Informing the Development of a Public Health Emergency Preparedness and Response Science Strategy:
Final Report

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Background

The United States Centers for Disease Control and Prevention (CDC), Center for Preparedness and Response (CPR) Science Agenda framework aims to strengthen and expand the public health emergency preparedness and response (PHEPR) evidence base by addressing short-term and long-term research priorities. The framework is structured into six research domains. It captures technical and non-technical resources, incorporates risk safety and security elements, and identifies quality improvement measures essential to PHEPR practice across the state and local public health landscape. The Science Agenda team, integrated under the Office of Applied Research (OAR), Office of Science and Public Health Practice (OSPHP), and the CPR, is developing decision-making processes and stakeholder engagement plans to assist in the identification and prioritization of PHEPR knowledge gaps across the six domains (Community Resilience, Public Health Incident Management, Information Management, Surge Management, Countermeasures and Mitigation, and Biosurveillance). Each of the six domains also includes associated sub-domains, concepts, and sub-concepts as part of the decision-making framework. This approach will steer future PHEPR research, evaluation, translation, and dissemination activities to strengthen public health infrastructure, systems, and science at the local level.

Through funding from the CDC/CPR/OSPHP, the Association of Public Health Laboratories (APHL) engaged SGNL Solutions (SGNL) to design and implement an information-gathering strategy to capture input from diverse stakeholders and subject matter experts (SMEs) about gaps in state, tribal, local, and territorial (STLT) PHEPR practice evidence for two domains – Public Health Incident Management and Community Resilience – that could be targeted under the CPR PHEPR Science Agenda framework

Within the CPR PHEPR Science Agenda framework, the **Public Health Incident Management (IM)** domain is described as the ability to coordinate with emergency management and direct and support an incident or event with public health or health care implications by establishing a standardized, scalable system of oversight, organization, and supervision consistent with jurisdictional standards and practices and the National Incident Management System. The IM domain includes the following sub-domains, concepts, and sub-concepts.[1]

Sub-Domains	Concepts and Sub-concepts
Operations & Resources	Assets & Logistics • Travel & Processing • Facility & Infrastructure • Storage, Transportation & Shipping • Equipment, Materials, & Supplies Risk Financing

[1] Based on draft internal CDC document dated 08/09/21

	• Response-specific funding • Reimbursement strategies • Non-traditional funding mechanisms • Mutual aid (e.g., Emergency Management. Assistance Compact) Acquisition & procurement • Emergency acquisitions • Equipment procurement Operational Support • Incident command, general, and specialized staff & resources (multi-agency/multi-jurisdictional) • Plans & Procedures Incident Management and Incident Command Partnerships • Partnership policy & plans for partnership engagement/coordination • Coordination with incident command partners • Learning/information Sharing • Evaluation/metrics • Incident management and related crisis leadership at STLT levels
Operational Risk, Safety, & Security	Hazard/Risk Analysis • Risk analyses conducted during IM/Incident response Responder Safety & Health • Risks & protections • Mental/behavioral health & responder well-being • Communication • Accountability for responder safety and health Laws & Regulations • Emergency Authority: Extent & Exercise • Coordination, Roles & Responsibilities • PH and Law Enforcement • Liability • Rights Protections (overlap with ethics/liberty restrictions) • Pharmaceutical Regulations Ethics • Scarce resource allocation • Responder duties (to work, to treat, to get vaccinated) • Liberty restrictions (overlap with laws and regs/rights and protections) • Protecting vulnerable populations • Transparent communication & public engagement

	• Weighing public health with other conflicting and interdependent public goods (e.g., economy) • Scientific considerations • Global justice and governance (international)
Information and Communication Technology	Situational Awareness, Alerts & Early Warning, & Emergency Communication Capabilities • Low-tech communication capabilities • Advanced monitoring capabilities • Alert/early warning mechanisms • Hardware, Software-as-a-Service (SaaS), & Networks • Enterprise services
Learning & Development	Education, Training, & Exercise • Knowledge, skills, and abilities (KSAs) • Technology/Database • Curriculum • Specialized training models & tutorials • Drills, Simulations, Joint exercise planning Knowledge Management • Policies, procedures, and practices • Institutional knowledge • Knowledge exchange initiatives • Knowledge management IT systems, tools, techniques • Emerging technology
Quality Improvement & Standards	National Incident Management System • Staff roles, responsibilities, and functions • Incident management structure Standards, Assessment, & Accreditation • Standards, metrics, and quality improvement tools • Position Task Books & Credentialing Operations Evaluation & Corrective Action • Operations evaluation, implementation, and management • Corrective action program planning, implementation, and management

Within the CPR PHEPR Science Agenda framework, the **Community Resilience (CR)** domain is described as the ability to prepare for anticipated hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions. Activities, such as disaster preparedness—which includes prevention, protection, mitigation, response, and

recovery—are key steps to resilience. The CR domain includes the following sub-domains, concepts, and sub-concepts.[2]

Sub-Domains	Concepts and Sub-concepts
Assessment and Monitoring: Risk, Vulnerability, Capacity & Capability	Risk and Vulnerability Assessments • Implementation and adoption • Tools and Approaches Public Health Emergency Preparedness, Response and Recovery Measures and Metrics • Standard definitions and measures • Indices
Community PHEPR & Social Cohesion	Community Engagement • Pre-disaster volunteer engagement • Public relations Multi-sector Preparedness Partnerships & Coalitions • Cross-sector engagement and collaboration • Local network structures /partnership models • Public health trust • Roles and responsibilities (including legal considerations; cross-cutting with governance) • Resource distribution and management (Cross-cutting with Incident Management Partnerships) Community Capability and capacity to engage in Preparedness, Response and Recovery • Community member preparedness • Social capital • Social cohesion
Access and Functional Needs	Intersection of PHEPR & Social Determinants of Health (SDOH) • Community health status (pre-existing health of a community including access to resources, over time) • Education • Built Environment • Social & Community context (history, culture, civic engagement, incarceration, social dynamics) • Economic Factors Health & Social Service Systems • Service Delivery • Quality and Cost-Effective Services • Hospital preparedness or engagement with Public Health • Integration

[2] Based on draft internal CDC document dated 08/09/21

	Payer/Provider Relationships • Non-traditional providers (Community Organizations, Local Retail, Faith Orgs) • Shared-service model • Data sharing
Disaster/Disaster Recovery Workforce Development and Management	Public Health Workforce Management • Workforce resilience • Recruitment and retention • Staffing and expertise • Responder support and readiness • Non-Public Health workforce (including volunteers) Professional Preparedness Training • Leadership competencies • PHEPR competencies (public health and partners) • Culture, ethics, DEI competencies • Pipeline/succession planning
Organizational Infrastructure and Administration for Public Health Preparedness	Organizational Performance & Resources • Health department performance and quality improvement • Surge capacity Informational Infrastructure • Data and information systems Governance: Legal, Ethics, and Policy Infrastructure • Leadership • Representation, Diversity, Equity & Inclusion • Ethics • Governance policies and procedures (not incident management) • Preparedness planning • Politics/Legal Fiscal Resources • Resource (re)allocation • Acquisition and procurement

Methods

SGNL, with guidance from CDC and APHL staff, utilized the following methods to guide this project and collect meaningful information:

- Scoping Process to Narrow Concepts,
- Survey of SMEs,
- Convening of a Steering Committee,
- Environmental Scan,
- Listening Workshops, and
- Individual SME Conversations.

Scoping Information Gathering Activities

Given limited time and resources, it was deemed necessary to narrow the sixteen concepts within IM and the 13 concepts within CR domains to a shortlist of nine to 12 concepts to be explored through information-gathering activities, to include three listening workshops and up to nine individual subject matter expert conversations.

To narrow down the set of concepts SGNL staff used a mixed-methods approach, which included a survey sent to SMEs, a facilitated discussion with project steering committee members, and a brief environmental scan. This information was used to develop recommendations for CDC and APHL to finalize concepts selected for the workshops and one-on-one SME conversations.

Subject Matter Expert Survey

A survey was programmed in Qualtrics and consisted of eight questions, including four ranking items and four free-response items. Respondents were asked to rank concepts within each domain by two factors: 1) the potential for positive effect if advancements were made in practice guidance and 2) level of confidence that practitioners know what to do to achieve the outcomes they desire. Respondents were also provided an opportunity to make comments. Within the survey tool, respondents were provided with definitions of the domains, sub-domains, and concepts. Eight SMEs were sent a link to the survey. SMEs represented local, state, federal, and national perspectives, practice and research experience, and knowledge of both domain areas. SMEs included five men and three women; seven white people and one person of color; three people under age 40 and five over age 40. All eight SMEs completed the survey.

The following concepts ranked within the top five for each of the domains:

Incident Management

- Partnerships
- Knowledge Management
- Responder Safety and Health
- Ethics

- Hazard/Risk Analysis

Community Resilience

- Social Determinants of Health
- Community Cohesion
- Multi-Sector Partnerships
- Health and Social Service Systems
- Community Engagement

Steering Committee Discussion

A steering committee was formed to provide review and feedback on SGNL's process and recommendations. The steering committee was comprised of senior staff from APHL, the Association of State and Territorial Health Officials (ASTHO), the Council of State and Territorial Epidemiologists (CSTE), the National Association of County and City Health Officials (NACCHO), and CDC/CPR. Results from the SME Survey were presented to the steering committee for a facilitated discussion. Following the discussion, steering committee members offered two additional concepts that warranted further consideration for inclusion in the listening workshops. These were (1) Laws and Regulation and (2) Education, Training, and Exercise.

Environmental Scan

A high-level environmental scan focused on recent literature reviews found within the CR and IC domains as well as articles centered around learnings from the coronavirus disease (COVID-19) pandemic. Themes identified through the environmental scan included gaps in communication of knowledge across sectors; how to develop and deploy training opportunities that include coordination of sectors; the importance of prioritizing responder safety and health, particularly areas of mental health; how to measure local assets and resources; and a lack of attention to social determinants of health, particularly social stressors that are often magnified in times of disaster.

Concept Selection

The final workshop concepts included the following, with the respective domains in parentheses.

Workshop 1: Exploring Gaps in the Evidence Base for Collaboration and Social Factors in PHEPR Practice

- Community Cohesion (CR)
- Social Determinants of Health (CR)
- Multi-sector Partnerships & Coalitions (CR) and Partnerships (IM)

Workshop 2: Exploring Gaps in the Evidence-Base for Laws, Policies, and Governance in PHEPR Practice

- Responder Safety and Health (IM)
- Laws and Regulations (IM)
- Governance (CR)

Workshop 3: Exploring Gaps in the Evidence-Base for Learning and Sharing in PHEPR Practice

- Education and Training (CR), Education, Training and Exercise (IM)
- Knowledge Management (IM)
- Operations Evaluation and Corrective Action (IM)

Information Gathering Activities

Listening Workshops

SGNL designed and conducted a series of three listening workshops to gather feedback on STLT PHEPR practice needs. Each workshop was designed to achieve three objectives:

1. Identify gaps or critical needs in evidence-based PHEPR practice
2. Explore the context of identified gaps and needs
3. Generate ideas for future research, translation, and dissemination investments

The workshops were not intended to generate consensus recommendations or a group work product. The following section provides a summary of the workshop process and participants.

Design

The workshops were held on April 22, 26, and 29, 2021, using Zoom, a virtual convening platform. During each workshop, participants were divided into small groups to engage in facilitated discussions about specific themes within PHEPR. The table below lists the workshop titles and associated topics.

Workshops	Topics
Listening Workshop 1: Exploring Gaps in the Evidence Base for Collaboration and Social Factors in PHEPR Practice (April 22, 2021)	• Public health agency partnerships for incident management • Multisector partnerships and coalitions for community resilience to support or working in collaboration with public health departments • Consideration of social determinants of health in public health agency PHEPR activities • Public health agency support of community cohesion to improve community resilience
Listening Workshop 2: Exploring Gaps in the Evidence Base for Laws, Policies, and Governance in PHEPR Practice (April 26, 2021)	• Laws and regulations in public health incident management • Responder safety and health in public health incident management • Governance to support community resilience
Listening Workshop 3: Exploring Gaps in the Evidence Base for Learning and Sharing in PHEPR Practice (April 29, 2021)	• Education, training, and exercise to support community resilience and public health incident management • Knowledge management in public health incident management • Operations evaluation and corrective action in public health incident management

The workshop design was inspired by the World Café Method, a whole group interaction strategy focused on deliberate, progressive conversations. In a traditional (i.e., in person)

process four to eight participants join small tables for short rounds of conversation (i.e., 20 to 45 minutes) that focus on one or two meaningful questions. At the end of each round, one person remains at each table as the host, while the others travel to new tables of their own choosing. Table hosts welcome newcomers to their tables and share the essence of that table's previous conversation. The newcomers relate any conversational threads they are carrying, and then the conversation continues, deepening as the rounds progress. The World Café Method typically involves visual or graphic documentation, often provided by participants on paper covering the discussion tables. The method was adapted for the virtual space.

For each workshop, participants were divided into three small groups, ranging from eight to 12 participants. Each small group participated in three rounds of facilitated discussion. Each group spent one round discussing each workshop topic, building on the discussion of the previous round. Each round had a central discussion prompt:

- Round 1: What gaps have you observed our understanding of and how we apply/address/use [topic]?
- Round 2: How can applied research, translation, and dissemination help address these gaps?
- Round 3: How can we use research to design a better, more sustainable PHEPR practice?

After three rounds of discussion, the participants returned to the main virtual room for a closing reflection about overarching themes and potential next steps.

Workshop Participants

Over the three workshops, participants with diverse state, local, tribal, academic, national, foundation, and nonprofit perspectives engaged in facilitated discussions and offered their individual expert opinions about specific themes within public health emergency preparedness, response, and recovery. The table below provides a summary of invited discussants by workshop and by primary perspective.

	Workshop 1	Workshop 2	Workshop 3
Total Participants*	22	29	24
Federal	1	2	1
State	4	4	5
Territorial	0	0	0
Local	7	9	7
Tribal	1	2	1
Academic	6	8	6
Nonprofit	7	9	7
Other	2	3	0
* Some participants attended more than one workshop.			

Individual SME Conversations

Following the workshops, SGNL conducted individual conversations with SMEs to gather feedback on research opportunities related to STLT PHEPR practice, specifically regarding 1) public health law, 2) health equity, and 3) partnerships. The following section provides a summary of the conversation process and participants.

Design

SGNL aimed to conduct 60-minute conversations with up to nine research, policy, and practice experts to identify potential PHEPR research projects. Desired discussant characteristics included:

- Experience serving as health department officials or emergency management leaders,
- Diversity in race/ethnicity and sex/gender,
- Service in localities with recurring disruptions (New England, Gulf Region, Midwest) and/or cofounding vulnerabilities (e.g., rural, underserved, lower income),
- Experience serving as a grantmaker for public health/PHEPR, and
- Expertise in health equity, partnerships, and/or public health law.

Individuals who accepted an invitation were asked to indicate their availability via a scheduling poll, and video conversations were scheduled with members of the SGNL team. All confirmed discussants were provided with a description of the project, conversation themes, and thinking prompts and encouraged to engage with colleagues, particularly those with "boots on the ground" perspectives, to consider four thinking prompts.

Conversation Themes

PHEPR + Public Health Law	Public health law focuses on the government's legal authorities and duties to ensure the conditions for people to be healthy and balance of these authorities and duties with individual rights to autonomy, privacy, liberty, property, and other legally protected interests.
PHEPR + Health Equity	Health equity is achieved when every person has the opportunity to "attain their full health potential" and no one is "disadvantaged from achieving this potential because of social position or other socially determined circumstances." PHEPR practices historically relied on providing equal access to resources and services to prevent, mitigate, respond to, and recover from disasters and large-scale emergencies. PHEPR practitioners must take an equity approach that contemplates how to meet community's needs based on their unique circumstances and actively seeks to remove complex systemic barriers that inhibit success to better protect communities and foster safer, more resilient communities for all.

PHEPR + Partnerships	Partnerships occur when two or more entities join in a collaborative undertaking to achieve a set of common goals and specific outcomes. Collaboration is characterized by mutually beneficial and well-defined relationships. Cooperation is characterized by informal relationships, informal information sharing, preserved authority in each organization, and separated resources by organizations. Coordination is characterized by a more formal relationship, an understanding of compatible missions, with some planning and division of roles, and some established communication channels. Engagement, or alliance, is characterized by bi-directional relationships between entities (usually one with more power than the other) that results in participatory decision-making.

Thinking Prompts

- Where do we need research to better understand public health law, health equity, and partnerships (causal pathways, theory, concepts) to advance PHEPR practice?
- Where do we need research to generate evidence-based solutions for public health law, health equity, and partnerships to reduce harm and improve PHEPR practice?
- Are there public health law, health equity, and partnerships practices that we need to translate or scale?
- Are there things about public health law, health equity, and partnerships that we should not support or study?

SGNL staff developed and used a conversation guide with questions about research opportunities related to crosscutting themes of partnerships, knowledge transfer, equity, communication, and coordination. The questions were designed to elicit potential research opportunities that would have an impact on how STLT public health prepares for, responds to, and recovers from large-scale disruptions. In addition, participants were prompted to offer research projects that would have implications for multiple settings and where solutions could be scaled to have impact.

All discussions were conducted using Zoom and were recorded for transcription and record-keeping purposes, with the permission of each discussant. Individual discussant contact information is on file with APHL.

