weather patterns and forecasts; high-resolution smoke models; and overnight air quality index (AQI) observations. Smoke Outlook reports were produced for the deployment, and sample Outlook reports can be found through AirFire.org: https://tools.airfire.org/ara/deployments/ . These tools may assist disaster epidemiologists in responding to wildfires, predicting risk for vulnerable populations in specific areas, and developing geographic-specific air quality reports.

Louisiana Department of Health, Office of Public Health. Dr. Nikki Honore described role within the Department of Health to understand and support the needs of each community. For sheltering, the State has congregate and non-congregate sheltering to support the needs of individuals during hurricanes and other major disasters. This is a recent division into sheltering options based on pandemic protocols. This year, there were back-to-back storms in Louisiana overlapped with the COVID-19 pandemic and tensions on hospital systems. Sites were opened specific to supporting both storm and medical monitoring to relieve tensions on hospital systems. The State offices are all represented in the Emergency Operations Center (EOC), including Epidemiologists, which allows us to utilize data and problem solve quickly and with as few delays as possible. A member of the vital records team also supports during this time to help with fatality records and discussion of those data.

Session 2.2: Equity/Vulnerable Populations

Speakers in this panel discussed the importance of data and epidemiology in supporting vulnerable populations during disasters.

Access and Functional Needs. Vance Taylor from the California Office of Emergency Services (CalOES) spoke about Access and Functional Needs (AFN) because individuals with these needs can be most at risk before, during, and after disasters. A lack of data can lead to assumptions being built into the way we plan/prepare, mitigate, and respond to disasters. For example, without understanding the varied way that individuals understand information, materials for data collection and surveillance may be developed in English-only, or protocols for disaster epidemiology may be focused on accessible populations rather than inclusive of all. Disaster epidemiologists need to conduct surveillance before disasters to assess individuals and their needs in order to support public health response during and recover after disasters. Community-based organizations serving individuals with access and functional needs are one of the best resources for identifying individuals from this population for inclusion in needs assessments. Good information about individuals with access and functional needs also exist in state and national datasets like California's In-Home Health Services (IHHS) or regional center patient assessments. The Department of Motor Vehicles (DMV) has information on who has handicapped placards and why. CMS provider-types, EMS agencies, and other public-private partnerships can also be utilized for getting and sharing data.

Question: *When forming public-private partnerships for getting and sharing data, how do we get around privacy rules? E.g., government PII concerns?*

Vance suggested bringing government, public sector, and community-based organizations together with legal teams. Using this group, identify at the outset what the barriers are to sharing information. The barrier tends to be the number of protected information/data shared together to make it identifiable. However, it may be possible to develop heat maps at higher, jurisdiction levels to see how many people have certain types of needs. Once we do that, we can start to rank or tier needs and use the information to inform where we can replace infrastructure first. When do you put technology in a microgrid to restore power to specific neighborhoods. If look at what the needs are is rather than specific individuals, approaches to disaster preparedness can be modified.

Question: *What are a few higher priority datasets you could suggest that we're not using now and are relatively low hanging fruit to make happen?*

IHHS and the regional center data is vetted and verified; it is the most easy to start using for planning and as a proof of concept of public-private partnership and data sharing. Additional high-quality data exist through the HHS emPOWER program, DMV, and other cross-agency partners like EMS. Another idea is to gather data already collected by local community-based organizations that may already be collecting (or could collect) needs assessment data. Some have fantastic data and others, at the very least, could give you a very good sense of what the needs are and how extensive they are.

HHS Empower Program and Health Equity. Kristen Finne from the Office of the Assistant Secruary of Preparedness and Response spoke about the HHS emPOWER program**.** The emPOWER program uses Medicare administrative data to identify those with functional and access needs and begin to inform disaster preparedness at the federal and local level. It is a partnership between ASPR and the Centers for Medicare and Medicaid Services (CMS) and provides "dynamic data, GIS, AI tools, training, and informational resources and technical assistance to help federal-to-community partners protect the health of at-risk Medicare beneficiaries that live independently." Recently HHS launched the emPOWER program platform, a new mobile-ready technical assistance site that provides emPOWER data and tools to public health, health care, and emergency management organizations, first responders, power companies, and other partners. Kristen provided many examples of how these data, including the de-identified data, can help state, regional, and local partners in emergency preparedness (e.g., re-charging stations, assessment of evacuation assistive equipment needs and services), mitigation (e.g., integrate power needs into sheltering), response (e.g., access supplier capacity for continuing community-based health services), and recovery (e.g., prioritize durable medical and assistive equipment, expedite determines to personal residences). Recently a state public health department utilized secure emPOWER data to support targeted outreach to older adults at higher risk of adverse health outcomes from COVID-19 infection and home health agencies caring for these at-risk patients in the community. There is a COVID-19 At-Risk Dashboard in HHS Protect to provide meaningful data visualizations of all de-identified data at the state, territory, county, and zip code levels to support response and mitigation activities as well. An individual dataset can be requested to help with direct outreach and vaccination efforts. Additional emPOWER Program data initiatives are being piloted, including the use of Medicaid and CHIP data via emPOWER-generated datasets.

More information about the **emPOWER Program** can be accessed at: https://empowerprogram.hhs.gov/. The **emPOWER in Action** page, https://empowerprogram.hhs.gov/in-action.html provides vignettes of examples and also more detailed "Stories from the Field" about how the data were used to conduct lifesaving outreach.

Note: A more detailed overview of COVID-19 tools were uploaded to the meeting site on Base Camp.

Question: *Are there similar datasets for tribal communities?*

One of the challenges still being explored is tribal data. Currently data systems are not structured in a similar way to do this work through emPOWER. However, tribal partners are at the table, and we are hopeful we can come together soon.

Question: *To capture a larger swath of electricity dependent individuals, we could take emPOWER ICD-10 codes and methods and translate to other systems, such as large state insurers or private healthcare providers. Could ASPR provide such ICD-10/methodology to local public health partners?*

At this time, ASPR is not able to offer ICD-10/methodologies that are applied to emPOWER they are validated across the pilot projects. The long-term hope is to continue to expand relationship with Medicaid so that all the information could be provided in one platform. Once that is nailed down, we will roll out to local public health partners.

Question: *When sharing data with state HDs, which department(s)/position(s) receive the dataset? Preparedness Director? Office of Vital Statistics? State Epidemiologist?*

The emPOWER Emergency Planning De-identified Dataset is provided to the Preparedness Director and or their identified support staff each month.

Question: *Besides sharing the empower data with public health agencies, is it also provided to the State/County OES groups and their partners?*

The public health agencies are able and encouraged to use the data and work with and across their partners to inform and support targeted emergency preparedness, mitigation, response, and recovery activities. For example, at a minimum we understand that partners fulfill different roles and needs during a response and therefore working together and leveraging the data for decision making and planning is critical.

Question: *Is there a best practice/recommendation on requesting census tract-level or address-level data from the local level up?*
I believe you are asking about individual level data during emergencies. I would encourage checking out the HHS emPOWER Program Platform (launched in Dec 2020) at We have been working to actually capture these stories and have more that will be coming and added to the site. We were slowed down by COVID. If you know of others too, please encourage them to reach out to us so we can feature their work.

CDC Assignment: Shaping Our Appalachian Region Organization. Captain Margaret "Margo" Riggs presented about her work with as the CDC assignee to Shaping Our Appalachian Region Organization (SOAR) and what it is does, particularly around Healthy Communities and focus on chronic disease prevention and intervention through economic and health improvement. One of the tools Capt. Riggs spoke about using in her work is the CDC Diabetes Atlas, which can be used to see local level diabetes indicators. For example, the county where SOAR is located is driving the high rates of diabetes across the state. This tool lets you also examine urban versus rural trends, state versus county level, and other SVI indicators (minority status, language, housing, type of transportation, socioeconomic status). Access the atlas here: https://gis.cdc.gov/grasp/diabetes/DiabetesAtlas.html#

Question: *Does SOAR create its own datasets? How is that public-private collaboration work in terms of data collection and sharing?*

SOAR does not create its own datasets for health-related data. There is collaboration with the state-level health department to collect data like rapid needs assessments for COVID-19.

Day 3: May 19, 2021

Session 3.1 Syndromic Surveillance

The third day of the workshop began with three presentations and discussions with presenters about syndromic surveillance. For more information on the National Syndromic Surveillance Program (NSSP) Community of Practice, visit: https://nsspcommunityofpractice.org

Winter Storm 2021. Ashley Hawes from the Austin Department of Public Health presented about the 2021 Winter Storm and cold-related illnesses. She discussed the timeline of the storm, which spanned from February 10-26, 2021. Of particular importance in this timeline were power outages that began on February 13, 2021 and lasted up to 7 days for some residents. EMS, syndromic information, and death certificate data were utilized for surveillance of epidemiologic data throughout this time. A total of 6058 calls for EMS service occurred during these 7 days, many of which were related to environmental exposures, falls, and carbon monoxide poisonings. Findings form surveillance included: (1) There were a high number of cold-related emergency department visits by individuals living in the area's most vulnerable housing and homeless areas; (2) Males were disproportionately affected by the storm compared to females; (3) There was a decrease in motor vehicle accidents initially because fewer people were driving; however, as some roads started to defrost and grocery stores reopened, more accident occurred; (4) About 3 days into the emergency, dialysis daily data counts spiked; (5) Death data from the Austin office of vital records indicated 21 deaths in the city of Austin, 12 of which were from hypothermia and 5 of which were from falls/other; Those age 60 years old and greater were the most impacted and represented 12/21 deaths overall; and (6) there was 1 known positive COVID-19 case in a warming center but no spike in COVID-19 cases in warming centers.

Question: *Were there other measures you wish you had been able to analyze related to the storm?*

During this storm there were more deaths in urban versus rural (county) areas. For this reason, we may look at city (urban) versus rural settings and increase preparedness in urban areas based on findings.

Question: *The homeless query indicator is interesting. How is that measured daily? Like an emergency-related PIT count or census?*

There is a PIT count conducted each year. But for this was a registration-based query shared by Meredith Jagger (next speaker) to examine population counts in warming shelters.

Question: *It would be interesting to compare the data for auto-related visits, with the timing of emergency alerts to stay off roads. For example, were there any lulls in emergency department auto-related visits when the weather was at its worst?*

Location-based EMS data will be helpful because it is more geo-coded. It would be most useful to look at that this data via the Emergency Department visit because the zip code data only tells where the person is from not where the accident occurred.

Syndromic Definitions for National Wildfires. A CSTE limited-time workgroup has been working to develop smoke and wildfire definition guidance. The definition of wildfire is a "non-prescribed, non-structure wildland fire." Climate change affects wildfires, and there are currently more wildfires and a longer wildfire seasons. health outcomes associated with fires include air pollution from smoke, occupational exposure, potential chemical releases, and long-term mental health impacts from evacuation and loss. During an active fire, public health response usually focus on air pollution from fine particulate matter 2.5 (PM 2.5). Health outcomes associated with PM 2.5 include premature mortality, respiratory outcomes, and cardiovascular outcomes. Groups of interest in this work are children, older adults, people working and/or spending time outdoors, people with underlying respiratory and/or cardiovascular conditions, pregnant people, and people in marginalized and low-income communities (because they might have reduced access to mitigation resources like air conditioners, air filters, also have preexisting conditions and greater chemical exposures already).