Sample

Thirty-four (34) potential discussants were identified via previous project activities, suggestions from project stakeholders, and internet searches. Nine individuals were selected for initial outreach. Each individual received at least two emails before back-up discussants were contacted. A total of 19 individuals received invitations. Eight (8) accepted, and 11 declined or did not respond. A concerted effort was made to extend invitations to diverse individuals who met the desired characteristics. The final respondents represented the following characteristics:

- Perspectives: public health practice 3, academic 3, philanthropy 1
- Gender: Male 4, Female 4
- Race: White 5, Person of Color 3
- Subject Matter Expertise: law 1, partnerships 1, general/multiple 6

SGNL was unable to secure participation from a health equity expert. We contacted two Black females and one indigenous female to provide equity perspectives. One Black woman declined and recommended another Black woman, who did not respond to the invitation. The other two women did not respond to the invitation.

Analysis

Data from the information-gathering activities, including transcripts and notes, were reviewed and systematically categorized using an open-coding method to find themes and patterns. Coders further categorized information within each theme by type of contribution (i.e., challenge, root cause of challenge, and research opportunity). The findings from each information-gathering activity were synthesized and provided to APHL and CDC in the following documents:

- *Informing the Development of CDC CPR's Public Health Preparedness and Response Science Strategy: Proceedings of Information Gathering Workshops* (Appendix A)
- *Informing the Development of CDC CPR's Public Health Preparedness and Response Science Strategy: Documentation of SME Conversations* (Appendix B)

The research opportunities from each activity were then matched to appropriate sub-domains within the IM and CR domains of the CPR PHEPR Science Agenda framework.

Findings

Across the information-gathering activities, participants offered a wealth of opportunities for future PHEPR research.

Foundational Opportunities

Information-gathering activity participants offered ideas about how PHEPR research is conducted, rather than what PHEPR research should be conducted. Many of these ideas could not be categorized within the CPR PHEPR Science Agenda framework. SGNL classified these important ideas as "foundational opportunities" noted below:

- Recommend standard definitions for PHEPR concepts, including social determinants of health (SDOH), community cohesion, partnerships, community resilience, workforce well-being, and equity.
- Recommend standard metrics and methods for assessing and evaluating PHEPR concepts, including SDOH, community cohesion, partnerships, community resilience, workforce well-being, and equity.
- Measure the impact of PHEPR actions on various short-, medium-, and long-term outcomes, including SDOH, community cohesion, partnerships, community resilience, workforce well-being, and equity.
- Develop theories of change and document causal pathways and mediating factors for PHEPR actions.
- Enhance PHEPR logic models, indices, and assessment tools to reflect new learning.
- Encourage community-driven and practice-sourced research projects.
- Enhance the quality, granularity, and availability of systemic reviews and datasets (particularly legal datasets).

- Promote community-academic-practice partnerships.
- Revise request for proposals (RFPs) and funding agreements to promote/require the research environment needed to generate the desired future state (e.g., trans-disciplinary).
- Expand research to include comparison (e.g., control communities, other response efforts in the same community) and longitudinal designs.
- Review the evidence base for PHEPR practice (including public health emergency preparedness capabilities) to identify opportunities for research investments and guide decision-making.
- Develop an understanding of the potential consequences of PHEPR actions (e.g., legal, societal, SDOH, health, environmental, political) to better inform planning and decision-making.
- Facilitate just-in-time learning and sharing among communities that are implementing innovative or novel PHEPR practices.

Research Opportunities by Domain and Sub-domain

The following section outlines high-level research and foundational opportunities found through SGNL's analysis that could be categorized by IM and CR domains and sub-domains. Many of the identified opportunities could be categorized in multiple sub-domains and across the two domains of focus. In these instances, the opportunities are included as duplicates.

For more granular findings, context, and details regarding these opportunities, refer to the documents *Informing the Informing the Development of CDC CPR's Public Health Preparedness and Response Science Strategy: Proceedings of Information Gathering Workshops* (Appendix A) and *Informing the Development of CDC CPR's Public Health Preparedness and Response Science Strategy: Documentation of SME Conversations* (Appendix B). Refer to the Background section of this report for a detailed outline of the concepts and sub-concepts included within each of the domains and associated sub-domains.

Domain: Public Health Incident Management

Research Opportunities within Sub-domain 1: Operations & Resources

- Document purpose, membership, governance, benefits, and risks of a range of partnership structures and models for PHEPR planning, implementation, and evaluation.
- Develop guidance for ensuring the perspectives and needs of communities with a diversity of exposures and identities are represented in PHEPR data and decision-making.
- Develop guidance for enhancing operations evaluation and corrective action infrastructure, practices, and resources to facilitate continuous learning within and across jurisdictions.

Research Opportunities within Sub-domain 2: Operational Risk, Safety, & Security

- Document laws, regulations, and authorities related to the use of non-public health workforce, including volunteers for PHEPR.
- Provide guidance on adjusting federal and STLT regulations and organizational policies to facilitate activation of public health and non-public health workforce, including volunteers, during times of surge.

Research Opportunities within Sub-domain 3: Information and Communication Technology

- None identified

Research Opportunities within Sub-domain 4: Learning & Development

- Develop core and just-in-time PHEPR competencies for surge staff, skilled and unskilled volunteers, and PHEPR leaders and staff (beyond traditional emergency management competencies).
- Develop guidance on best practices for just-in-time training design and implementation.
- Understand how skilled and unskilled volunteers are utilized during response.

Research Opportunities within Sub-domain 5: Quality Improvement & Standards

- Develop guidance for enhancing operations evaluation and corrective action infrastructure, practices, and resources to facilitate continuous learning within and across jurisdictions.
- Document examples of how jurisdictions track operations evaluation and corrective action over time to determine if improvements in processes and outcomes occur.
- Develop guidance for implementing rapid cycle operations evaluation and corrective action during disruptions, when real-time changes would be most beneficial.

Domain: Community Resilience

Research Opportunities within Sub-Domain 1: Assessment and Monitoring: Risk, Vulnerability, Capacity & Capability

- Develop guidance on incorporating community resilience concepts into risk and vulnerability assessments.
- Develop recommendations for enhancing current situational awareness platforms and processes to include community resilience concepts.
- Enhance PHEPR logic models, indices, and assessment tools to reflect new learning.
- Recommend standard definitions for PHEPR concepts, including SDOH, community cohesion, partnerships, community resilience, workforce well-being, and equity.
- Recommend standard metrics and methods for assessing and evaluating PHEPR concepts, including SDOH, community cohesion, partnerships, community resilience, workforce well-being, and equity.

Research Opportunities within Sub Domain 2: Community PHEPR & Social Cohesion

- Understand how racism (structural, institutional) influences PHEPR research, leadership, practices, partnerships, and outcomes.
- Develop guidance for how to implement trauma-informed PHEPR actions.
- Understand how communication/messaging needs differ by disruption/hazard.
- Understand how communication/messaging needs differ by social identity groups.
- Develop frameworks for crafting messages before, during, and after disruption.
- Develop frameworks for message dissemination before, during, and after disruptions.
- Provide guidance on communication and messaging coordination for multi-jurisdictional disruptions.
- Document purpose, membership, governance, benefits, and risks of a range of partnership structures and models for PHEPR planning, implementation, and evaluation.
- Develop guidance for ensuring the perspectives and needs of communities with a diversity of exposures and identities are represented in PHEPR data and decision-making.
- Understand the relationship between PHEPR and community cohesion before, during, and after disruptions.

Research Opportunities within Sub Domain 3: Access and Functional Needs

- Understand how racism (structural, institutional) influences PHEPR research, leadership, practices, partnerships, and outcomes.
- Develop guidance for how to implement trauma-informed PHEPR actions.
- Develop guidance for ensuring the perspectives and needs of communities with a diversity of exposures and identities are represented in PHEPR data and decision-making.
- Understand the relationship between PHEPR and community cohesion before, during, and after disruptions.

Research Opportunities within Sub Domain 4: Disaster/Disaster Recovery Workforce Development and Management

- Develop core and just-in-time PHEPR competencies for surge staff, skilled and unskilled volunteers, and PHEPR leaders and staff (beyond traditional emergency management competencies).
- Understand the ethical, legal, social, and operational challenges experienced by leaders during disruptions.
- Develop guidance on best practices for just-in-time training design and implementation.
- Develop guidance for PHEPR staff recruitment and retention (e.g., diversity, burnout).
- Guidance on how to “activate” health department staff when the funding for their positions might not easily allow it (e.g., WIC staff).

- Guidance for empowering and supporting public health officials during disruptions, especially those that become political.
- Evaluate whether equity officers (agency and/or within ICS) affect PHEPR processes and outcomes.
- Document laws, regulations, and authorities related to the use of non-public health workforce, including volunteers) for PHEPR.
- Provide guidance on adjusting federal, state, tribal, territorial, and local regulations and organizational policies to facilitate activation of public health and non-public health workforce, including volunteers, during times of surge.
- Understand how skilled and unskilled volunteers are utilized during response.
- Understand how federal, state, and local PHEPR funding is used to support staffing, including the characteristics of dedicated PHEPR roles.

Research Opportunities within Sub Domain 5: Organizational Infrastructure and Administration for Public Health Preparedness

- Develop guidance on specifications for model PHEPR data and information systems (data sources/types, functionality, interoperability).
- Develop guidance on enhancing/leveraging regulations and administrative policies to facilitate data and information sharing for PHEPR.
- Understand the ethical, legal, social, and operational challenges experienced by leaders during disruptions.
- Guidance for empowering and supporting public health officials during disruptions, especially those that become political.
- Evaluate whether equity officers (agency and/or within ICS) affect PHEPR processes and outcomes.
- Document laws, regulations, and authorities related to the use of non-public health workforce, including volunteers) for PHEPR.
- Provide guidance on adjusting federal, state, tribal, territorial, and local regulations and organizational policies to facilitate activation of public health and non-public health workforce, including volunteers, during times of surge.
- Understand how skilled and unskilled volunteers are utilized during response.
- Understand how federal, state, and local PHEPR funding is used to support staffing, including the characteristics of dedicated PHEPR roles.

Discussion and Conclusions

Across all workshops and conversations, there were similar discussions around key barriers or persistent challenges in delivering standardized and high quality PHEPR practice, as well as questions about how things could be improved. Some of these were centered around infrastructure and systems, such as variance in regulations and authorities, limited workforce development for PHEPR response, and a lack of adopted competencies in the field. Others were more tied to culture and community, such as current trainings based on traditional emergency management and not scientific evidence or community priorities, and community stakeholders not being engaged in PHEPR planning and practice. Additionally, discussions focused on missed opportunities for stronger connections between researchers and practitioners to better inform best practices and leverage advances in other fields. Finally, some were related to a lack of certainty or standards around shared language, definitions, measurements, and roles.

The following section calls out areas within PHEPR that need to be better understood or require additional evidence to support interventions, and types of practices that should be scaled to have greater impact across states and jurisdictions.

What needs to be understood to advance PHEPR (causal pathways, theory, concepts)?

A theme that emerged across the activities was the need for a better understanding and defining of terms such as resilience and equity. There is not a good understanding of how to quantify and qualify “resilient” communities, making it difficult to focus and test interventions on those variables. Some participants argued that the concept of resilience needs to be reframed to account for underlying inequities experienced by certain populations. This can also be augmented by developing a better understanding of cumulative impacts of multiple types of “exposures” across the lifespan. Of note, relationships between PHEPR actions and the outcomes related to concepts such as community cohesion and social determinants of health are uncertain.

Officials can sometimes inadvertently exacerbate disparities during a disaster response and the relationships between PHEPR governance and authorities and community resilience, trust, and public health outcomes are uncertain. Building social determinants of health into hazards vulnerability analysis and other assessments can help to understand how disparities may be influenced by various response actions and consequently how health outcomes could be affected. Currently, PHEPR resources are scarce for social determinants of health or community cohesion work, leading to a blind spot for both researchers and response officials.

Where are evidence-based solutions needed to improve PHEPR?

Communication is one area identified that could benefit from greater evidence-based solutions. For example, there is a need to facilitate cross-jurisdictional communication and messaging coordination during large disruptions that affect multiple jurisdictions, but how this is best done is often unclear. A better understanding of various messaging

strategies for hazard types, political ideologies, and social and cultural norms would be helpful to inform messaging during a disruption or emergency event. Additionally, some participants offered questions such as, “How does misinformation grow?”, “How can we protect against it and mitigate the impact?”, and “How can PHEPR messaging reconcile science and lived experience during disruptions to acknowledge the limitations of current evidence and uncertainty?”

Additionally, PHEPR governance and leadership practices are not always grounded in science and evidence. Participants voiced a need for developing better understanding of fundamental political and leadership tensions, types of PHEPR leadership competencies and capabilities, and the best practices for leadership and decision-making during an emergency. PHEPR laws, regulations, and guidelines may also not be based in evidence and there is uncertainty around the unintended consequences of policies. One participant noted that “PHEPR needs evidence for what actions to take to prevent immediate morbidity and mortality from a disruption, and how best to mitigate potentially negative consequences of those actions.” Another asked, “Are HSEEP requirements based in evidence? How can exercises be more inclusive of real-life response issues, such as equity, trust, or politics?”

Finally, the current trainings and educational offerings are often focused on traditional, non-PHEPR emergency management approaches that may not translate to PHEPR needs. Participants noted that current training and educational offerings are often not reflective of research-based evidence or community needs and concerns.

Are there PHEPR practices that CDC could translate or scale?

Many best practices may have an evidence base, but have only been applied on smaller, local scales. An effort to facilitate just-in-time learning and sharing among communities that are implementing novel PHEPR practices can help generate more data to prove or disprove the feasibility and good effect of the intervention, while also connecting communities who experience similar hazards or threats.

Developing an understanding of best practices for interoperable data systems and enhancing policies and practices supporting data sharing can also help to accelerate the translation and scaling of PHEPR practices around the country. Ideally, communities can learn lessons from others who have already gone through events and tested interventions, instead of learning the lessons themselves through first-hand experience.

Are there aspects about PHEPR that CDC should not support or study?

Recurring themes regarding aspects of PHEPR that CDC should not support or study did not emerge during the workshop and SME conversations. However, some participants felt that much of PHEPR practice is built on assumptions, with the considerable investments made in PHEPR practice since 9/11 based on weak levels of evidence. As such, it may be time to examine or acquire actual evidence and make sure PHEPR

practice and policies are not maintained or scaled out of habit, momentum, or resistance to change. Areas for consideration include:

- Utility and reliability of After-Action Reports (AAR) as data sources and performance metrics;
- Efficacy of exercises to prepare for emergencies;
- Overemphasis on individual preparedness; and
- Reliance of traditional top-down or government centered models such as the Incident Command System (ICS).

Other participants offered that CDC should not continue to study PHEPR in capability-based and field-of-practice siloes. Future studies should consider PHEPR across capabilities and expand scope to include non-PHEPR fields of expertise and concerns.

Limitations

The following factors may have influenced the outcomes of this project and represent opportunities for improvement as CDC continues to CPR PHEPR Science Agenda framework.

Concepts/Frameworks

1. The CPR PHEPR science framework was not final at the time of implementation of this project. It was difficult to select concepts and plan activities without having a more finalized framework, particularly definitions.

Participation/Representation in Data Collection

2. The activities were conducted during the COVID-19 pandemic. It is likely that invitees were unable to respond to SGNL requests for participation or did not have ample time to provide feedback during activities. This might have limited diversity in participation.
3. As part of the information gathering activities, a concerted effort was made to extend invitations for participation to diverse individuals who met the desired characteristics (e.g., a combination of institution/organization type, perspective, gender, race, subject matter expertise, and geography). However, due to lack of response, declines, and scheduling conflicts, the desired diversity was not achieved.
4. CDC staff expressed a preference for perspectives “from the field”, or those that understood the practical needs of STLT PHEPR. SGNL prioritized such individuals for workshop invitations. However, practitioners had difficulty describing ideas through a research opportunity lens. In addition, it was difficult to balance the need to identify opportunities that addressed immediate needs at the practice level while filling actual gaps in evidence. The PHEPR evidence base is not well documented, nor are practitioners aware of the limited evidence available.

Analysis

5. Towards the conclusion of the project, APHL and CDC staff requested to have these opportunities for future PHEPR research categorized by the IM and CR domains, sub-domains, concepts, and sub-concepts of the CPR PHEPR Science Agenda framework. Given limited time and resources, SGNL was not able to conduct a methodical qualitative review necessary to categorize the research opportunities to the concept and sub-concept levels. Therefore, categorization was limited to domain and sub-domain levels.
6. When asked for guidance on translating workshop and discussion outputs into findings, CDC staff noted a need to consider their budget limitations and scope of influence and control. SGNL was not able to accommodate this request without further collaboration with CDC.
7. CDC staff requested that findings be further categorized as research, evaluation, or translation activities. This analysis would require a thorough understanding of the evidence for each domain/sub-domain/concept/sub-concept. SGNL was unable to accommodate this request.

Appendix A - Informing the Development of CDC CPR's Public Health Preparedness and Response Science Strategy: Proceedings of Information Gathering Workshops

Informing the Development of CDC CPR's Public Health Preparedness and Response Science Strategy

Proceedings of Information Gathering Workshops

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INTRODUCTION

Through Cooperative Agreement funding from the US Centers for Disease Control and Prevention (CDC), the Association for Public Health Laboratories (APHL) contracted with SGNL Solutions, LLC to design and conduct a series of three listening workshops in April 2021 to gather feedback on state, tribal, local, and territorial (STLT) public health emergency preparedness, response, and recovery practice needs. During each workshop, invited participants engaged in facilitated discussions and offered their individual expert opinions about specific themes within public health emergency preparedness, response, and recovery. The workshops were not intended to generate consensus recommendations or a group work product. Section 1 of this document provides an overview of the themes discussed in each workshop, as well as gaps and challenges that emerged during the conversations. These findings are also conveyed graphically. Each of the gaps and challenges are buoyed by root causes and nuanced context that cannot always be captured in short bullets or graphics. These details for each of the workshops can be found in Section 2.