CSTE in collaboration with the CDC reviewed existing wild-fire related syndrome definitions; developed recommendation definitions for wild-fire related health outcomes (focus on respiratory related visits of interest, e.g., asthma, exclusions of smoking and non-fire exposures, viral illnesses, etc.); produced a guidance document for use of recommended definitions. The guidance document is in near-final form, and it should be out in the next few months. The guidance includes 4 steps for implementing syndromic smoke and wildfire definitions:

- Use novel definitions for wildfire and smoke and respiratory visits
- Use air pollution data ($PM_{2.5}$) – monitored observations are integrated into ESSENCE
- Understand your climate, geography, and past trends
- Prepare in advance of the season

Results of validation through this project were that the Wildfire and Smoke definition worked well and correlated to $PM_{2.5}$ in large and small areas and populations. The respiratory definition was broad, and there may not statistically significant signal during a wildfire event, but it is more likely if air pollution is high. Use this definition in combination with other definitions.

Finally, to prepare a wildfire and smoke dashboard using the myESSENCE tab, consider the following elements:

- Novel wildfire and smoke visits
- Novel respiratory visits of interest
- More specific health outcomes
- Disaster-related Mental Health v1
- Occupational
- Age group stratification
- $PM_{2.5}$ overlays

Question: *Is the particulate matter part of the wildfire definition, or is that searched separately as free text?*

There is a separate data source within ESSENCE that include monitored air quality metrics, including PM 2.5 plus others regulated by the EPA. So, it can be examined separately or as a PM 2.5 overlay.

Question: *What other health outcomes would be informative? Cardiac, injuries?*

There was a long discussion about cardiovascular definitions. Workgroup members always are asked about cardiovascular events but never see an increase after wildfires. So, these health outcomes weren't as helpful to us here. Looking at injuries could definitely be useful, as would occupational outcomes among firefighters.

Question: *The RAND Corporation is working with the CDC on surveillance of mental health after disaster. Have you considered for the validation also extending correlations to not just be by time but by space and time?*

It really depends on what data were available for our validators. Some looked at data statewide but at least one of our validators looked at hospital data closest to fires. There is a dose-response relationship you can see when you look geographically.

Question: *What are the best ways to use syndromic surveillance in a wildfire situation where most of the population in your jurisdiction may be evacuated to outside the jurisdiction? Regional approaches?*

If you are from a local health department, collaborate with the state and see if there are data sharing agreements in place with the place(s) where people were moved. Individuals from state health department can reach out to the CDC NSSP to gain a more regional perspective or work with a neighboring state health department. Another workshop participant shared an additional suggestion for identifying people from outside the jurisdiction by adding a query for "distance traveled" using patient county of residence as a filter for visits to the facility of interest.

Behavioral Health Surveillance During COVID-19. Cody Carmichael and LaReina LaFlair from the Washington Department of Public Health spoke about syndromic surveillance during the COVID-19 pandemic. Washington State syndromic surveillance data are gathered in the unceded territories of 29 federally recognized tribes, as well as that of the Duwamish Tribe, which is still fighting for federal recognition. A Behavioral Health Group was formed after the stay at home order for COVID-19; it was formed in April/May 2020 and was made up of disaster psychologists, epidemiologists, health care systems strategies, and communications specialists. The group analyzed both traditional and novel data to inform service demand and capacity related to CDC Suicide Attempt v1, CDC Suicidal Ideation v1, CDC All-drug v1, CDC Alcohol v1, and SDC Disaster-related Mental Health v1. Paired analysis focused on aligning syndromic surveillance, surveys, telephone support line activity with social media sentiments and the disaggregation for regions, local health jurisdictions, and tribal governments. Weekly situational reports, monthly forecast documents, and ad hoc products were produced by the group to give ongoing information back to the public health community. An example of reports can be found here: https://www.doh.wa.gov/Emergencies/COVID19/HealthcareProviders/BehavioralHealthResources.

Work through this group, including its analysis of cumulative traditional and novel data, helped guide the issuance of provider alert to screen for suicide risk in December 2020 and related to overdose risk in February 2021. Some lessons learned from the project include to remember to address health data

literacy in the products you disseminate to the public health community; it may be necessary to introduce basic epidemiology concepts to audiences in projects and provide information about how to interpret different trends and other data elements, like missing data.

The presenters also shared two publications that help interpret trends in mental health-related ED visits, specifically spotlighting denominator considerations (counts vs. rates) in those ED visits: (1) MMWR from November 2020 on Mental Health–Related Emergency Department Visits Among Children Aged <18 Years https://www.cdc.gov/mmwr/volumes/69/wr/mm6945a3.htm and (2) JAMA Psychiatry article from February 2021 on Trends in ED Visits for BH conditions https://jamanetwork.com/journals/jamapsychiatry/fullarticle/2775991

Question*: Do you have a sense of whether these data may be affected by race misclassification?*

We do know there has been quite a bit of race misclassification; for some populations the race misclassifications of certain populations can be as much as 30%. The NSSP has a workgroup to work as a national committee addressing this issue. There is a partnership with the National Hospital System and the Northwest Tribal Epidemiology Centers to assess classification overall within Washington State syndromic data overall and broken down by facility, facility network, and physician. The next stage of the project is interviewing hospitals about how race information is gathered, options within the electronic medical record, and what/how improvements can occur.

Session 3.2: Behavioral/Mental Health

Session 3.2 about behavioral and mental health included four presentations related to mental health effects on the population and public health workforce.

Mental Health in the Kentucky Pipeline. Lindsay K Tompkins from the CDC spoke about the August 2019 national gas pipeline explosion in a residential rural area in Kentucky. The explosion and subsequent fires killed 1 resident, injured 1 other, and caused significant damage. In the weeks following the incident, health complaints were received by community members and health responders. The CDC investigated potential adverse health effects from the pipeline explosion, including mental health impacts of the explosion. The Assessment of Chemical Exposures (ACE) tool was used for the investigation. It was modified to include additional questions on mental health question. For any symptom of mental health, community members and first responders were asked if the symptoms were present before or only after the incident, as well as about persistent mental health effects. After structured interviews were conducted, results revealed that 82% of community members and 27% of first responder had at least one new or worsened mental health symptom since the explosion. Feeling jumpy was most frequently reported within adult community members. Among first responders, it was flashbacks of the incident. The majority were still experiencing symptoms at least one month after the incident, but many did not seek care for these symptoms. Subsequent health education was focused on providing information on healthy coping behaviors, the importance receiving help after a disaster, and the importance of deploying crisis response/mental health first aid after the disaster. This work has also resulted in the development of a mental health module for the ACE tool.

Question: *How do did mental health literacy or lack thereof influence findings?*

Many did not recognize they were experiencing these symptoms, so there was some disconnect. That is why we wanted to re-work some of the questions in the toolkit. Some questions used to ask about anxiety, for example. However, not everyone fully understands what that is. So, we are now trying to ask about symptoms that might indicate the needs of a mental health response. There is a role for mental health literacy here and that is even more of a reason to make sure these resources are available, and that mental health first aid is administered after events like this.

West Texas Fertilizer Plant Explosion Mental Health. Kahler Stone from Middle Tennessee State University spoke about the Texas Fertilizer Plant Explosion in West, Texas in 2013. An original assessment included an injury investigation with up to nine reported injuries. This assessment discussed in this presentation aimed to assess subsequent chronic health conditions including substance use disorder and mental health among community members six years after the event. Door-to-door data collection were completed utilizing parcel census-based methods, and surveys could be completed in-person or online. Results showed that six years following the explosion, community members reported chronic and psychological distress associated with the event. Substance use changes were particularly notable. Qualitative data indicated a lack of access to mental health services in the area. Taken together, these findings suggest the chronic and mental health impacts a disaster has on a small rural community are long-term, and communities must have long-term recovery efforts in place. More information can be found at https://westfollowup.org

Question*: Are there additional analyses that you hope to conduct?*

Some additional analyses of interest focusing more on substance use and access to mental health services to better able to promote services. Another element will be examining the location of residents; is the whole community affected the same, or is it only individuals impacted by an injury or on scene.

Question: *For incidents like the explosion, is it feasible for establish cohorts for long-term follow up?*

That is very doable with the logistical support of public health departments. From the community side, there was incredible support and buy-in to this study six years later because it was so impactful, as well as the original injury investigation. At least in this type of this community, a long-term follow up cohort would be excellent and very feasible.

Question: *Should follow-up assessments be conducted after every disaster?*

If we can customize scales like the ACE tool or other tools to include relevant behavioral health questions, we can look to conducting post-assessments in a more comprehensive and meaningful way.

Mental Health Impacts on COVID-19 Response on Public Health Workforce. There are limited projects that examine the response on the public health workforce compared to on the patient-facing healthcare workforce. Qualitative interviews about supportive and detrimental factors of the response were collected from a stratified sample of a previous, larger cross-sectional survey. A wide range of professions

were represented in interviews, including epidemiologists. Five key themes were identified through coding: (1) Teamwork and workplace comraderie; (2) potential for growth in the field (i.e., improvements in IT systems due to pandemic let people get to projects more quickly and across silos); (3) reduction of commute and option for remote work, although some felt it was stressful to be at home; (4) impact of ongoing communications challenges; and (5) staffing/hiring limitations and staff burnout. The biggest takeaways were that these categories were extremely interdependent. For example, the opportunity to partner with someone new (a strength of the response) made it feel like people were stretched too thin (a barrier of the response). Interestingly, participants were extremely engaged and responsive to the project via Zoom methodology. It suggests that disaster epidemiologists may need to consider assessment tools that focus on both quantitative and qualitative aspects so the qualitative sharing is not lost within a quantitative-only data tool.

Question: *Did you see a relationship between types of roles/responsibilities and people's responses?*

People that were displaced from positions like program evaluation or substance use were feeling the stress of doing something other than their selected career path, and those people suggested more of this than others. However, those findings were more from survey results rather than these interviews.

Question: *Are there recommendations for what public health staff can do now can mitigate stress based on the results of this project?*

Find ways we can have work-life balance again will be extremely important. Other suggestions were to check in on staff, say thank you for work, and care about employees.

Question: Are you planning to do the assessment again to see if burnout stress will impact in the long run, or is this a one-time assessment?

The cross-sectional survey is still open and we are about to launch a longitudinal survey. Several more timepoints would help us characterize if there are long-lasting impacts from the COVID-19 response.
Question: *Were you able to stratify the analysis between length of time employed in public health (especially new hires -vs- "seasoned" PH professionals)?*
With the qualitative results just shared, no that was not done. However, with the cross-sectional study that Jen referenced, we have explored the relationship between length of time, full-time vs. part-time, roles and responsibilities, etc. Those analyses are under review in several journals and will hopefully be published and available soon! while we didn't stratify by length of time employed, there were some interesting differences. A number of "seasoned" PH professionals we spoke with connected their experiences to previous response events. There were a number of interviewees who came out of retirement or postponed retirement at the beginning of the pandemic as well. This gave a really unique perspective to their responses.

Disaster Behavioral Health Strategies and Resources. Aimee Voth Siebert from the Colorado Department of Public Health and Environment discussed disaster behavioral health, as well as disaster behavioral health strategies and resources. Disaster behavioral health is not about diagnosis and pathologizing, it is

about recognizing that the situations around us have changed, causing us to feel that things are not as comfortable and safe as they felt before the disruption(s).