Across all workshops, there were similar discussions around key barriers or persistent challenges in delivering standardized and high quality PHEPR practice, as well as questions about how things could be improved. Some of these were centered around infrastructure and systems, such as variance in regulations and authorities, limited workforce development for PHEPR response, and a lack of adopted competencies in the field. Others were more tied to culture and community, such as current trainings based on traditional emergency management and not scientific evidence or community priorities, and community stakeholders not being engaged in PHEPR planning and practice. Additionally, there have been missed opportunities for stronger connections between researchers and practitioners to better inform best practices and leverage advances in other fields. Finally, some were related to a lack of certainty or standards around shared language, definitions, measurements, and roles. The sections below provide more background and context on each of these issues.

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SECTION 1

Workshop 1: Exploring Gaps in the Evidence Base for Collaboration and Social Factors in PHEPR Practice (April 22), focused on the following themes:

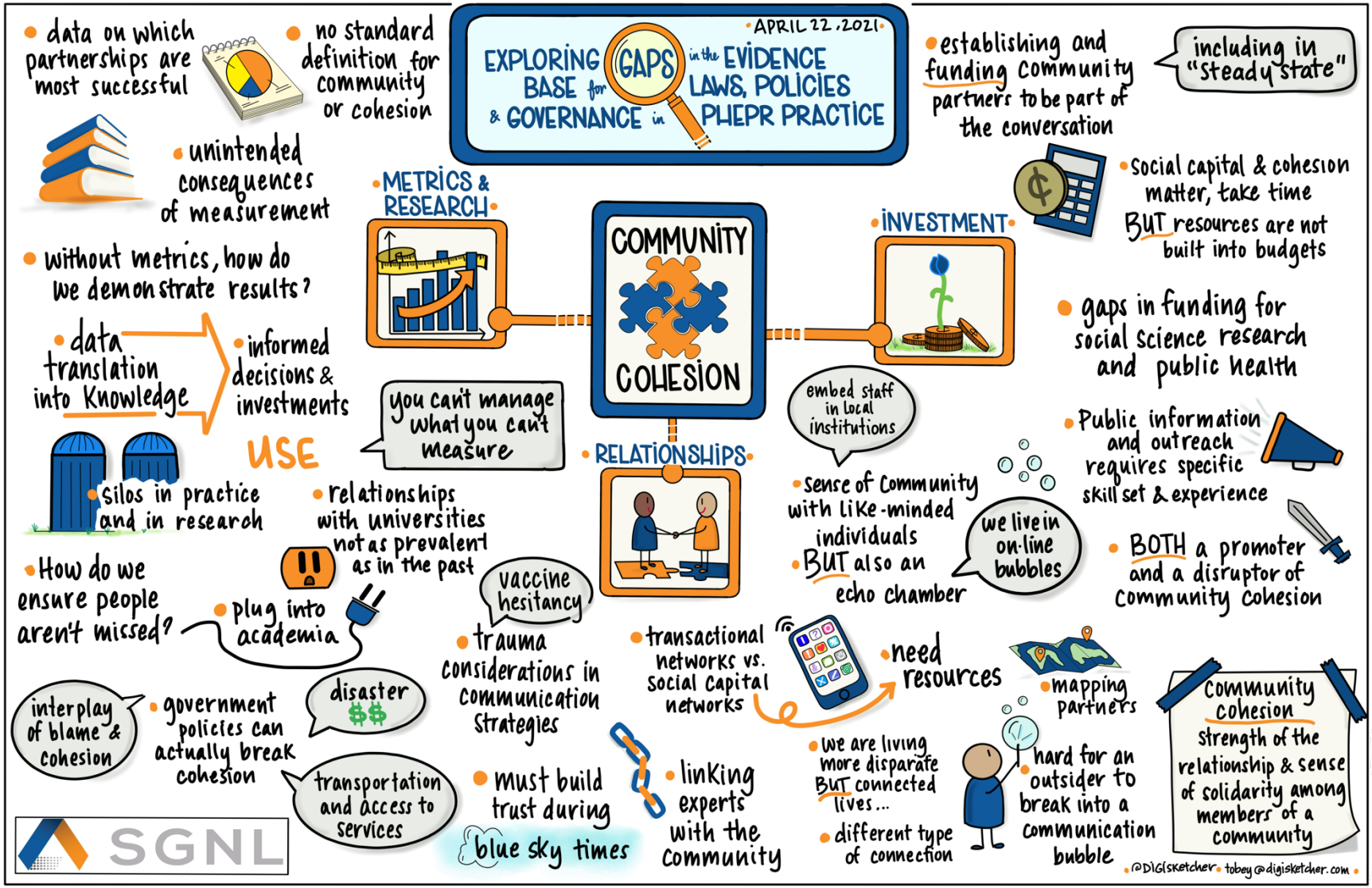
- Public health agency partnerships for incident management
- Multisector partnerships and coalitions for community resilience to support or working in collaboration with public health departments
- Consideration of social determinants of health in public health agency preparedness, response, and recovery activities
- Public health agency support of community cohesion to improve community resilience

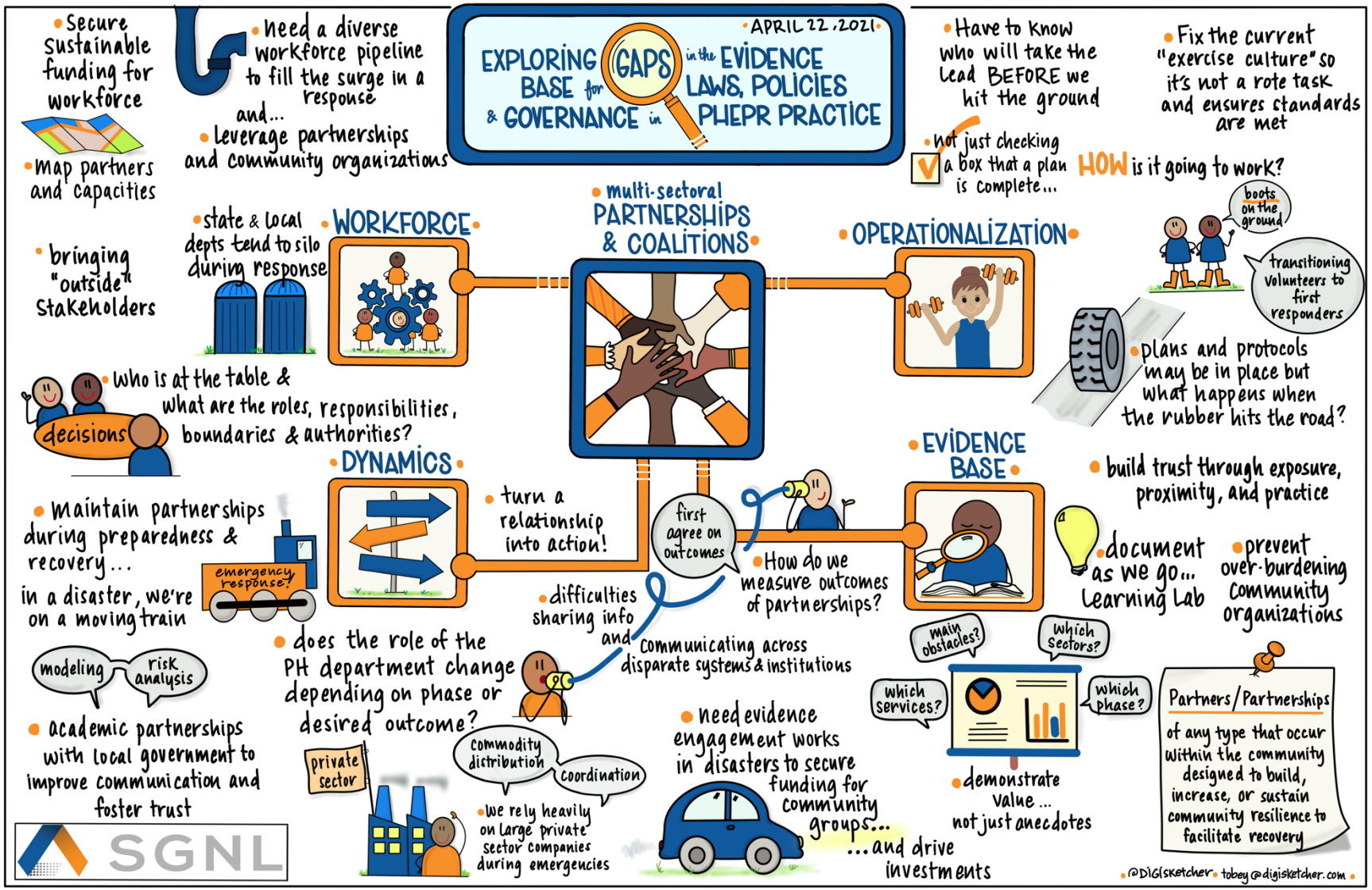
Summary of Gaps and Challenges Across Themes:

- Shared Language, Understanding, and Measurement
    - These concepts (e.g., SDOH, community cohesion, partnerships, community resilience) are not well defined for PHEPR.
    - Metrics and methods for assessing and evaluating these concepts (e.g., SDOH, community cohesion, partnerships, community resilience) within PHEPR are not standardized.
    - Relationships between PHEPR actions and these outcomes related to these concepts (e.g., community cohesion, SDOH) are uncertain (e.g., theory of change, causal pathways).
- Workforce Competencies/Capabilities/Capacities
    - The current PHEPR workforce competencies do not match what is needed for the future.
    - PHEPR leaders do not have capacity/capabilities/competencies to apply these concepts to PHEPR actions.
- Relevance to PHEPR
    - SDOH are not seen as central or core to PHEPR.
    - PHEPR engagement in SDOH is not always met with public approval.
    - Structural problems related to SDOH are outside of PHEPR influence.
    - Governmental agencies risk losing public trust when taking PHEPR actions
    - PHEPR resources are not available for SDOH or community cohesion work.
- Siloed Stakeholders
    - PHEPR partnerships are challenged by siloes that persist between sectors (government/public, private/for-profit, nonprofit/community, academia).
- Evidence-based Strategies and Actions
    - PHEPR practitioners have limited awareness of actions they can take to build community cohesion.
- Community-Centering
    - Communities are not properly engaged in planning, implementation, and evaluation of PHEPR actions.
    - PHEPR partnerships tend to be transactional, not relational. Resilience requires different types of relationships.
- Technology
    - Social media and technology can build community cohesion, but also have the potential to harm.

    - Current information sharing systems and practices do not facilitate PHEPR partnerships.
- Justice and Equity
    - PHEPR practices are not always equitable.
    - PHEPR practices are not trauma-informed.
    - PHEPR practices are often not informed by other disciplines such as the social sciences.
    - Social inequities are perpetuated in PHEPR partnerships.

Workshop 1: Exploring Gaps in the Evidence Base for Collaboration and Social Factors in PHEPR Practice
Graphic Portrayals of Meeting Themes by Breakout Groups




EXPLORING GAPS in the EVIDENCE BASE for LAWS, POLICIES & GOVERNANCE in PHEPR PRACTICE
APRIL 22, 2021
Secure sustainable funding for workforce
Map partners and capacities
need a diverse workforce pipeline to fill the surge in a response
and...
Leverage partnerships and community organizations
bringing "outside" stakeholders
state & local depts tend to silo during response
WORKFORCE
multi-sectoral PARTNERSHIPS & COALITIONS
OPERATIONALIZATION
Have to know who will take the lead BEFORE we hit the ground
not just checking a box that a plan is complete...
Fix the current "exercise culture" so it's not a rote task and ensures standards are met
HOW is it going to work?
boots on the ground
transitioning volunteers to first responders
plans and protocols may be in place but what happens when the rubber hits the road?
decisions
Who is at the table & what are the roles, responsibilities, boundaries & authorities?
DYNAMICS
EVIDENCE BASE
build trust through exposure, proximity, and practice
Maintain partnerships during preparedness & recovery...
in a disaster, we're on a moving train
emergency response?
turn a relationship into action!
first agree on outcomes
How do we measure outcomes of partnerships?
document as we go... Learning Lab
prevent over-burdening community organizations
difficulties sharing info and communicating across disparate systems & institutions
does the role of the PH department change depending on phase or desired outcome?
modeling
risk analysis
academic partnerships with local government to improve communication and foster trust
main obstacles?
which sectors?
which services?
which phase?
demonstrate value ... not just anecdotes
Partners / Partnerships
of any type that occur within the community designed to build, increase, or sustain community resilience to facilitate recovery
private sector
commodity distribution
coordination
we rely heavily on large private sector companies during emergencies
need evidence engagement works in disasters to secure funding for community groups...
...and drive investments
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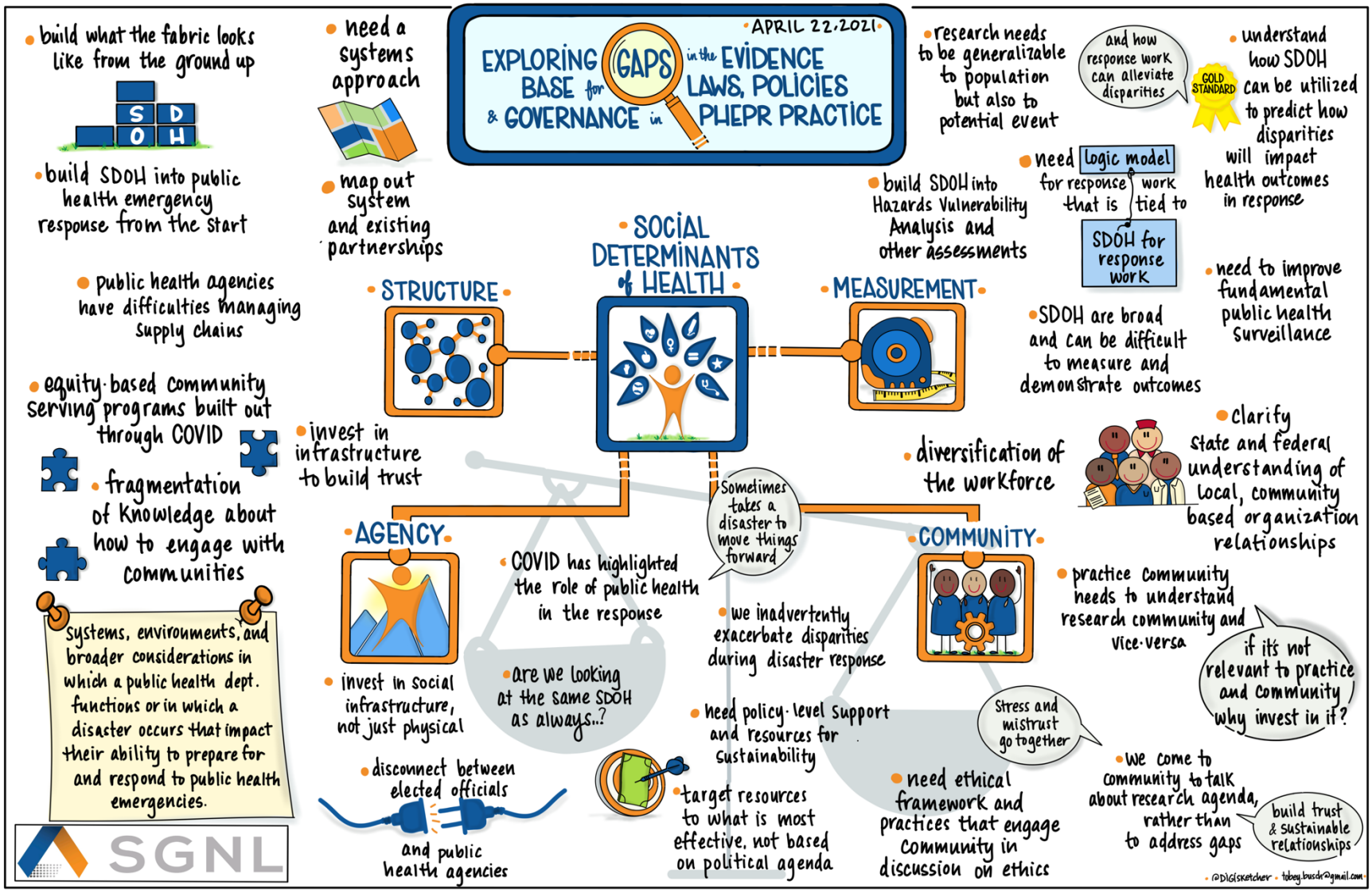
APRIL 22, 2021
EXPLORING GAPS in the EVIDENCE BASE for LAWS, POLICIES & GOVERNANCE in PHEPR PRACTICE
SOCIAL DETERMINANTS of HEALTH
STRUCTURE
MEASUREMENT
AGENCY
COMMUNITY
build what the fabric looks like from the ground up
S D O H
build SDOH into public health emergency response from the start
need a systems approach
map out system and existing partnerships
public health agencies have difficulties managing supply chains
equity-based community serving programs built out through COVID
fragmentation of knowledge about how to engage with communities
invest in infrastructure to build trust
Systems, environments, and broader considerations in which a public health dept. functions or in which a disaster occurs that impact their ability to prepare for and respond to public health emergencies.
SGNL
invest in social infrastructure, not just physical
disconnect between elected officials and public health agencies
COVID has highlighted the role of public health in the response
Sometimes takes a disaster to move things forward
are we looking at the same SDOH as always...?
we inadvertently exacerbate disparities during disaster response
need policy-level support and resources for sustainability
target resources to what is most effective, not based on political agenda
research needs to be generalizable to population but also to potential event
and how response work can alleviate disparities
GOLD STANDARD
understand how SDOH can be utilized to predict how disparities will impact health outcomes in response
build SDOH into Hazards Vulnerability Analysis and other assessments
need Logic model for response work that is tied to SDOH for response work
need to improve fundamental public health surveillance
SDOH are broad and can be difficult to measure and demonstrate outcomes
diversification of the workforce
clarify state and federal understanding of local, community based organization relationships
practice community needs to understand research community and vice-versa
if it's not relevant to practice and community why invest in it?
Stress and mistrust go together
need ethical framework and practices that engage community in discussion on ethics
we come to community to talk about research agenda, rather than to address gaps
build trust & sustainable relationships
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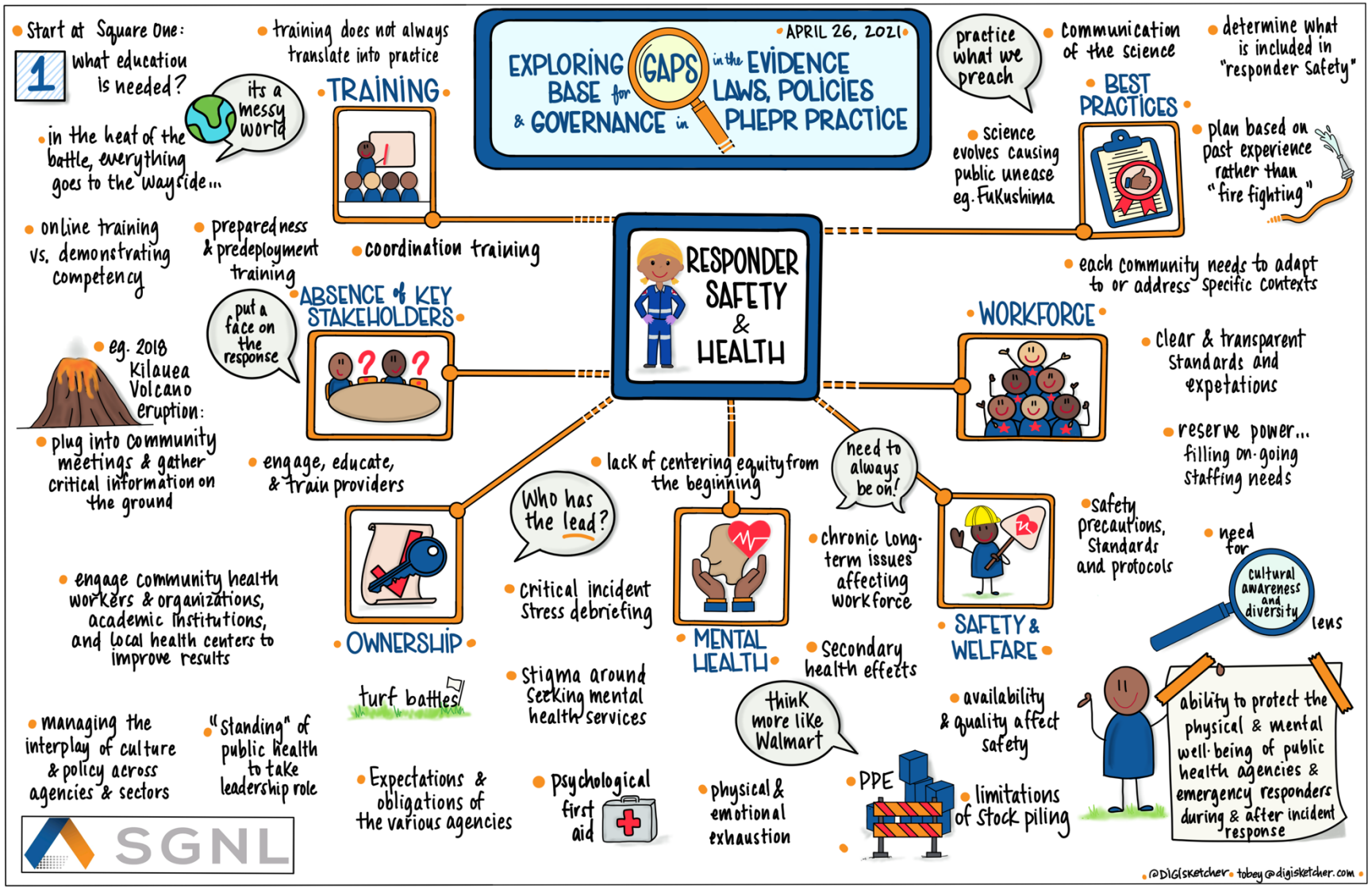
Workshop 2: Exploring Gaps in the Evidence Base for Laws, Policies and Governance in PHEPR Practice (April 26), focused on the following themes:

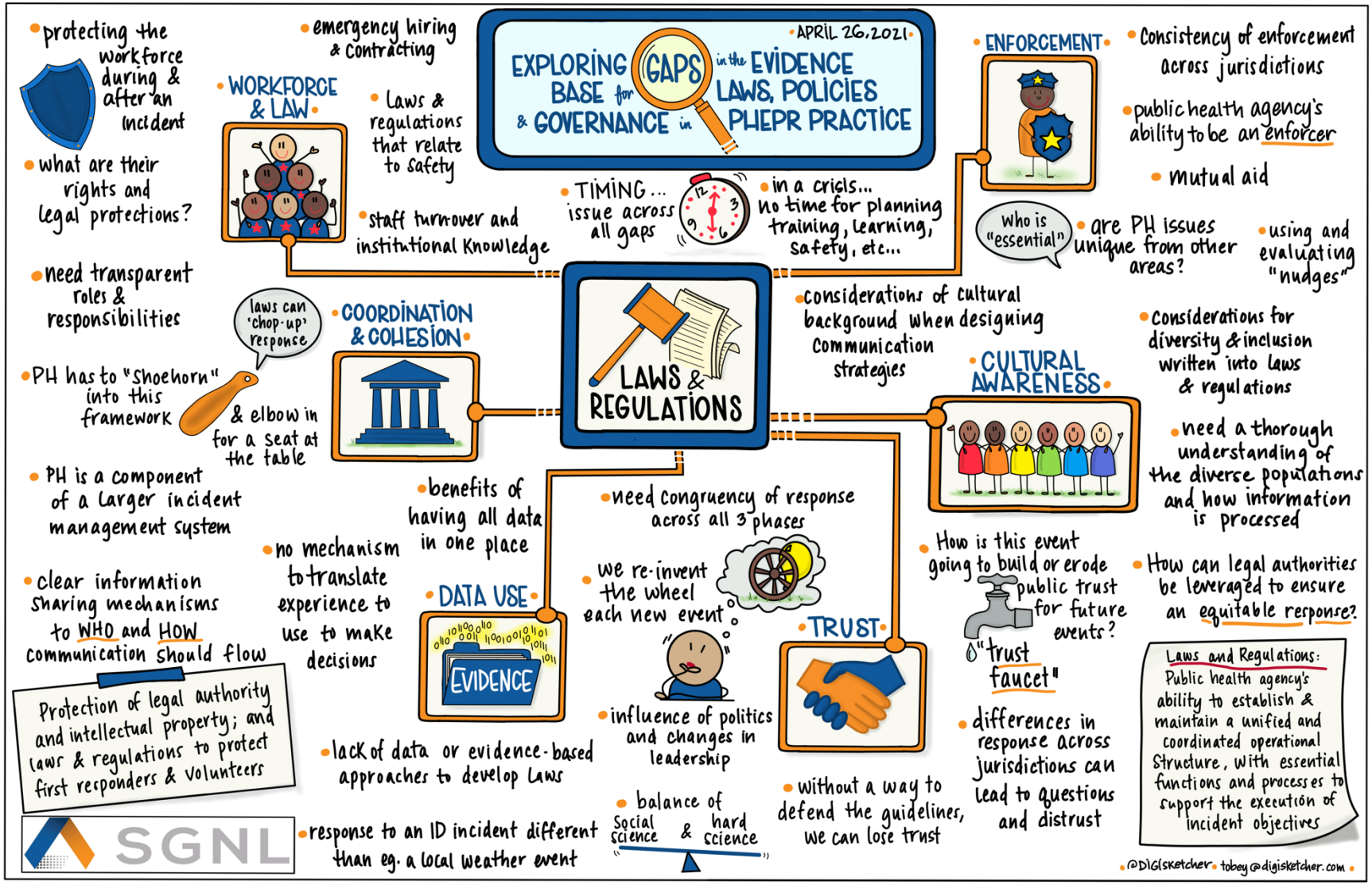
- Responder safety and health
- Laws and regulations
- Governance

Summary of Gaps and Challenges Across Themes:

- Shared Language, Understanding, and Measurement
    - The concept of community resilience is not well defined or regularly assessed for PHEPR.
    - Relationships between PHEPR governance and authorities and community resilience, trust, and public health outcomes are uncertain (e.g., theory of change, causal pathways).
    - Relationships between response and PHEPR workforce well-being are uncertain (e.g., theory of change, causal pathways).
- Workforce Competencies/Capabilities/Capacities
    - While FSTLT jurisdictions have specific PHEPR authorities, the available resources, leadership, and infrastructure are not always aligned to provide capability/capacity to operationalize and enforce.
    - Workforce turnover has impact on optimal enforcement of PHEPR laws, regulations, and authorities.
    - Public health workers are not aware of their risks, rights, and protections when activated for response.
    - Existing workforce development options, including routine and just-in-time trainings, do not adequately prepare the workforce for response roles.
    - Accountability for the safety and wellbeing of PHEPR responders is unclear.
- Workforce Surge
    - Laws, regulations, and authorities related to the use of volunteers for PHEPR activities are ambiguous.
    - Expanding the PHEPR workforce during periods of surge is necessary, but challenging.
- PHEPR Roles and Relevance
    - The role of PHEPR FSTLT jurisdictions in fostering community resilience is unclear.
    - The role and authorities of public health in emergency preparedness, response, and recovery are unclear to some stakeholders.
    - PHEPR plays a key role in response but is not always designated as or considered a response agency/workforce.
- Variance across Jurisdictions
    - FSTLT jurisdictions can have a high degree of variance in how PHEPR regulations and authorities are operationalized.
- Evidence-based Strategies and Actions
    - PHEPR governance practices are not always grounded in science and evidence.
    - PHEPR capacity for leveraging governance to build community resilience is limited.
    - PHEPR laws, regulations, and guidelines may not be based in evidence.
- Community-Centering
    - Communities are not engaged in governance.
    - Communication about PHEPR laws, regulations, and authorities is flawed.

Workshop 2: Exploring Gaps in the Evidence Base for Laws, Policies and Governance in PHEPR Practice
Graphic Portrayals of Meeting Themes by Breakout Groups




EXPLORING GAPS in the EVIDENCE BASE for LAWS, POLICIES & GOVERNANCE in PHEPR PRACTICE
APRIL 26, 2021
LAWS & REGULATIONS
WORKFORCE & LAW
protecting the workforce during & after an incident
what are their rights and legal protections?
need transparent roles & responsibilities
emergency hiring & contracting
Laws & regulations that relate to safety
staff turnover and institutional knowledge
COORDINATION & COHESION
laws can 'chop-up' response
PH has to "shoehorn" into this framework
& elbow in for a seat at the table
PH is a component of a larger incident management system
clear information sharing mechanisms to WHO and HOW communication should flow
Protection of legal authority and intellectual property; and laws & regulations to protect first responders & volunteers
DATA USE
EVIDENCE
benefits of having all data in one place
no mechanism to translate experience to use to make decisions
lack of data or evidence-based approaches to develop Laws
response to an ID incident different than eg. a local weather event
TIMING... issue across all gaps
in a crisis... no time for planning training, learning, safety, etc...
need congruency of response across all 3 phases
we re-invent the wheel each new event
influence of politics and changes in leadership
balance of Social Science & hard Science
TRUST
Without a way to defend the guidelines, we can lose trust
ENFORCEMENT
Who is "essential"
Consistency of enforcement across jurisdictions
public health agency's ability to be an enforcer
mutual aid
are PH issues unique from other areas?
using and evaluating "nudges"
considerations of cultural background when designing communication strategies
CULTURAL AWARENESS
considerations for diversity & inclusion written into laws & regulations
need a thorough understanding of the diverse populations and how information is processed
How is this event going to build or erode public trust for future events?
"trust faucet"
differences in response across jurisdictions can lead to questions and distrust
How can legal authorities be leveraged to ensure an equitable response?
Laws and Regulations:
Public health agency's ability to establish & maintain a unified and coordinated operational structure, with essential functions and processes to support the execution of incident objectives
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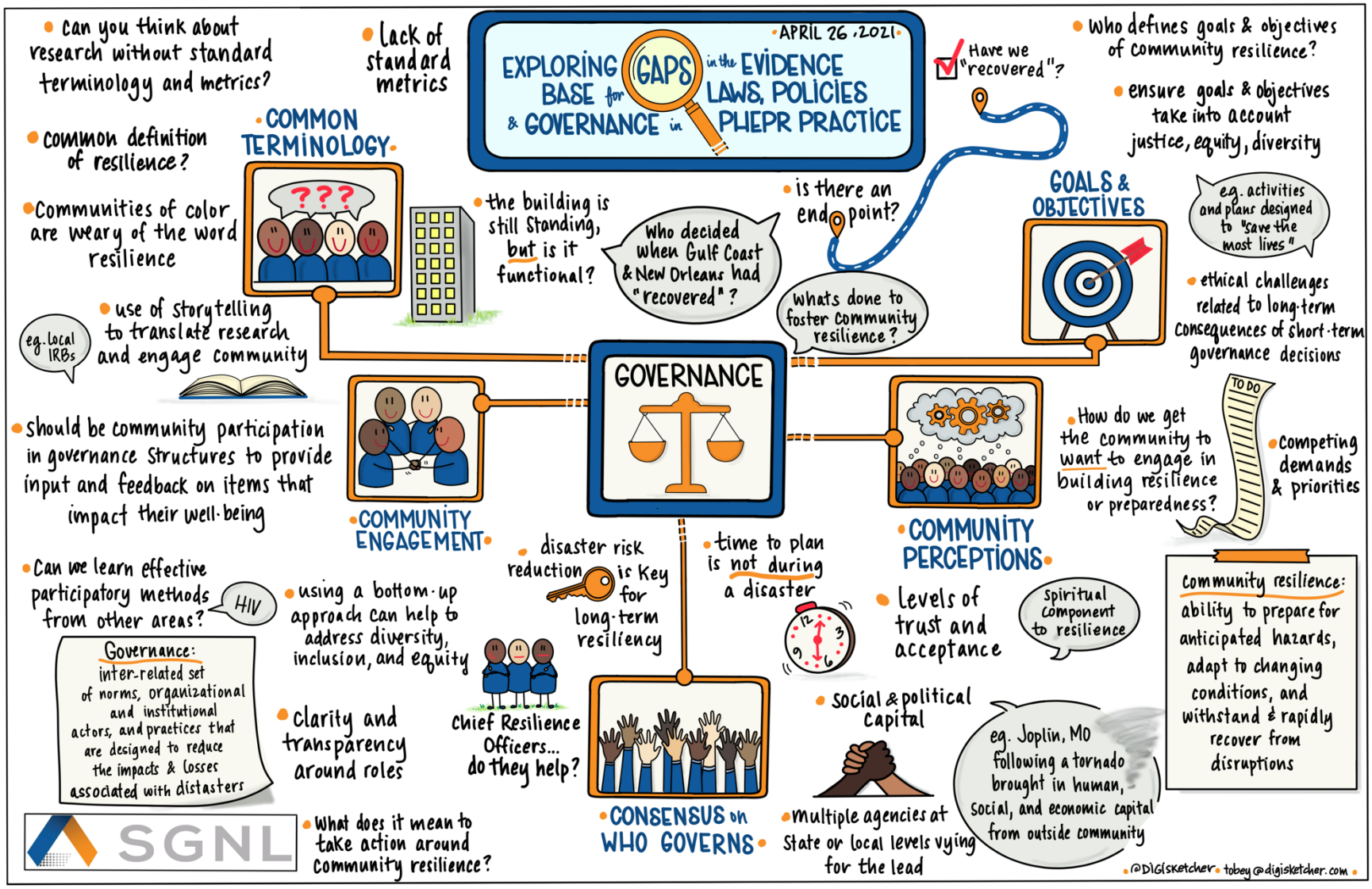
APRIL 26, 2021
EXPLORING GAPS in the EVIDENCE BASE for LAWS, POLICIES & GOVERNANCE in PHEPR PRACTICE
Can you think about research without standard terminology and metrics?
Lack of standard metrics
COMMON TERMINOLOGY
common definition of resilience?
Communities of color are weary of the word resilience
use of storytelling to translate research and engage community
eg. local IRBs
Should be community participation in governance structures to provide input and feedback on items that impact their well-being
COMMUNITY ENGAGEMENT
Can we learn effective participatory methods from other areas?
HIV
using a bottom-up approach can help to address diversity, inclusion, and equity
Governance: inter-related set of norms, organizational and institutional actors, and practices that are designed to reduce the impacts & losses associated with distasters
clarity and transparency around roles
SGNL
What does it mean to take action around community resilience?
the building is still Standing, but is it functional?
Who decided when Gulf Coast & New Orleans had "recovered"?
Have we "recovered"?
is there an end point?
Whats done to foster community resilience?
GOVERNANCE
disaster risk reduction is Key for long-term resiliency
time to plan is not during a disaster
Chief Resilience Officers... do they help?
CONSENSUS on WHO GOVERNS
multiple agencies at State or local levels vying for the lead
social & political capital
eg. Joplin, MO following a tornado brought in human, social, and economic capital from outside community
COMMUNITY PERCEPTIONS
Levels of trust and acceptance
Spiritual component to resilience
How do we get the community to want to engage in building resilience or preparedness?
Who defines goals & objectives of community resilience?
ensure goals & objectives take into account justice, equity, diversity
GOALS & OBJECTIVES
eg. activities and plans designed to "save the most lives"
ethical challenges related to long-term consequences of short-term governance decisions
TO DO
Competing demands & priorities
Community resilience: ability to prepare for anticipated hazards, adapt to changing conditions, and withstand & rapidly recover from disruptions
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Workshop 3: Exploring Gaps in the Evidence Base for Learning and Sharing in PHEPR Practice (April 29), focused on the following themes:

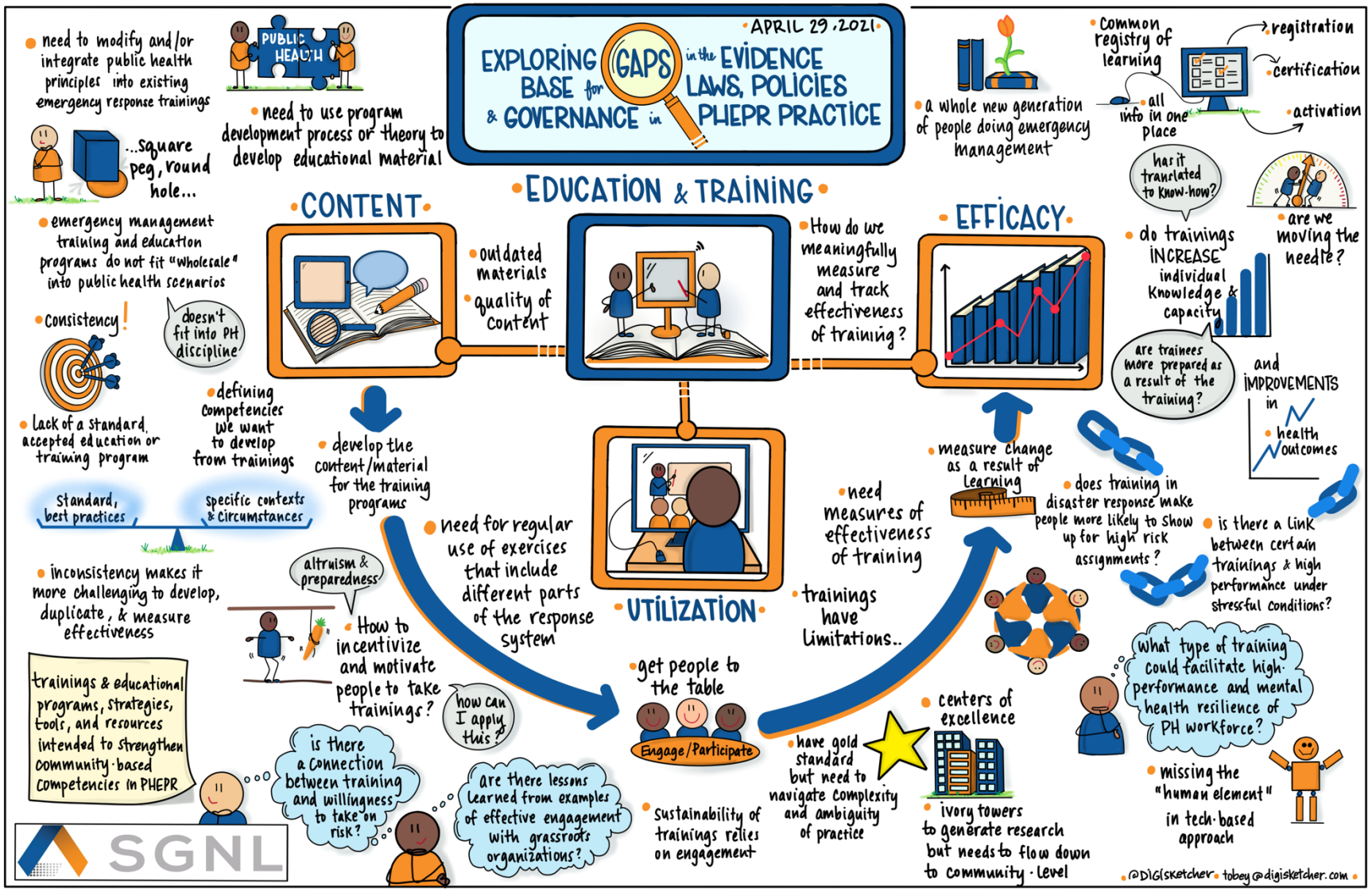
- Education and training for community resilience
- Education, training, and exercise for incident management
- Knowledge management in incident management
- Operations, evaluation, and corrective action in incident management

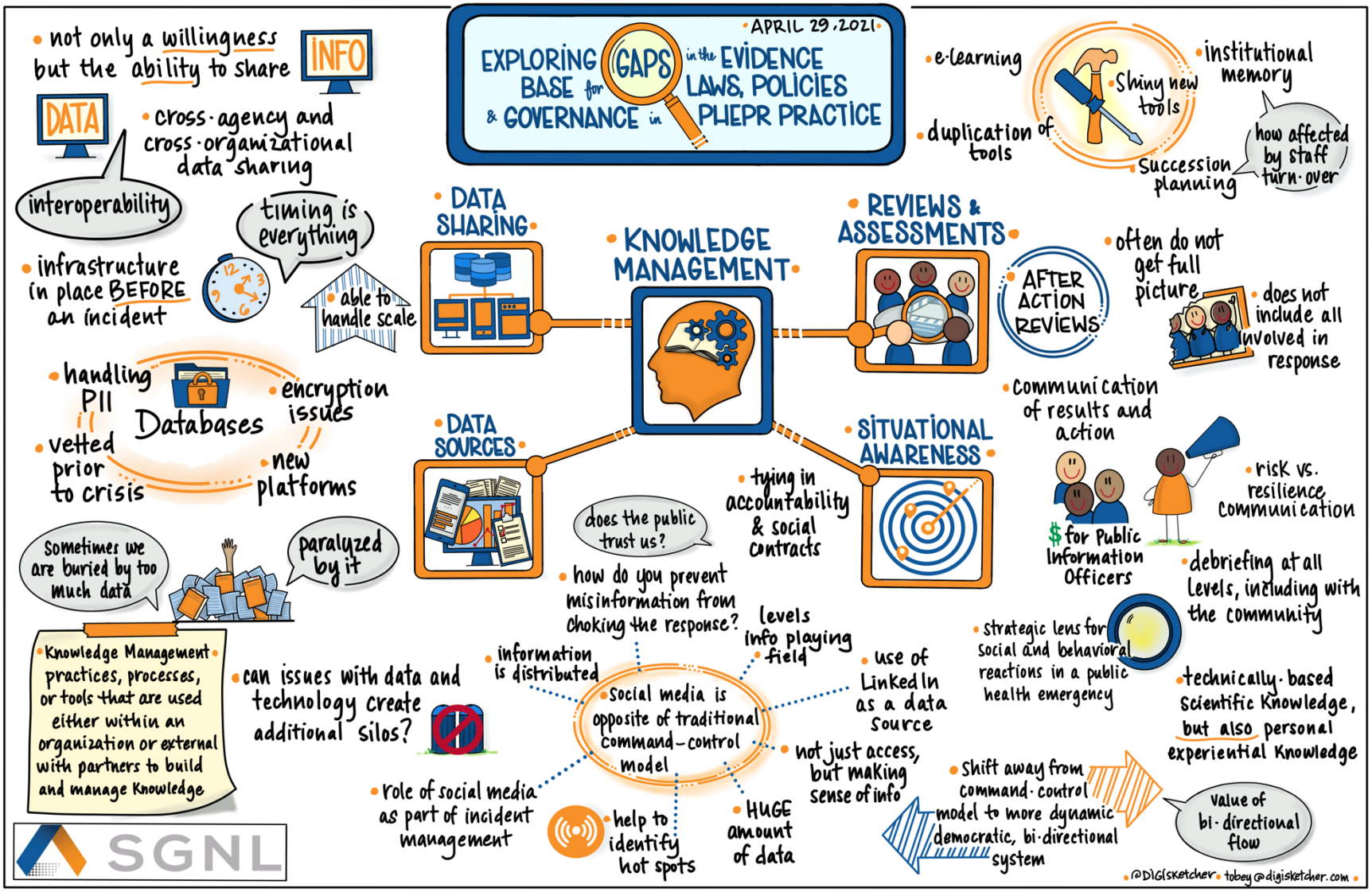
Summary of Gaps and Challenges Across Themes:

- Shared Language, Understanding, and Measurement
    - Relationships between education/training and community resilience outcomes are uncertain (e.g., theory of change, causal pathways) and hard to measure.
    - Operations evaluation and corrective action within a jurisdiction are rarely tracked over time to determine if improvements in processes and outcomes occur.
    - The role of media and PIOs are not well understood for public health emergencies.
- Workforce Competencies/Capabilities/Capacities
    - The field has not adopted PHEPR competencies.
    - Workforce turnover creates gaps and challenges in knowledge management, including succession planning and continuity.
    - Public health employees and community volunteers are often activated to provide PHEPR support (i.e., PHEPR is not their formal job).
    - The people leading the operations evaluation and corrective action activities often do not have the KSAs needed.
    - High quality, learner-centered PHEPR trainings are not easy to find.
- Evidence-based Strategies and Actions
    - Current trainings/education offerings are often focused on traditional emergency management approaches and not reflective of research-based evidence or community needs and concerns.
    - Operations evaluation and corrective action has been highly routinized through AARs, but the templates and processes available may not be what is needed to achieve improvement goals.
- Limitations of Information used for Decision-Making and Improvements
    - Current PHEPR situational awareness platforms and processes do not give a complete picture and limit the ability of practitioners to predict and respond in a disaster.
    - PHEPR must value and include data from more diverse sources.
    - PHEPR data is often not nuanced enough address issues of diversity, inclusion, and equity.
    - Participants in operations evaluation and corrective action should include more than agency staff.
    - Existing data systems used by PHEPR are limited in functionality and interoperability.
- Sensitivity to Backlash
    - There are serious concerns about privacy and transparency.
    - Jurisdictions fear backlash or punishment from operations evaluation and corrective action.
    - Operations evaluation and corrective action activities should focus on policies, systems, and environments, not individuals.

- Culture of Learning and Improvement
    - The field does not always build on lessons learned from previous experiences.
    - The current operations evaluation and corrective action infrastructure and practices make it difficult to learn within and across jurisdictions.
    - Operations evaluation and corrective action do not seem to result in actual changes or improvements (i.e., the feedback loop is not closed).
    - Operations evaluation and corrective action tends to happen at the end of an event rather than during at event, when real-time changes would be most beneficial.

Workshop 3: Exploring Gaps in the Evidence Base for Learning and Sharing in PHEPR Practice
Graphic Portrayals of Meeting Themes by Breakout Groups




APRIL 29, 2021
EXPLORING GAPS in the EVIDENCE BASE for LAWS, POLICIES & GOVERNANCE in PHEPR PRACTICE
not only a willingness but the ability to share
INFO
DATA
cross-agency and cross-organizational data sharing
interoperability
timing is everything
able to handle scale
infrastructure in place BEFORE an incident
DATA SHARING
KNOWLEDGE MANAGEMENT
REVIEWS & ASSESSMENTS
e-learning
duplication of tools
Shiny new tools
Succession planning
institutional memory
how affected by staff turn-over
AFTER ACTION REVIEWS
often do not get full picture
does not include all involved in response
handling PII
Databases
encryption issues
vetted prior to crisis
new platforms
DATA SOURCES
SITUATIONAL AWARENESS
tying in accountability & social contracts
communication of results and action
$ for Public Information Officers
risk vs. resilience communication
debriefing at all levels, including with the community
Sometimes we are buried by too much data
paralyzed by it
does the public trust us?
how do you prevent misinformation from choking the response?
Knowledge Management practices, processes, or tools that are used either within an organization or external with partners to build and manage knowledge
can issues with data and technology create additional silos?
information is distributed
levels info playing field
Social media is opposite of traditional command-control model
use of LinkedIn as a data source
strategic lens for social and behavioral reactions in a public health emergency
technically-based Scientific Knowledge, but also personal experiential Knowledge
not just access, but making sense of info
role of social media as part of incident management
help to identify hot spots
HUGE amount of data
Shift away from command-control model to more dynamic democratic, bi-directional system
value of bi-directional flow
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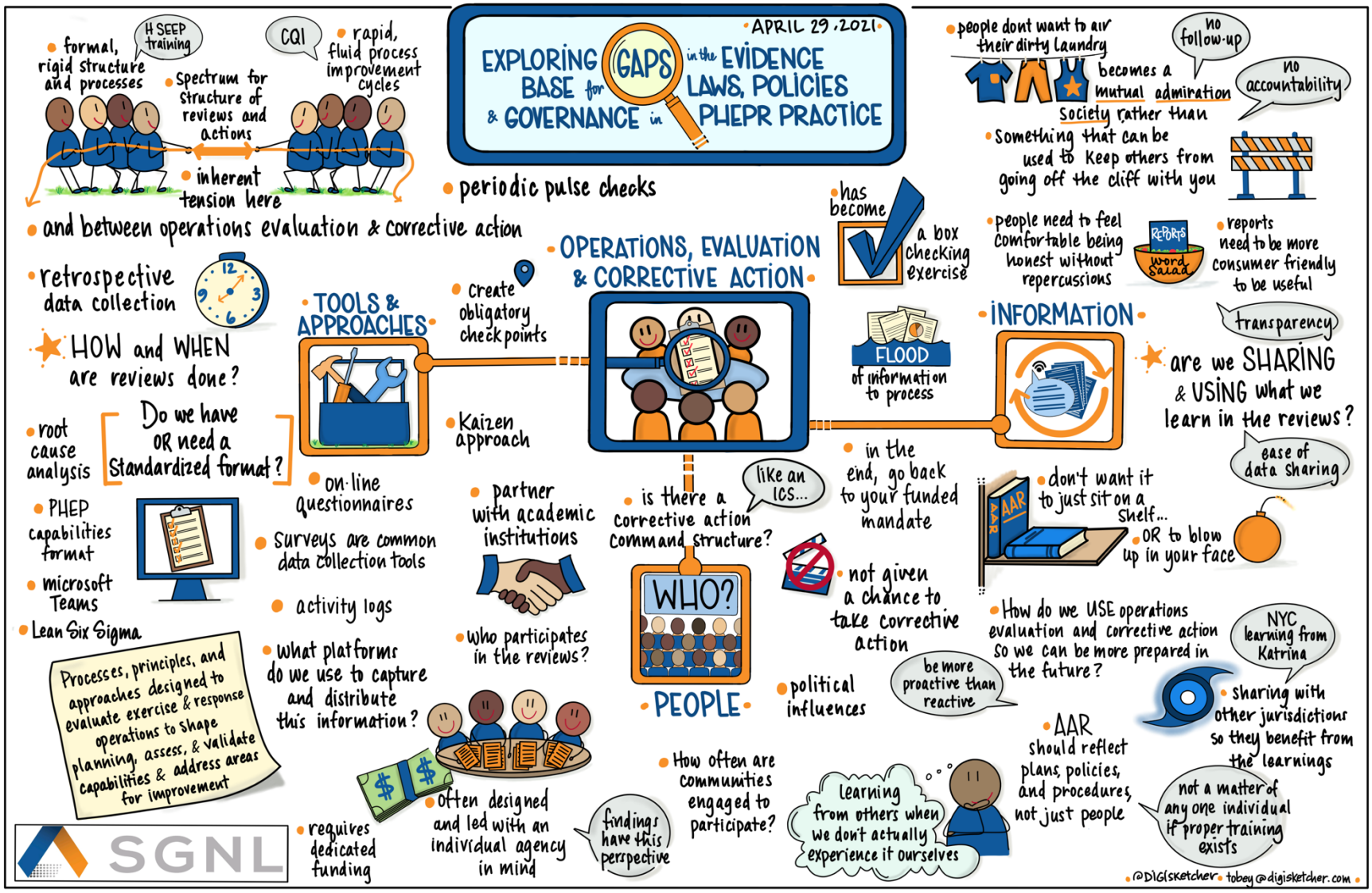
EXPLORING GAPS in the EVIDENCE BASE for LAWS, POLICIES & GOVERNANCE in PHEPR PRACTICE
APRIL 29, 2021
formal, rigid structure and processes
H SEEP training
Spectrum for structure of reviews and actions
inherent tension here
CQI
rapid, fluid process improvement cycles
periodic pulse checks
and between operations evaluation & corrective action
retrospective data collection
HOW and WHEN are reviews done?
root cause analysis
Do we have OR need a Standardized format?
PHEP capabilities format
microsoft Teams
Lean Six Sigma
Processes, principles, and approaches designed to evaluate exercise & response operations to shape planning, assess, & validate capabilities & address areas for improvement
TOOLS & APPROACHES
create obligatory check points
Kaizen approach
on-line questionnaires
Surveys are common data collection tools
activity logs
what platforms do we use to capture and distribute this information?
partner with academic institutions
who participates in the reviews?
OPERATIONS, EVALUATION & CORRECTIVE ACTION
is there a corrective action command structure?
like an ICS...
WHO?
PEOPLE
political influences
has become a box checking exercise
FLOOD of information to process
in the end, go back to your funded mandate
not given a chance to take corrective action
be more proactive than reactive
INFORMATION
people dont want to air their dirty laundry
becomes a mutual admiration Society rather than
no follow-up
no accountability
Something that can be used to Keep others from going off the cliff with you
people need to feel comfortable being honest without repercussions
REPORTS
Word Salad
reports need to be more consumer friendly to be useful
transparency
are we SHARING & USING what we learn in the reviews?
ease of data sharing
don't want it to just sit on a shelf...
OR to blow up in your face
AAR
How do we USE operations evaluation and corrective action so we can be more prepared in the future?
NYC learning from Katrina
sharing with other jurisdictions so they benefit from the learnings
AAR should reflect plans, policies, and procedures, not just people
not a matter of any one individual if proper training exists
Learning from others when we don't actually experience it ourselves
How often are communities engaged to participate?
findings have this perspective
Often designed and led with an individual agency in mind
requires dedicated funding
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SECTION 2

Root Causes and Context Details for Each Explored Theme
Workshop 1: Exploring Gaps in the Evidence Base for Collaboration and Social Factors in PHEPR Practice

THEME: Community Cohesion

GAPS/CHALLENGES	NOTES/CONTEXT/ROOT CAUSES
The concepts of community cohesion and community resilience are not well defined for PHEPR and are not regularly assessed.	• Health departments do not regularly assess community cohesion or resilience (e.g., for comparing pre/post disaster). • Existing social vulnerability indices are ineffective for programmatic use. • Assessments of metrics at the community level create an environment for counterproductive comparison. We should assess a community against itself and engage the community in deciding how it can strengthen its resilience. The focus should be on moving the needle for the community, not on comparing communities to one another. • How can PHEPR practitioners efficiently map communities and gatekeeper organizations/individuals in order to maximize reach into the communities? • Capturing Bonding, Bridging, and Linking Social Capital through Publicly Available Data • Engaging Community Leaders to Identify Community Assets for Emergency Preparedness

Relationships between PHEPR actions and cohesion outcomes are uncertain (e.g., theory of change, causal pathways).	• PHEPR actions might harm or build community cohesion (e.g., pit groups against each other).
	  o Example: Public health agency shuts down community feeding locations following hurricane out of concern about foodborne illness.
	  o Example: Mutual aid efforts related to Katrina became politically active because of the structural racism revealed in response and recovery. Some mutual aid group activities were deemed counterproductive to response activities, and there were efforts to shut them down.
	• In the short-term, people may not follow guidance or take action. In the long-term, trust in one another might be weakened.