Resources shared during this presentation include:

- Disaster Behavioral Health position in Joint Information Center
- Connected Colorado public television panel, Governor's press conference for mental health during the holidays
- Webpages, social media graphics
- I am a disaster communicator and this is why you should be one too
- Disaster Behavioral Health task force with non-traditional partners (e.g. State Unit on Aging, Colorado Respite Coalition)
- COVID-19 Vaccine Planning and Distribution: Disaster Behavioral Health Principles and Support
- Developing a DBH data sentinel surveillance system
- Psychological First Aid training series for Contact Tracing teams
- Healthcare Worker Resilience and Retention Initiative
- "Sustainable Work Requires Sustainable People" briefings at DOC- Weekly and Monthly updates
- Resources for Leaders and Workers
- CDPHE "Are you getting crispy?" article and resources

Tips for reducing stress and increasing adaptive functioning with your team through debriefings, counseling, or larger presentations were:

- Before disaster:
  - Set expectations, have a healthy baseline, make a toolkit
- During disaster:
  - Energy maintenance, use, discharge, recharge
- After disaster:
  - Make meaning, acknowledge, memorialize, show gratitude, reconnect, engage in storytelling, learning, and improvement

Question: H*ow do public health department leadership balance expectations/workload with mental/behavioral health of their workforce? Any practical recommendations for improving organizational culture?*

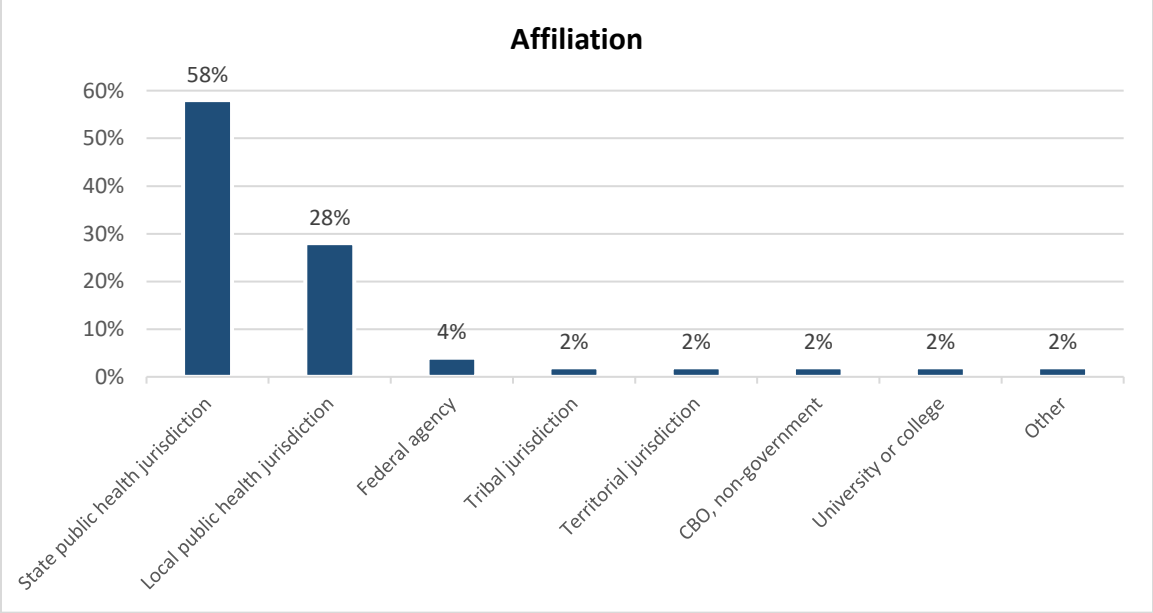
There are three things you can always do: Ask what did I say, what did I do, and what did I advocate/make possible to have resourced? If you want to foster a culture of team care and mental wellness, have to demonstrate doing it yourself. Start conversations about what we can let go of as a priority and how everyone can model communicating about what they can handle in the workplace during a disaster.

Summary of Participant Evaluations

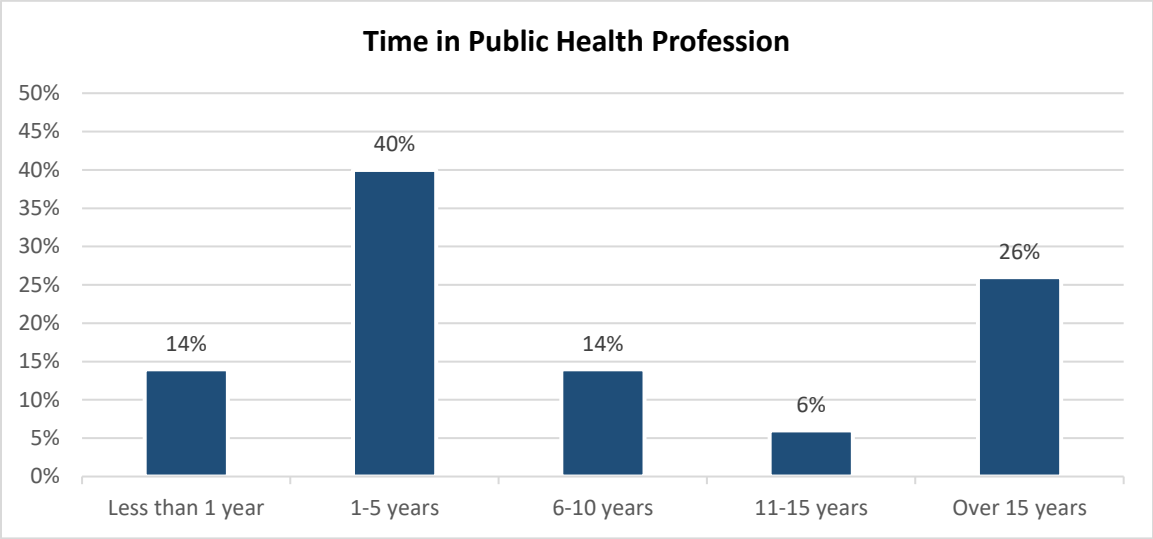
Survey Results

The CSTE 12th Annual Disaster Epidemiology Workshop was held May 17-19, 2021. Peak attendance on Day 1 was 206 people, while peak attendance on Days 2 and 3 were 137 and 121 people, respectively. Approximately 50 individuals completed the post-workshop evaluation survey, 70% of whom reported being current CSTE members and 30% of whom reported being current members of the CSTE Disaster Subcommittee. Responses to survey items are provided below.

Affiliation. Most participants reported being from a state or local public health jurisdiction, but a variety of other agencies and community-based organizations (CBOs) were represented too.



Time in Public Health Profession. Workshop attendees most frequently reported working in public health for 1-5 years (40%) or over 15 years (26%). However, about one-sixth of participants had been working in public health less than 1 year.

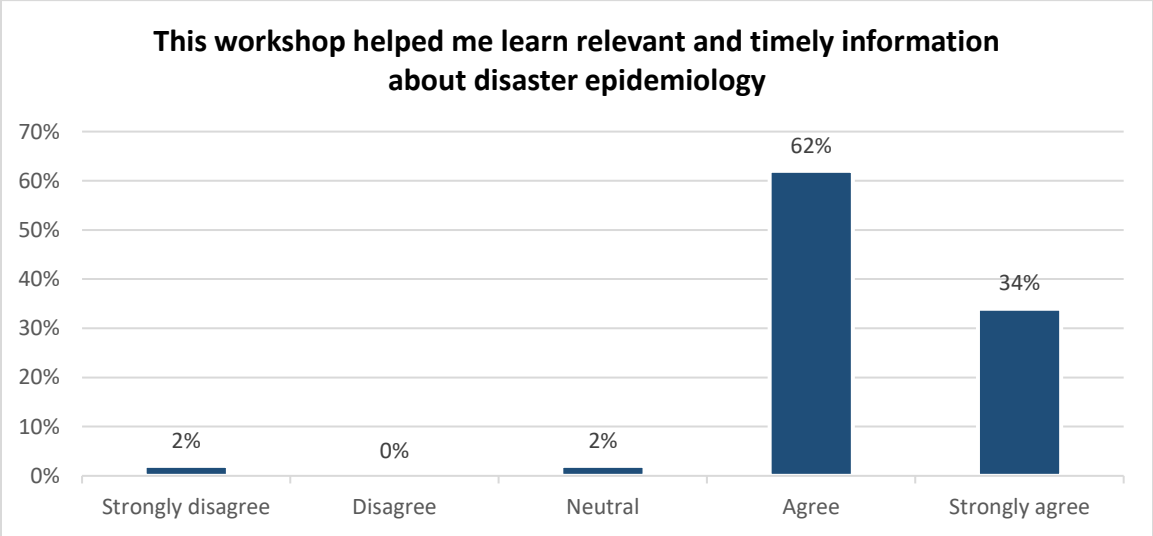


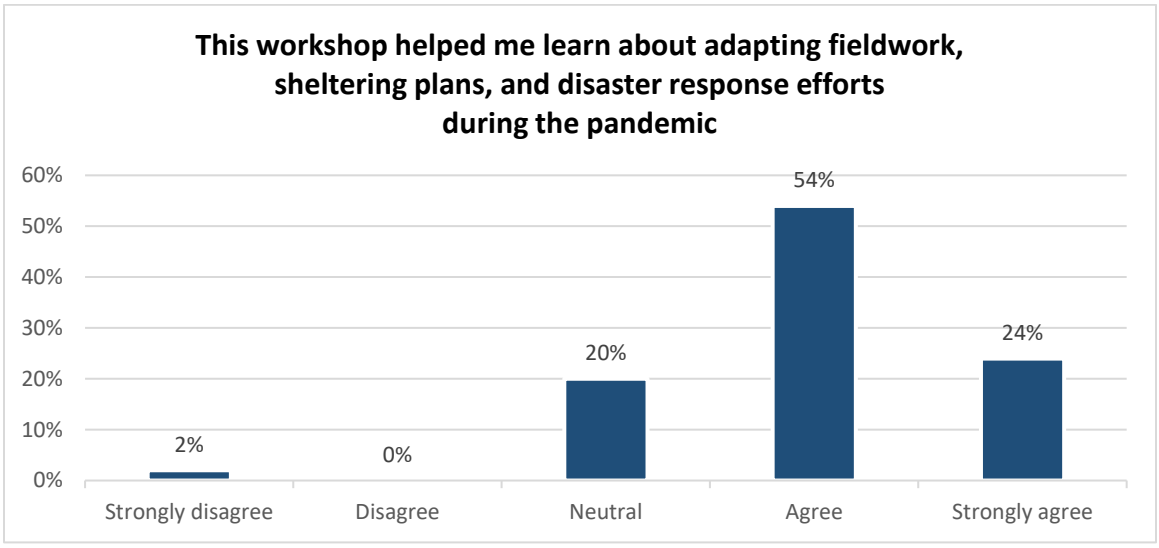
Heard About Workshop. Attendees most frequently heard about the workshop from the CSTE listserv (51%) or website (7%). Approximately 25% of attendees heard about the workshop from a colleague, 13% from a local public health department, and 2% because they had attended a previous workshop.