	• PHEPR actions/objectives should be evaluated for their likely effect on community cohesion, whether intended or not. • Government agency staff don't understand how the work they do may affect cohesion or what strategies enhance vs harm cohesion.
Governmental agencies risk losing public trust when taking PHEPR actions.	• Response involves a range of stakeholders (public health, police, fire, EMS, healthcare), sometimes across a range of jurisdiction levels (federal, tribal, territorial, state, local), and the public perception of and trust in each group varies. • How can PHEPR practitioners maintain status as trusted sources of information and guidance (i.e., "divorce themselves from politics")? • PHEPR practitioners might do the work to build trust with communities only to have leaders make decisions or take actions contrary to the desires and needs of the communities. How can leadership be convinced to center communities in efforts?
PHEPR practitioners have limited awareness of actions they can take to build community cohesion.	• Bringing mutual aid groups into response will provide two benefits. First, it can provide additional surge to the response. Second, it ought to improve trust between the community and the government long-term because the government is working more transparently with the community.

Communities are not properly engaged in planning, implementation, and evaluation of PHEPR actions.	• Cohesion contributes to resilience in the face of disruption, but this is not always measured.
	  o Example: Vietnamese communities on gulf coast after Katrina and Gulf Oil Spill faring better in recovery than communities who suffered less flooding and disruption.
	• How can we adapt PHEPR to existing community infrastructure rather than asking the community to conform with PHEPR?
	• To what degree are PHEPR actions informed by local knowledge?
	  o Example: The inclusion of healthcare coalitions in the PHEP/HPP program standards is helpful, yet these coalitions are often limited in scope. There are many "health-adjacent" organizations that could be included in disaster preparedness planning.

	• Government bureaucracy incentivizes a dependence on larger, more formal CBOs (i.e., it's easier to get approval to work with those groups), making partnerships with grassroots community organizations less common.
The current PHEPR workforce competencies do not match what is needed for the future.	• There is often a high turnover rate for PHEPR positions. • PHEPR responsibilities are often added on to existing positions rather than filled by dedicated staffing. • When a disruption occurs, all agency staff can expect to support response. Do they have the skills and knowledge they need to do so (e.g., ICS, crisis communication)? Are response staffing plans plugging people with the right KSAs into the right positions? • To what extent is PHEPR perceived as a foundational and cross-cutting public health function? • The PHEPR workforce does not represent the diversity that exists in the communities they serve.
Social media and technology can build community cohesion, but also have the potential to harm.	• Communities are not based solely on physical proximity, which makes community cohesion more complex. A cohesive community could be at higher risk for spread of misinformation via social media. • Not every public health agency has staff with competencies needed for PHEPR communication. • All response starts locally, but how does that play out with communication? When should messaging come from a unified source?
PHEPR partnerships tend to be transactional. Resilience requires different types of relationships.	• Stakeholders are comfortable thinking about tangible transactions (e.g., sharing staff, stuff, space, systems). It's much harder to think about shared goals, metrics, accountability, and decision making. • PHEPR partnerships and coalitions are funded to achieve tangible, transactional objectives, not for intangible, social capital building. o Example: Community health workers, who spend a large portion of time attending local meetings and events, are focused on "being with the people" rather than "talking at the people". Invest time in building relationships rather than meeting specific dissemination/communication objectives.

	• Are the stakeholder engagement models in ESF-8 and RSF-8 effective?
Resources for community cohesion related to PHEPR are limited.	• If we know community cohesion matters, why isn't it being included in PHEPR budgets? • Are leaders willing to support use of PHEPR resources for community cohesion related activities? • Community cohesion takes targeted engagement and listening/acting on community needs and concerns. • Often LHDs lack time and resources to engage in this way.
PHEPR practices are not always equitable.	• A tension exists between equitable practices and PHEPR practices: o Equitable practices (e.g., distributing vaccines to who is most at risk vs. straight age-strata) often run the risk of disrupting community cohesion o Metrics that are used are often inequitable and too simplistic (e.g., numbers of people vaccinated vs. what populations are getting vaccinated) o The funding and reimbursement tied to disaster often creates or exacerbates inequities due to who is able to complete extra paperwork, what communities are able to seek funding • How does structural racism impact PHEPR practices and outcomes? • Equitable and ethical principles are not always the easiest or most attractive to implement.
PHEPR practices are not trauma-informed.	• Unknown how historical trauma affects community cohesion and trust in government.
PHEPR practices are often not informed by other disciplines such as the social sciences.	• Partnerships with local universities around PHEPR may not be as common as they were historically. • Quality measurement, social sciences, cognitive psychology are all disciplines that may have insight on several gaps in community cohesion. • Intersections between implementation science and real-world evidence generation are underexplored. • How can we maximize internship and mentoring opportunities for some of this work? • What funding mechanisms and opportunities can be leveraged for cross-disciplinary research in disaster preparedness?

THEME: Partnerships

GAPS/CHALLENGES	NOTES/CONTEXT/ROOT CAUSES
The boundaries and structures of PHEPR partnerships are not well understood by stakeholders.	• PHEPR stakeholder roles and responsibilities are not well defined. • Expectations of PHEPR stakeholders before, during, and after disasters are not clear. • Disasters require different types of partnerships and stakeholders; there is not one partnership approach. • Each jurisdiction operationalizes partnerships differently based on their local context. • Emergency response/management and public health preparedness and response approach partnerships differently. • There is support for cross-sector partnerships on paper but not in practice. • Partners' roles and responsibilities outlined in PHEPR plans are often ignored when disasters occur. • Policies and funding opportunities often include partnership requirements but do not provide clear expectations or guidance.
PHEPR partnerships are challenged by siloes that persist between sectors (government/public, private/for-profit, nonprofit/community, academia).	• Private sector (for profit) is willing to help but often don't know how to effectively and efficiently engage. • There is a lack of resource sharing between sectors. • PHEPR leaders don't understand how to best engage and leverage private sector (for profits), community organizations (nonprofits), or academia before, during, and after disasters. • Sectors define key concepts differently. • Distrust exists across sectors and jurisdictional levels. • Conflicting politics, "bottom-lines", and motivations challenge the creation of meaningful PHEPR partnerships • Partnerships with tribal entities must take sovereignty into consideration. • Community/nonprofit/mutual aid groups are often better connected and more nimble than organizations in other sectors, but they are often not meaningfully engaged or taken as seriously as responders in PHEPR activities.

	• Many organizations involved in PHEPR response do not consider themselves responders until after a disaster occurs. They are often not included in planning activities and exercises.
Metrics and methods for evaluating PHEPR partnerships are not standardized.	• The relationships between PHEPR partnerships and disaster preparedness, response, and recovery outcomes are not documented (theory of change, causal pathways). • PHEPR stakeholders do not have standardized, relevant metrics/indices for partnerships. • Measure local/community partnership impact instead of trying to fit it into slower, existing governmental incident command framework • How and where are successful PHEPR partnerships documented for replication?
Knowledge management practices and information sharing systems do not facilitate PHEPR partnerships.	• PHEPR leaders have trouble collecting, synthesizing, managing, and disseminating information to partners.
PHEPR leaders do not have capacity/capabilities/competencies to form meaningful PHEPR partnerships.	• The creation and maintenance of effective and efficient PHEPR partnerships requires dedicated time and resources, both of which are limited at the local and state levels. • PHEPR leaders are concerned about overburdening community partners. • Similar to PHEPR capabilities, PHEPR partnerships must be "exercised" regularly. • During response, decisions must be made quickly. How can PHEPR leaders practice meaningful partnerships when there's not time to engage partners? • PHEPR workforce does not reflect that of potential partners. • There is a disconnect between jurisdictions regarding resource availability. Those at the top believe that resources are available, but those at the bottom see access to resources as limited.
Social inequities are perpetuated in PHEPR partnerships.	• How do municipal equity officers affect partnership processes and outcomes? • PHEPR partnership activities (e.g., outreach, education, information sharing, engagement) and the metrics for measuring success often do not reflect equity, inclusion, or diversity principles (e.g., centering oppressed populations).

THEME: Social Determinants of Health (SDOH)

GAPS / CHALLENGES	NOTES / CONTEXT / ROOT CAUSES
The PHEPR workforce awareness and understanding of SDOH is varied.	• PHEPR and public health workforce not always able and/or knowledgeable about how to leverage expertise for SDOH challenges. • Some areas of public health are more familiar in working with SDOH than others, PHEPR expertise does not always translate to SDOH. • Knowledge that SDOH impact PHEPR response is not widespread among workforce. • Intersects with diversifying the public health workforce.

Relationships between PHEPR actions and SDOH are uncertain (e.g., theory of change, causal pathways)	• SDOH are broad-reaching and not always aligned with PHEPR activities and outcomes.
	• SDOH often framed as remediable characteristics of individuals or communities rather than outcomes of structural racism, ableism, etc.
	• PHEPR actions during response often negatively impact disparities and SDOH.
	• SDOH outcomes are not connected to PHEPR.
	• To what extent are SDOH factors considered in PHEPR research?
	  o How do we provide guidance for how to include SDOH lens in research, translation and dissemination related to PHEPR?
	  o How do we integrate SDOH into hazard/vulnerability/risk assessments OR use of SDOH to assess PHEPR partnerships/networks?
	  o How can SDOH be used to predict how disparities will impact PHEPR outcomes AND how can PHEPR work can alleviate disparities?
	• Won't You Be My Neighbor? Uncovering ties between Social Capital and COVID-19 Outcomes at Local Levels
	• How Social Ties Influence Hurricane Evacuation Behavior

SDOH are not seen as central or core to PHEPR.	• Challenging to get positions and resources dedicated to SDOH in public health departments. • There are often competing priorities and the existing daily crises get priority. • Overall, there is an underemphasis of the social infrastructure (vs. physical infrastructure) within PHEPR

PHEPR resources are not available for SDOH work.	• Policy level support and resources to sustain SDOH work in PHEPR does not exist. • There are more organizations and communities with whom PHEPR needs to coordinate than it has time and resources to extend.
PHEPR partnerships tend to be transactional not relational.	• Investing in infrastructure to build trust is key and centering for SDOH. • PHEPR actions tend to prioritization relationships with higher returns on investment related to the positive influence on response. • How can we optimize relationships between healthcare systems, government agencies, and CBOs to addressing systemic regional public health problems? o This seems to happen during response (surge) but dissipates in recovery.
PHEPR engagement in SDOH is not always met with public approval.	• Public gaps in trust of health care institutions, public health measures, public health data assumptions exist. • A broad public understanding of SDOH and related concepts is lacking.
Structural problems related to SDOH are outside of PHEPR influence.	• Supply chain issues with food, medical supply, energy are outside traditional public health purview. • Is public health and/or PHEPR in a position to have decision-making authority or influence in the realm of SDOH?

Workshop 2: Exploring Gaps in the Evidence Base for Laws, Policies and Governance in PHEPR Practice

THEME: Governance

GAPS/CHALLENGES	NOTES/CONTEXT/ROOT CAUSES
Communities are not engaged in governance.	• Communities are not engaged in all phases of the disaster management cycle. • PHEPR plans should be subject to a public comment period. • Emergency plan approval body should include community members (i.e., like IRBs or FQHCs) • Continued engagement with the communities: trust building, two-way communication, and empowerment. • Community needs to be engaged in resource allocation decision making. • Existing relationships, education on importance of this work, buy-in, defined role and purpose, "authority" in steady-state and response • How can we use storytelling to listen to the community and integrate community voices into the PHEPR decision-making process? • How can PHEPR collaborate with existing trusted community-based groups? • How can we communicate with communities on their level?
The role of PHEPR FSTLT jurisdictions in fostering community resilience is unclear.	• Who are the institutional actors/leaders for community resilience at the various jurisdictional levels? How do PHEPR leaders fit into that? • Multiple agencies stake a claim in "owning" resilience. • Does having structured offices and positions like a chief resilience officer make a significant difference in process and outcomes? • Does it matter who governs resilience or do we need a clear leader with a mandate? • PHEPR leaders need to be more visible at the local level. • How willing are public health officials to take risks and be in the spotlight?
Relationships between PHEPR governance and community resilience outcomes are	• What are the economic consequences of not being resilient? • Where individual resilience meets community resilience is unexplored.

uncertain (e.g., theory of change, causal pathways).	• "Lack of research base to support specific governance interventions that support/enhance (or that might hinder) community resilience, however the latter is defined." • What are the ethical challenges of focusing on reducing immediate short-term harm (i.e., does "save the most lives" create long-term harm)? • What is the impact of governance on first responder wellbeing? • The long-term consequences of short-term governance decisions during response phase are not evaluated. • Does the intentional development of relationships with communities during times with no particular crisis result in jurisdictions being better able to respond in ways that support community resilience?
The concept of community resilience is not well defined or regularly assessed for PHEPR.	• A consistent definition of community resilience for PHEPR practice across FSTLT jurisdictions is needed. • The concept of resilience should reflect diversity, equity, and inclusion. • What are the metrics of resilience? How do you know when a community is resilient? • The word "resilience" is not resonating as much as it once was, especially for communities of color o Implies communities of color must expect to endure trauma • Disaster risk reduction would reduce need to always be resilient. • Is the concept of community resilience based on the values and beliefs of the dominant narrative/culture?
Relationships between PHEPR governance and trust outcomes are uncertain (e.g., theory of change, causal pathways).	• How can PHEPR policies, systems, and environments be changed to improve trust? • How can governments recover from loss of trust during and after disruptions? • How can communities recover from loss of trust during and after disruptions? • When and how is transparency in governance harmful? • There's a need to explore trust dynamics for tribal jurisdictions and PHEPR.
PHEPR capacity for leveraging governance to build community resilience is limited.	• PHEPR practitioners need easily accessible training about resilience. • PHEPR lacks resources for paying community partners for their time and expertise.

	• PHEPR jurisdictions don't have adequate infrastructure to coordinate community-engaged drills and exercises. • How can PHEPR education and workforce development keep up with emerging knowledge and best practices and evolving hazards, risks, vulnerabilities, and threats?
PHEPR governance practices are not always grounded in science and evidence.	• The field is missing connections between the researchers and the STLT jurisdictions to translate the research into practice. • How can PHEPR incorporate principles of community-based participatory research into governance practices? • We must develop a culture of equity and resilience across disciplines and sectors. • Leverage participatory processes and strategies that already exist (e.g., chronic disease, HIV) • How are lessons learned integrated into informing program development and post disaster community resilience strategies?

THEME: Laws and Regulations

GAPS/CHALLENGES	NOTES/CONTEXT/ROOT CAUSES
The role and authorities of public health in emergency preparedness, response, and recovery is unclear to some stakeholders.	• Many disruptions are not inherently health emergencies (e.g., weather events) but have potential for tremendous health impacts. Public health has an important role that is not always recognized by other stakeholders. • Public health is one stakeholder in the overall larger incident management system. Different stakeholders may serve as lead based on the type of disruption, but public health should always play a significant role. This is hard for some stakeholders (e.g., emergency managers) to understand. • Legislation usually gives emergency management the role of being responsible for coordinating response. Public health does not have a similar statute giving them a designated role. This reinforces the focus on short-term emergency management and not on preventing and mitigating negative short- and long-term public health impacts. • PHEPR practitioners often feel they are "elbowing" to get a seat at the emergency

	management table. • Should local health departments be responsible for preparedness and response? Do they have the competencies, capabilities, and capacity? • How has public health been successful at getting a seat at the table for other issues (e.g., climate change, urban planning)?

FSTLT jurisdictions can have a high degree of variance in how PHEPR regulations and authorities are operationalized.	• Legislation that governs public health agencies is old and often has no mention of PHEPR outside of core public health functions.
	• Major metropolitan areas contain many jurisdictions.
	• Moving across state lines means different laws. People may live in an area with one set of regulations and work in an area with another.
	• Congruent response across jurisdictions rarely occurs.
	• Mismatch between state and local authorities and operations.
	  o Example: State regulates nursing homes, but local authorities have practical relationships with nursing homes.
	• Authority and responsibility for enforcement of PHEPR actions are often situational and unclear.
	  o Examples:
	  ▪ martial law, mutual aid, capitol riots, EMAC laws
	  ▪ when people show up who PHEPR leaders are not expecting to show up
	• Federal preparedness, response, and recovery decision-making is subject to a range of regulatory and administrative agencies (e.g., ASPR, HHS, OSHA, NIOSH, EPA). Each is responsible for a distinct "lane of work", yet dependencies abound. When federal decisions are not aligned and coordinated, implementation at the STLT levels is more challenging.
	• How are inter-agency and cross-agency collaborations or partnerships being created and supported to address this issue?
	• On a federal level, the vertical nature of how local public health enacts the practice is not necessarily apparent to some of the non-local public health agencies.
	• The role of local PH by federal regulatory agencies is underestimated in the response phase.