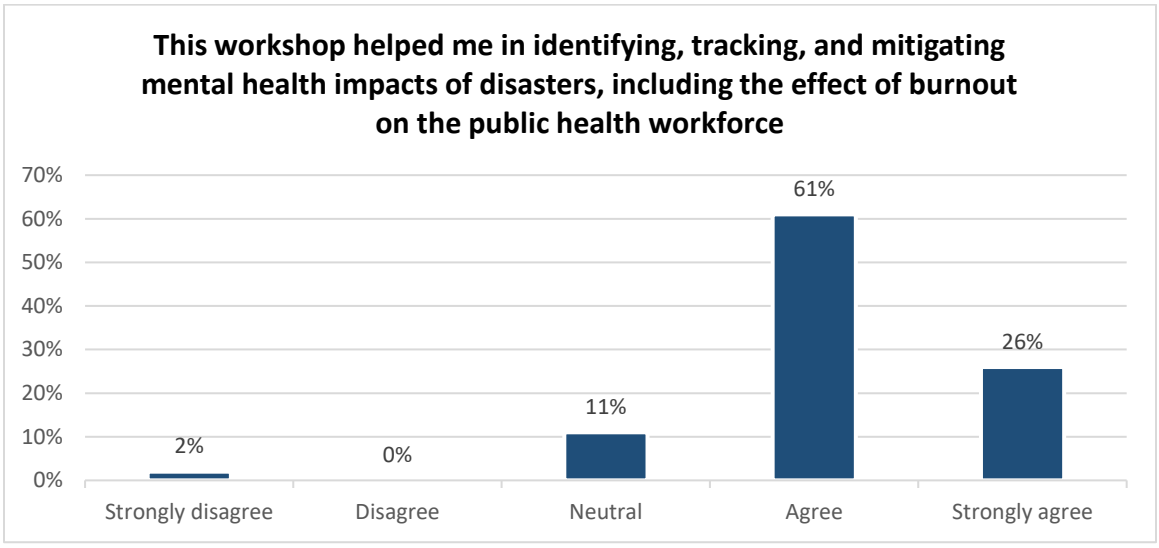
Previous Attendance at Workshop. A total of 62% of attendees were new to the workshop, while 26% had attended 1-2 times before, 6% had attended 3-4 times before, and 6% had attended 5 or more times.

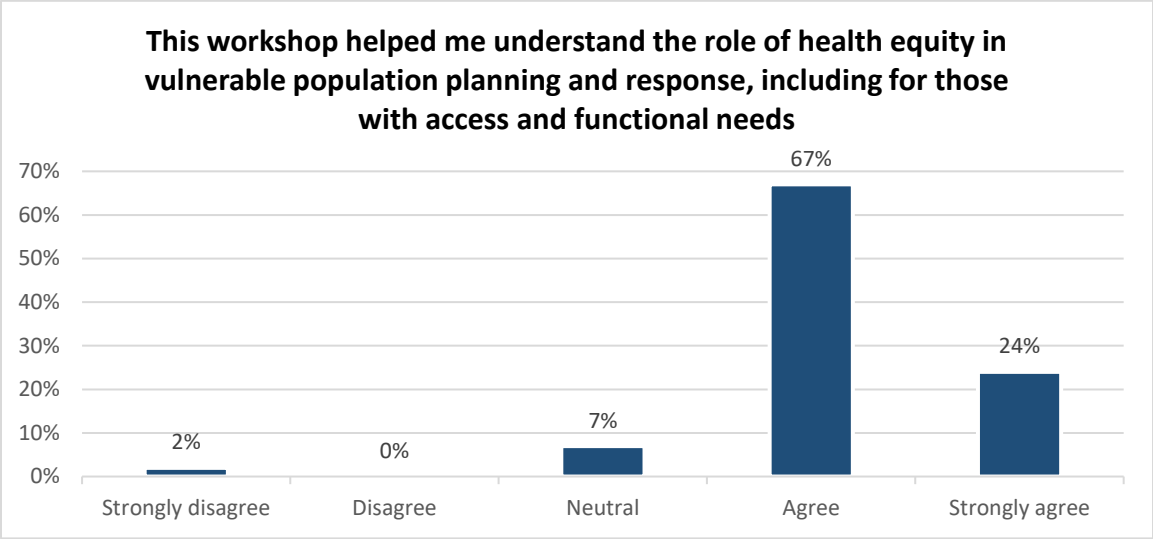
Overall Satisfaction with Workshop. A total of 100% of survey participants reported being very satisfied (43%) or satisfied (57%) with the CSTE Disaster Epidemiology workshop overall.

Meeting Alignment with Objectives. Participants were asked to rate agreement with four statements corresponding to the workshop's objectives. Results are presented in the charts below.




This workshop helped me learn about adapting fieldwork, sheltering plans, and disaster response efforts during the pandemic
60%
50%
40%
30%
20%
10%
0%
2%
0%
20%
54%
24%
Strongly disagree
Disagree
Neutral
Agree
Strongly agree


This workshop helped me in identifying, tracking, and mitigating mental health impacts of disasters, including the effect of burnout on the public health workforce
70%
60%
50%
40%
30%
20%
10%
0%
2%
0%
11%
61%
26%
Strongly disagree
Disagree
Neutral
Agree
Strongly agree



Session Effectiveness in Improving Knowledge of the Topic Area. Participants most frequently rated sessions as "Effective" in improving knowledge of the session's topic area/subject. Session 3.1 about Syndromic Surveillance received the most ratings of "Effective" or "Very Effective." Most frequently reported responses are bolded in the table below.

Session Title	Not Effective	Neutral	Effective	Very Effective	Did Not Attend
Session 1.1 Fieldwork/CASPERS	--	16%	**66%**	2%	16%
Session 1.2 IRB Considerations for Disaster Epidemiology	2%	16%	**60%**	4%	18%
Session 2.1 Major Disasters	--	9%	**68%**	7%	16%
Session 2.2 Equity/Vulnerable Populations	--	17%	**72%**	4%	7%
Session 3.1 Syndromic Surveillance	--	9%	**74%**	4%	13%
Session 3.2 Mental/Behavioral Health	--	11%	**69%**	2%	18%

Agreement with Statements About Workshop. Participants responded favorably to the workshop. Most frequently reported responses are bolded in the table below.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The workshop was well-organized	2%	--	--	**49%**	**49%**
The workshop adhered to the scheduled agenda	2%	--	2%	42%	**54%**
Objectives of worship clearly communicated	2%	--	--	**60%**	38%
Workshop achieved its objectives	2%	--	2%	**63%**	33%

Workshop content was useful to my work	2%	--	11%	**57%**	30%
The speakers/presenters were knowledgeable in the topic areas	2%	--	--	**55%**	43%
The length of the workshop was appropriate	2%	--	2%	**60%**	35%
The presentations and discussion were relevant to my public health practice	2%	--	13%	**60%**	25%
The panel discussions were beneficial to the workshop	2%	--	9%	**60%**	29%
There was adequate time for questions and discussions with presenters	2%	2%	7%	**65%**	24%
The online platform (Zoom) was easily navigable and accessible	2%	--	7%	37%	**54%**
The registration platform (CSTE Learn) was easily navigable and accessible	2%	2%	9%	37%	**50%**

Attendance Next Year. Participants were able to "check all that apply" about whether they would attend the CSTE Disaster Epidemiology workshop next year. A total of 77% of participants said they would attend if the meeting was held virtually, 40% said they would attend if it were held in-person, and 17% were undecided about whether or not they would attend. Reasons for being undecided included not knowing whether individuals would still be supporting COVID-19/disaster response next year (i.e., whether disaster epidemiology would still be relevant to them), travel being unlikely to be approved by participants' health jurisdiction/agency, and uncertainty about whether the workshop would be a mandatory job requirement for next year.

Application of Information from Workshop. Participants described several ways they will apply the information they learned during the CSTE Disaster Epidemiology Workshop. These ways included:

- Inviting a workshop speaker to talk to a participant's public health team
- Following up with speakers about CASPER work/methodologies
- Preparing for natural disasters in jurisdiction
- Reviewing resources provided during workshop to identify new initiatives in the participant's health department
- Drawing from elements of effective prevention and interventions strategies presented during workshop to engage in disaster response
- Engaging in syndromic surveillance of suicidal/self-harm events
- Understanding all aspects of disasters, even if content was not as relevant to participants' day-to-day work
- Applying information, particularly about Institutional Review Boards (IRBs) and mental/behavioral health to their public health career
- Using CASPER presentation findings to bring vaccines to manufacturing/agricultural workplaces

Other Topics or Information for Future Meetings. Several great suggestions for future meetings were provided by participants. These included making the session more methods/application/implementation oriented instead of results-oriented ("how to do, not what you found"); networking events even in virtual meeting format; best practices and lessons learned in planning and deployment processes; and a bigger emphasis on minority/diversity health. Other suggestions included holding sessions about disaster mental health, disasters and human rights, outbreaks, response(s) to natural disasters like winter storms and tornados in other parts of the country, the impact of flash floods and droughts on human health (communicable diseases, injuries, mental health), and threat assessment and preparedness. If possible, future meetings should include group activities or outside activities like homework for hands-on experience. It was also suggested to offer a pre-session on the basics of disaster epidemiology and some "nitty gritty" sessions on ESSENCE query writing.

Additional Comments. Other additional comments and recommendations from meeting participants included the following:

- **"**I saw that there were slide decks that were available after the workshops but I wish the recordings were more easily accessible for the workshops I wasn't able to participate in real time."
- "Thank you for providing this and for it being free of charge too. It enabled me to attend. This was meaningful and I am glad i got to be a participant."
- "The IRB session seemed overly long, but that may have had more to do with personal feelings about IRB."
- I would appreciate more trainings in the nitty-gritty of Essence query writing as well as the deployment and evaluation of new queries in crisis settings.
- "I really enjoyed this workshop and found the content incredibly interesting. Thank you and great job!"
- "Leave more time for questions […]."
- "Provide discussion questions ahead of time [to improve inclusion of distance participants]."

Action Items Based on Participant Evaluations

Several items from participant evaluations will be taken into consideration for the next CSTE Disaster Epidemiology Workgroup. These include:

- Reviewing suggested session topics and including as many as possible in next year's meeting;
- Working with presenters to ensure topics are most relevant to attendees and that presentations end with enough time for participant questions;
- Considering soliciting participant discussion questions ahead of workshop meeting;
- Further enhancing technological aspects of meeting (e.g., Zoom, CSTE Learn platform) to facilitate ease-of-use by meeting participants and access to comprehensive information about those who attended the workshop each day (i.e., name, affiliation, etc.); and
- Ensuring that the participant evaluation instrument offers flexibility to assess point-in-time priorities, such as questions about virtual-only meetings or other formats relevant to the year(s) in which the workshop is held.

Review of Report and Next Steps

The CSTE Disaster Epidemiology Sub-Committee reviewed and discussed evaluation findings from the Disaster Epidemiology Workshop during its regularly scheduled meeting on July 21, 2021. The group suggested soliciting basic information from workshop participants as far in advance of the workshop as possible to ensure sessions are tailored to the appropriate audience. For example, if many who plan to attend are early-career public health professionals, it would be important to offer basic information about disaster epidemiology, overview handouts, and more "how to" information rather than high-level summaries of projects. The CTSE Disaster Epidemiology Workshop Planning Committee will again review this report for suggested topics when it begins planning sessions for the 2022 meeting in late 2021 and early 2022.