While FSTLT jurisdictions have specific PHEPR authorities, the available resources, leadership, and infrastructure are not always aligned to provide capability/capacity to operationalize and enforce.	• Variation in PHEPR laws, regulations, and guidelines by jurisdiction may negatively affect communication, coordination, and enforcement. • The public doesn't understand that public health agencies can operationalize and enforce regulations. • Perceived variance in laws, regulations, and guidelines across jurisdictions contributes to public mistrust (e.g., covid, ebola, zika). • Example: laws for shelter in place and evacuation orders might say jurisdictions have certain authorities, but in reality, jurisdictions lack the enforcement capacity. Jurisdictions need the infrastructure and the corresponding funding to be able to do that work.
Relationships between the exercise of PHEPR authorities and public health outcomes are uncertain (e.g., theory of change, causal pathways).	• The average person does not always understand the implications of a disruption. All types of disruptions and associated response can have some kind of short- and long-term impact on health and wellbeing. • The idea that all actions have health impacts is not well known outside of public health. • The unintended and long-term consequences of PHEPR laws and regulations are not well known. • PHEPR laws, regulations, and guidelines are not linked to health outcomes. • How can unintended consequences be regularly captured in stories, AARs, or other analyses?
PHEPR laws, regulations, and guidelines may not be based in evidence.	• PHEPR does not always learn from past experiences – especially when needing to transfer the knowledge gained across regions. How can feedback loops be closed in proactive rather than reactive ways (i.e., improvements based on what was learned in the last disaster rather than "planning for the last disaster"). • Experts review evidence and come up with recommendations, but fall short of translating those to actual policies, guidance, and protocols. • There's no mechanism to integrate rapidly evolving science into PHEPR decisions/regulations/authorities. • PHEPR laws, regulations, authorities are not informed by principles of justice, equity, inclusion, and diversity. • PHEPR decision-making is often politicized. • Example: conflict between the local government and business community

	when there is any emergency. Businesses influence how decisions are being made. • How can modeling be used to inform PHEPR decision-making in real time? • How can we improve feedback loops so that research can more efficiently add to information that policy makers can use? • How can legal authorities be used to support the PHEPR decisions being made on the ground?
Workforce turnover has impact on optimal enforcement of PHEPR laws, regulations, and authorities.	• Turnover of public health staff and leaders requires constant onboarding to make sure the staff and leaders understand PHEPR-related laws, regulations, and authorities. • Even something so simple as the emergency hiring process and the ability to execute expedited contracts is impacted by workforce turnover.
Laws, regulations, and authorities related to the use of volunteers for PHEPR activities are ambiguous.	• The ability to have a qualified workforce is affected by required certifications and licenses. • Jurisdictions struggle with volunteer liability issues (e.g., lack of clear legal/tort claims protections). • Example: retired medical doctors who are longer licensed.
Communication about PHEPR laws, regulations, and authorities is flawed.	• The public and politicians do not understand the purpose of public health laws/regulations/authorities, and there is very limited capacity for PHEPR professionals to educate public/politicians. • Public health successes are not noticed by public – when responses are successful, the result is a null, and the general public thinks public health overreacted. • How do different groups react different to risk communication and guidelines? • How do different populations react to different stages of management? • Thinking about communication is always an afterthought. How can PHEPR become more proactive? • How does behavioral science / social science knowledge base contribute to understanding this? • Public and politicians do not understand public health laws/regulations/authorities, and there is very limited capacity for PHEPR professionals to educate public/politicians.

	• How can PHEPR practitioners engage community members to ensure laws, regulations, and guidelines are communicated effectively?

THEME: Responder Health and Safety

GAPS/CHALLENGES	NOTES/CONTEXT/ROOT CAUSES
PHEPR plays a key role in response but is not always designated as or considered a response agency/workforce.	• Why and when is an entity or position classified as responder, first responder, or essential worker? • Regulations and statutory authorities designate PHEPR as a first responder in some circumstances but not in others. • Many PHEPR positions are not thought of as "first responders" (e.g., epidemiologists) but these positions are subject to long working hours and other stressors. • How is it determined which agency has the lead in response? How can the interplay of culture and policy across agencies and sectors be better managed during response? • Protocols can be agency specific but the resources do not align and may be specific to different areas. • Consensus-driven approach of public health does not align with the incident command structure of response. People hired in public health are not hired for "responder" roles. • The people leading responses are often not public health practitioners. Their way of responding to emergencies is very reactionary, very quick. They do not think about including community in the solution. When the community does voice their concern, there's pushback, and they're not included in the process because there's this sentiment that the leader knows more than the community. We continue to marginalize those communities and add trauma to the emergency situation.
Public health workers are not aware of their risks, rights, and protections when activated for response.	• Workers are expected to make a quick shift from 'day jobs' to responder roles and new working relationships. • How can FSTLT agencies best communicate PHEPR HR protocols, practices, and protections to their workforces. • Workers often do not feel they have the ability to say "no" or decline being placed in

	a response role without compromising their current job. • Serving in a response role might compromise safety and wellbeing of workers' families. • Cultural and ethical issues emerge when you have professions with specific ethical codes or a sense of duty to act (e.g., public health workforce, healthcare workforce). • How can PHEPR include workers' partners, family members, and other contacts in safety assessments and screenings? • How does risk get communicated to responders? • "Science and the communication of science really should be at the heart of the discussion around what ultimately is responder safety and health. Because it extends beyond the responder's safety and health to what the public is going to make decisions around as well. If it's good enough for them, then it's good enough for me kind of thing. And I think that that communication should start around the science."
Expanding the PHEPR workforce during periods of surge is necessary, but challenging.	• How can the concept of "reserves" be applied to bring reprieve to exhausted workforce? • How can agencies effectively and efficiently accommodate new workers? • It can be difficult to coordinate workforce management during surge when professional cultures vary (e.g., hiring practices, compensation, incentives). • Community health workers are not well engaged. • What can be done (e.g., MOUs, registries, training) prior to a response to facilitate workforce expansion? • How can PHEPR leverage, coordinate, organize, and communicate with volunteers (e.g., academia, VOADs, and digital volunteers)? • What organizational structures need to be set up internally to allow for successful operations?
Existing workforce development options, including routine and just-in-time trainings, do not adequately prepare the workforce for response roles.	• Often public health responders are tasked with carrying out new or adapted functions without adequate training or education. • How can just-in-time training be improved to better equip the public health workforce to fill responder roles during surge? • Response often requires collaboration with other sectors; however, trainings are siloed by sector. How can potential responders train together?

	• What are the core competencies for PHEPR responders? • What are the pre and post deployment medical surveillance requirements for public health responders? • Workers do not always have basic awareness and knowledge of safety equipment. • Procedures that are in writing get tossed to the side in the heat of the moment.
There's more work to be done to understand and protect the mental health of PHEPR responders.	• Short-term mental health "fixes" not working in the long-term; unsure what the long-term mental health consequences of being "always on". • Public health workforce is subject to near continuous deployment, especially in places that experience lots of disruptions. • A lot of attention should be given to identifying the right methods and procedures to ensure good short- and long-term mental health outcomes for responders. • How have PH agencies measured and quantified mental health among their responders (e.g., critical incident stress debriefing)? • What is known about responder safety and health from other fields is not brought into PHEPR practice. Are there best practices from health care, from emergency rooms, or other fields? • What are the interventions that are most evidence-based and promising and have the most impact for our physical and mental health and well-being?
Accountability for the safety and wellbeing of PHEPR responders is unclear.	• How can organizations be held accountable for the mental health of their employees? • What is the exact role of a Safety Officer? Can this role be expanded or even broken into different roles to account for mental health of responders? • Is responder health and safety an HR/employee health issue or an incident management issue?

Workshop 3: Exploring Gaps in the Evidence Base for Learning and Sharing in PHEPR Practice

THEME: Education and Training

GAPS/CHALLENGES	NOTES/CONTEXT/ROOT CAUSES
The field has not adopted PHEPR competencies.	• There are no standard PHEPR competencies. • What are the competencies that we want from training? What are the skills that they need?
Current trainings/education offerings are often focused on traditional emergency management approaches and not reflective of research-based evidence or community needs and concerns.	• Existing trainings haven't been modified for/integrated with broader public health principles. • Course materials are dated. • There are inconsistencies in training at the state and local level. • Exercises and after action reports and debrief are not meaningful or based in reality. • Trainings are often based on a broader emergency management perspective and not focused on public health. • There is a lack of known/accepted standard curriculum for community resilience. • Trainings rely heavily on ICS models. Are there response structures that make more sense for PH? • How can practices from Environmental Justice, Mitigation, Climate Change be integrated into PHEPR training? • Are HSEEP standards limiting usefulness of trainings and exercises? • There's a need for regular use of exercises that includes different parts of the response system (e.g., public health, public safety). • Before we promote something via training, we need evidence for the content (e.g., ICS and principles improve health outcomes, hazard-based planning impacts health outcomes) and the methods (e.g., are tabletop exercises effective).
Relationships between education/training and community resilience outcomes are uncertain (e.g., theory of change, causal	• It's challenging to measure the impact of education/training beyond short-term gains. There's a need to connect training and education outcomes to health outcomes. • Training has inherent limits. We don't really understand these limits.

pathways) and hard to measure.	• How can we tie training to outcomes and actions? • Community resilience training differs from jurisdiction to jurisdiction. This makes it hard to measure effectiveness. • The field lacks follow-up to gauge whether training has been applied. • Do we know if training makes PHEPR workforce more or less willing to work in high-risk environments?
Public health employees and community volunteers are often activated to provide PHEPR support (i.e., PHEPR is not their formal job).	• Many people who attend PHEPR trainings are not dedicated PHEPR workers. These people will also need assistance with how to perform their PHEPR functions. • PHEPR position requirements and existing skill sets don't always align. • Having a solid understanding of the PHEPR role, and what's required in an emergency, is essential. New workers must receive training on a continual basis. • What incentivizes PHEPR training (e.g., credit for learning, rewards for taking training)?
High quality, learner-centered PHEPR trainings are not easy to find.	• Often the people in charge of PHEPR training are not skilled in developing and facilitating trainings • Training and education programs are sometimes developed without a concrete process, theory, or body of best practices. • There's a lack of standard or accepted education/training programs. • There's no registry of trainings. • Investments in training have not been sustained over time • Current offerings are not flexible. • How can we better integrate new learning technology to provide expanded access to local agencies?

THEME: Knowledge Management

GAPS/CHALLENGES	NOTES/CONTEXT/ROOT CAUSES

Current PHEPR situational awareness platforms and processes do not give a complete picture and limit the ability of practitioners to predict and respond in a disaster.	• Existing data platforms and outbreak management systems do not adequate situational awareness. • The field must understand and invest in the underlying information infrastructure that must be in place before events in order to support timely situational awareness/intel. • There's room for improvement in how we prioritize and organize data and information. • There is a need to have prepositioned, vetted database platforms that can accommodate events with an enormous number of cases. • After Hurricane Katrina, there are still no adequate systems to predict the demand of needs post-hurricane. Systems report different things and make it hard to get an accurate picture.
Existing data systems used by PHEPR are limited in functionality and interoperability.	• There's often a lack of interoperability between systems used by different jurisdictions. • Adoption of technology lags in the field. • Time is needed to transition state health departments from a paper system to an electronic system. • There is a lack of cohesion between federal and state systems. They are completely separate systems that don't communicate and are not structured the same way. • Existing are limited and not secure, and don't meet standards for encryption. • Funding is needed for interoperability—technology is expensive. • Lack of interoperability hinders successful and quick response- or even to be able to respond at all
PHEPR must value and include data from more diverse sources.	• A shift from the command-and-control model is needed to a more agile system that incorporates and values various kinds of knowledge, not just scientific knowledge. • There is a need for private-public data sharing. Antagonism exists in participating in public health reporting systems. Some states have been doing it for a long time. There is a lot of push back from the private sector. • How can PHEPR use citizen science to co-develop situational awareness? • PHEPR should do a better job of engaging the community to identify relevant and helpful data and work with community to identify best way of presenting data.

	• PHEPR needs better knowledge and understanding of partner agencies and the data they can contribute. • How can PHEPR use social media and online "listening" to gather data? • Should PHEPR give more consideration to qualitative data sources that are not captured by mainstream?
PHEPR data is often not nuanced enough address issues of diversity, inclusion, and equity.	• Data is not disaggregated by race and ethnicity. • Data does not incorporate intersectionality.
The role of media and PIOs are not well understood for public health emergencies.	• Media creates an opportunity and challenge for distributing helpful and accurate information. • What agencies are using social media well and what does that look like? Does increased engagement translate to more participation? • Tremendous cuts in the Public Health workforce continue to have impact. There is only one PIO for an entire county. The median age of the workforce is 30, and younger people are looking for higher paying jobs that are less stressful.
There are serious concerns about privacy and transparency.	• Would development of standing ethics committees or other equity structures assure rapid bidirectionality of communication? • PHEPR practitioners must adhere to public health statutory responsibilities and data privacy. • PHEPR practitioners must address concerns about data/information sensitivity.
Workforce turnover creates gaps and challenges in knowledge management, including succession planning and continuity.	• How are new people trained for public health to be prepared for the PHEPR side of their work. What do internships and externships look like? Is there a clear pathway after a master's degree? • Staff turnover creates gaps in knowledge and challenges to maintaining continuity in PHEPR processes. • Sometimes you can't download info from previous platforms, which creates legitimate concerns about data security.

	• People set up SOPs, but then they aren't shared, resulting in rough transitions. This affects planning, succession, and continuity.
The field does not always build on lessons learned from previous experiences.	• A venue to share research findings like the Disaster Medicine and Public Health Preparedness journal are rare in public health preparedness

THEME: Operations Evaluation and Corrective Action

GAPS/CHALLENGES	NOTES/CONTEXT/ROOT CAUSES
The current operations evaluation and corrective action infrastructure and practices make it difficult to learn within and across jurisdictions.	• "We struggle to learn when we don't experience something directly." Example: Other states didn't learn from Katrina or Flint. • We need more transparent cross-jurisdictional information sharing and mining. • AARs should be publicly accessible. • How can we make it easier to search for "lessons learned" by other jurisdictions for specific hazards or response strategies? • There needs to be a collective understanding of what was learned through the AAR process, which can be transferred to other groups or areas facing the same challenges. • Need more standardized AAR processes, from jurisdiction to jurisdiction
Jurisdictions fear backlash or punishment from operations evaluation and corrective action.	• There can be political backlash or retaliation if an individual does not like what an AAR says. • Can AARs be non-punitive and based on learning? • We cannot implement an AAR into an organization that has a punitive culture. The culture of qualitative improvement has to be ingrained for an AAR to work. • Findings are often sugarcoated to avoid conflict. • There is hesitation to put certain content in AARs because there may be blow back or threat of litigation.
Operations evaluation and corrective action do not seem to result in actual changes or improvements (i.e., the feedback loop is not	• PHEPR culture treats operations evaluation and corrective action as an activity to check off a list rather than a learning opportunity.

closed).	• What aspects of AARs truly engage people to actual change? • AARs may describe a problem well, but never acted upon. We see movement forward and movement back. • Pieces of the report are attempted to be "divided out", and there is confusion as to who is responsible for what. • There is confusion about what happens after AAR. • Learning from one AAR to use it into the next plan/action doesn't seem to be happening. • How can we study agencies to see how they conduct operations evaluation and apply corrective actions and what impact this has on their PHEPR outcomes? • Improved accountability is key when involvement of a community is present. • Eventually politicians decide what to fund as opposed decisions being based on the conclusions of the AAR. • There needs to be accountability when corrective actions are suggested to make sure they are being implemented. • If the corrective action is not feasible or politically acceptable, the action will not get executed. • People perceive AARs as a waste of time. • There's a need to distinguish between corrective actions your agency can implement versus what others involved in the response can and should do. • There's an artificiality to AARs because most people involved in response go back to their everyday job duties and lose sight of needed changes and improvements.
Operations evaluation and corrective action activities should focus on policies, systems, and environments, not individuals.	• AARs might focus too much on how individual people failed because of lack of training. • Evaluation is often used to evaluate staff. AAR should reflect corrective actions needed for plans, policies, and procedures not people.
Operations evaluation and corrective action has been highly routinized through AARs, but the templates and processes available may not be what is needed to achieve improvement goals.	• AAR templates can be unclear and can cause confusion. This can cause takeaways that are also unclear. We need to talk to people to see what they need in templates and processes. • The corrective action documented might not be the right solution. The AAR process may not come up with the right or best solution to an issue. The problem may need

	to be worked over time to better understand and investigate, through root cause analysis, why the problem occurred, in order to come up with solutions that actually work. • The process should be simplified in order to make it consumer friendly to the average person. • Quality of AARs of each individual organization varies and is dependent on organizational culture. • We should use business school research in public health to gain insight into organizational culture and how that affects evaluation. • Human-centered design principles within healthcare delivery in program development. We could test the transferability and translation of these designs into a public health context. • How can we use alternatives to AARs, such as Group Cause Analysis & Healthcare Failure mode and Effect Analysis?
Operations evaluation and corrective action tends to happen at the end of an event rather than during at event, when real-time changes would be most beneficial.	• Agencies should consider multiple "AARs" throughout a response to correct course midstream if needed. • Need to have multiple checks along the way to correct course if needed. • Are there any information systems that we can collect passive information? What systems can we use to gather info without disrupting the process. • We need obligatory checkpoints to make sure that everyone is aware of bigger picture and goals, especially within a big event. • Midaction reviews are important. • Using quality process improvement and project management tenants are new ideas that we need to use more. • College/graduate students could be used as observers or monitors. • Who should be doing these continuous check-ins? Academia, branches, consultancy companies? • Is it possible to gather passive information throughout an event without interrupting the response?

Operations evaluation and corrective action within a jurisdiction are rarely tracked over time to determine if improvements in processes and outcomes occur.	• There is no multi-year tracking on a federal scale.
Participants in operations evaluation and corrective action should include more than agency staff.	• There is a lack of community involvement in the AAR. • Higher-level officials are not involved in the process, but stakeholders of all levels need to be included. • There needs to be an academic partner built-in. • Who should be involved - only people involved in the response, or other community members impacted by the event?
The people leading the operations evaluation and corrective action activities often do not have the KSAs needed.	• Who is responsible for analyzing the findings and coming up with solutions? In many organizations there is no one designated to do this. • There is usually a flood of information that comes from these discussions, and we must zoom in on the key issues and prioritize them. • Does the moderator ask the right questions in the right way? Do they have background knowledge? • Who is doing the evaluations? What training and expertise should they have? Are the evaluation processes effective? • Must figure out how to build this capacity into our system.

Appendix B – Informing the Development of CDC CPR's Public Health Preparedness and Response Science Strategy: Documentation of SME Conversations

Informing the Development of Public Health Preparedness and Response Science Strategy

Documentation of SME Conversations

SGNL SOLUTIONS

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OVERVIEW

Through Cooperative Agreement funding from the US Centers for Disease Control and Prevention (CDC), the Association for Public Health Laboratories (APHL) contracted with SGNL Solutions, LLC to design and conduct a series of data collection activities to gather feedback on state, tribal, local, and territorial (STLT) public health emergency preparedness, response, and recovery (PHEPR) practice needs. To obtain granular input about specific concepts, SGNL staff conducted eight structured 60-minute conversations with Subject Matter Experts (SMEs). This document provides a summary of the process and outputs from the conversations.

The individual conversations aimed to gather feedback on research priorities related to state, tribal, local, and territorial (STLT) public health emergency preparedness practice, specifically regarding 1) public health law, 2) health equity, and 3) partnerships. Based on our discussions with CDC and APHL, we understood the following to be the desired discussant characteristics.

1. Experience serving as health department officials or emergency management leaders
2. Diversity in race/ethnicity and sex/gender
3. Service in localities with recurring disruptions (New England, Gulf Region, Midwest) and/or cofounding vulnerabilities (e.g., rural, underserved, lower income)
4. Experience serving as a grantmaker for public health/PHEPR
5. Expertise in health equity, partnerships, and/or public health law

Thirty-four (34) potential discussants were identified via previous project activities, suggestions from project stakeholders, and internet searches. The list included 20 women and 13 BIPOC. Nine (9) individuals were selected for initial outreach. Each individual received at least two emails before back-up discussants were contacted. A total of 19 individuals received invitations. Eight (8) accepted, and eleven (11) declined or did not respond. The final respondents included the following characteristics.

- Perspectives: practice 3, academic 3, philanthropy 1
- Gender: male 4, female 4
- Race: white 5, POC 3
- SME: law 1, partnerships 1, general/multiple 6

A concerted effort was made to extend invitations to diverse individuals who met the desired characteristics. We were unable to secure participation from a health equity expert. We contacted three (3) Black females and one indigenous female to provide equity perspectives. Three did not respond and one declined and recommended another individual (who was one of the three who did not respond).

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DOCUMENTATION

Crosscutting Themes

The discussants offered comments and questions related to the following crosscutting themes.

Workforce

- Enhancing local and state department routine and just-in-time PHEPR workforce training
- Adjusting federal, state, and local regulations and organizational policies to facilitate activation of agency staff and volunteers during times of surge
- Developing a better understanding of how skilled and unskilled volunteers are utilized during response
- Developing a better understanding of how federal PHEPR funding is used to support staffing, including understanding the characteristics of dedicated PHEPR roles
- Enhancing PHEPR workforce competencies for dedicated and surge staff
- Developing an evidence base for just-in-time training implementation

Communication

- Enhancing frameworks and messaging for PHEPR communication before, during, and after disruptions
- Facilitating cross-jurisdictional communication and messaging coordination during multi-jurisdictional disruptions
- Developing a better understanding of the messaging strategies for various hazard types, political ideologies, and social/cultural norms

Leadership

- Empowering and supporting public health officials during disruptions
- Developing a better understanding of the fundamental political/leadership tensions (e.g., individual rights vs public good, federal vs state vs local)
- Developing an understanding of PHEPR leadership competencies and capabilities
- Developing an understanding of leadership and decision-making best practices during disruptions

Resilience and Equity

- Reframing the concept of resilience to account for underlying inequities present in the status quo and perpetuated by authoritarian response frameworks
- Expanding our understanding of how to quantify and qualify "resilient" communities to better focus interventions on those variables
- Insisting that PHEPR shift toward equity-centric policy, practice, and research
- Expanding PHEPR funding for policy, research, and practice to support transdisciplinary approaches
- Ensuring perspectives and needs from communities with a diversity of exposures and identities are represented in data and decision-making
- Developing an understanding of the cumulative impacts of multiple types of exposures across the lifespan

- Conducting research on how PHEPR research, leadership, practice, and policies perpetuate inequities

Measuring and Modeling PHEPR Outputs and Outcomes

- Developing an understanding of the short-, medium-, and long-term effects of PHEPR actions on community function
- Enhancing PHEPR logic models, indices, and assessment tools to reflect new learning
- Testing assumptions and evidence base of PHEP capabilities

Research Design

- Leveraging the influence of CDC to encourage PHEPR to make linkages between other sectors and disciplines and public health in research, policy, and practice
- Encouraging community-driven and practice-sourced research projects
- Enhancing the quality, granularity, and availability of systemic reviews and datasets (particularly legal datasets)
- Promoting community-academic-practice partnerships
- Revising RFPs and funding agreements to promote/require the research environment needed to generate the desired future state (e.g., trans-disciplinary)
- Expanding research to include comparison (e.g., control communities, other response efforts in same community) and longitudinal designs

Collaboration and Community Engagement

- Encouraging adoption of emergency management models that disrupt the top-down, one-way approach to PHEPR,
- Incentivizing or mandating community engagement in planning, response, and recovery

Evidence Base for PHEPR Practice

- Reviewing the evidence base for PHEPR practice in order to identify opportunities for investments and guide decision-making
- Develop an understanding of the potential consequences of PHEPR actions (e.g., legal, societal, SDOH, health, environmental, political) to better inform planning and decision-making
- Facilitating just-in-time learning and sharing among communities that are implementing innovative or novel PHEPR practices

Data Collection and Sharing

- Enhancing policies and practices to support data sharing and data-driven decision making
- Developing an understanding of best practices for interoperable data systems

Individual Conversations

Detailed themes from each conversation are provided below.

Discussant 1

Theme	Comments/Questions	Research Inquiries
Workforce	• PHEPR is considered a separate category of public health rather than an intersectional practice. •	• How do you integrate PHEPR into workforce expectations for all health department positions? • How do you "activate" health department staff when the funding for their positions might not easily allow it (e.g., WIC)?
Communication	• WV COVID Communications Research	• How can we facilitate cross-jurisdictional communication to be able to stand up a national PHEPR network that can be efficiently mobilized? This was one of the first public health emergencies that really pitted jurisdictions against one another. • How can tabletop exercises better integrate counter movements (e.g., the guy with the largest twitter following in your community has declared this is a hoax)? • How does misinformation grow? How can we protect against it and intervene when it occurs? What's the role of counter-messaging in a robust preparedness response? • What messaging and communication strategies work best for different types of hazards and for different political, social, and cultural identities? What messaging should be avoided (e.g., lockdown, "mass" vaccination)? • How can we ensure local public health officials use consistent messaging?
Leadership		• How do we empower and support public health officials during disruptions, especially those that become political? • How do you build and mobilize a national PHEPR network that is insulated from politics?

		• How can a national PHEPR network minimize "self-inflicted wounds"? • How do we develop a national identity related to PHEPR?
Resilience		• What communities fared well during the pandemic? How and why did they excel? • What are the seven indicators or characteristics of resilient communities? What are examples of resilience? How do you build it?
Equity	• We shouldn't support anything that doesn't advance an equity-centered approach to PHEPR. • COVID made it impossible for the nation to ignore historical and contemporary abuse and oppression. We should have been working on mediating trust in communities of color forever because we knew we were going to get here someday.	

Discussant 2

Theme	Comments	Research Inquiries
Measuring and Modeling PHEPR Outputs and Outcomes	• There's an underlying assumption in PHEPR that "a rising tide lifts all boats" that needs to be tested. • Indices try to distill complex issues to one number. The balanced scorecard approach allows decision-makers to explore how changes in one domain affect others. Domains for PHEPR might include health/public health, build/natural, social, and economic consequences. We need tools that allow us to say, "This PHEPR action is doing a lot for build environment resilience, but look at how much it's eroding social resilience in these neighborhoods." • Theoretical framework for PHEPR performance measures	• How can we better predict, and ultimately better support, investments in communities that have cascading impacts that are beneficial, or at least less detrimental, to disaster morbidity and mortality?

Intersectionality and Integration	• The CDC should be able to inform the modeling across all critical infrastructure in terms of public health consequences of interventions and disruptions, particularly in the face of climate change and predicting the impacts of infrastructure failure.	• How can CDC contribute to organizing the linkages between critical infrastructure and public health (e.g., a place where someone can query for data related to the health impacts as a result of electric outages or water outages)?
Research Design	• There are too many case studies versus original data. The world does not need another survey of nursing students on preparedness. • There's more to be done to improve systemic reviews. Research is also spread out across many disciplines and journals. The CDC can encourage research to connect those dots. • The Hurricane Sandy Research Grants required researchers to leave something in the community. Anything to normalize that as an expectation, that you must leave more value than you take away, is important. If disaster-specific research grants were made standard, that'd be a game-changer. • Grantmakers/sponsors must be able to tolerate some uncertainty as part of the research process.	• To what extent did the Hurricane Sandy Research Grants at meeting the initiative objectives?
Partnerships	• PHEPR has a bit of a legacy of command and control. As the scope has widened the whole community, the model of command and control is no longer appropriate. • Funding should support staffing and compensation for community engagement. When you go into a community, you're costing them just by being there, you're taking up their time, you're taking their attention away from other things. Are you leaving more value than you're taking? That's also something that the community has to help define. • Rewarding A While Hoping for B	• How can we work with networked organizations and what is the value articulation that will change behavior, not just individual health-seeking behavior but investment behavior and organizational behavior?

Evidence Base for PHEPR Practice	• The evidence foundations of PHEPR practice were put together so quickly in the post 9/11 years. The landscape of evidence is very sporadic, and we really do need a strong organization of where we do have strong evidence and where that evidence is missing. We're resting on a lot of assumptions. For example, there's a huge push on personal preparedness, but there's not really a strong evidence base for it.	• How effective is the PHEPR planning process? How can it be improved so that plans are useful? • Where were plans useful during covid and why/how?
Leadership		• How can we better understand the connection between the public health and the overarching politics? • What dynamics facilitate and prohibit public health actions?

Discussant 3

Theme	Comments	Research Inquiries
Measuring and Modeling PHEPR Outputs and Outcomes	• If we don't get away from the traditional metrics, then we just get stuck measuring and evaluating the same things over and over again, and not moving the conversation forward. • We need to expand our metrics for access to include access to food, housing, transportation, education, childcare, and employment. No one would say they don't care about these social and societal outcomes, but it's also not what's driving PHEPR action.	
Leadership	• In public health, there were several fundamental tensions with authorities. One is the right of government versus the right of the individual, but another is the federal system versus the state systems. Very few people understand how these legal authorities play out. The lack of understanding ends up impacting the real-time	• Can we better understand how governors have made use of executive orders to address disruptions? Are they being implemented and enforced? How are the orders being implemented? What happens once the executive order has expired?

	response because you end up having a dearth of experts when you need them.	
Research Design	• We can better understand the potential impact of a particular type of law by finding two different states that are similar in many ways with the difference being this one type of law that's especially relevant for an emergency or disaster. Then we pick an outcome, health or otherwise, do the analysis and see if there are any statistically significant differences between the states relative to this outcome. Once we've controlled everything that we can so we feel relatively confident that we're looking at the difference in legal authority. • In order to conduct legal research, we need to understand the legal landscape, whether it's 50 states or at the county level or whatever. Funding opportunities tend to focus on the analysis, not building the datasets. CDC can support building these datasets.	
Workforce	• There are so many different laws in the state experiencing the disruption, but also in the state that is sending those who could provide the help, not to mention intermediary NGO groups. Volunteer workforce is a complex legal environment. • We know that there are all kinds of legal red tape issues when bringing in volunteer workforces. We don't know a whole lot about what happens once those providers get on the group or the types of things that they are doing or the legal challenges, if any, that they face once they are actually in the field. • Workforce surge is an important area to pursue because we know that it's going to keep coming up every time that there's an emergency.	• How can we track and understand how many volunteer providers went into the state that's facing the emergency? How long were they there? What exactly were they doing there?

Data Collection and Sharing	• When it comes to public and private sharing of data, this is an area where law is probably doing more harm than good at the moment. There are a lot of people that don't want to go anywhere near data sharing that because of concerns about being in violation of privacy regulations. • Almost none of the current PDPM systems are able to capture people or differentiate people that are coming in from a different state. That's a simple example of cross-border issues.	• What can we learn from states designing and implementing PDPMs? How are neighboring states figures figuring out how their systems are going to work with each other? • How can we build data systems and policies that allow for that cross jurisdictional analysis? • What are the public data reporting standards (e.g., for demographics)? Are they coming from the states, locals, or feds? Are the standards really just guidance or are they enforceable?
Partnerships	• There are many sample or model mutual aid agreements out there, but there's a lot less known about what works well and what doesn't work well. This is an opportunity for implementation research because getting an agreement in place is usually not the challenge. It's understanding how it is actually going to work in an actual disruption.	• Does mandating the number of community representatives on an Emergency Planning Task Force result in improved community engagement?
Equity		• How are inequities perpetuated during recovery (i.e., set up potentially even worse inequities when the next bad thing happens)? • How are Section 1135 Waivers used during disruptions? Who's taking advantage of them? Are they benefiting the right populations?

Discussant 4

Theme	Comments	Research Inquiries
Partnership	• PHEPR research must include a transdisciplinary approach within academia so that people from behavioral sciences work with people from infectious disease and all that, but it also must include collaboration across levels of government. • Academic Health Departments help health department access the expertise to do something with the data that they are collecting. • Regional medical public health centers (a health department, a school of public health, and a school of medicine) did population-health research with a focus on translation, implementation science, and dissemination. • The CDC should have a community advisory board along with their scientific advisory board.	• How can we improve coordination between and among policy, practice, research, and community members?
Equity	• PHEPR funders must be willing to support transdisciplinary approach. Are they willing to address issues of the built environment? Are they willing to address poor housing or transportation? • Developing capacity to assess adverse human health consequences of future disasters requires establishment of a comprehensive, sustained community health observing system, similar to the extensive and well-established environmental observing systems.	• How can public health promote PHEPR literacy to empower communities? They can't be with us at the table, they can't be decision-makers if that literacy isn't there. • How can PHEPR practitioners ensure engage communities that represent a diversity of exposures and diversity of experiences beyond the usual suspects? • What are the cumulative impacts of multiple types of exposures across the lifespan?
Evidence Base for PHEPR Practice		• Can "just-in-time" and "just-in-case" policies and practices be identified and disseminated during disruptions?
Research Design	• RFPs should promote/require the research environment needed to generate the desired future state (e.g., trans-disciplinary).	

	• RFPs can encourage the integration of community health workers not as only creating access or being a bridge to access but as part of the research team. • Community advisory boards can inform the design and implementation of research by anticipating and voicing community concerns.	
Workforce		• How can we ensure a trained and competent PHEPR workforce before, during, and after disruptions?

Discussant 5

Theme	Comments	Research Inquiries
Research Design	• We must build a structure that can do the necessary research appropriately. • There is not an agreed-on mechanism for PHEPR research. During every response, both the formal EOC and the community response efforts should be studied by researchers. We should study the PODs and the pharmacies. We should study the medical ships and the hospitals. • The only logical comparison for EOCs during a disaster is the community (e.g., formal food distribution vs mutual aid). • The PHEPR capabilities are not based in evidence. Therefore, our hypotheses are generated from potentially flawed foundations. • PHEPR has historically considered social and societal determinants of health to be outside its sphere of influence, but PHEPR outcomes are inherently influenced by and an influencer of SDOH. PHEPR must widen its scope.	

	• PHEPR research must be disaggregated by community, race/ethnicity, etc. to better understand impacts and guide decision-making.	
Resilience	• Resilience is about maintaining the status quo, but the status quo is non-optimal from a public health perspective. (J Remes Critical Disaster Studies) • The disaster environment gives us freedom to go back to authoritarian modes of leadership we reject in other situations. Part of the problem with community resilience and community preparedness or even the whole community framework, is that it means that the community groups must accept the logic of the EOC. • Vulnerability indices are flawed because they don't incorporate the flow of assets and resources between communities. For example, the ability of one community to withstand disruption might depend heavily on the workforce from another community.	• What can PHEPR learn from how the community itself is surging during disruptions? (Pascoe and Stripling Surging Solidarity: Reorienting Ethics for Pandemics) • What can we learn and apply from punctuated entropy, which is a theory that communities experience a permanent decline in the adaptive flexibility brought on by the cumulative impact of periodic disaster events and subsequent investments in "recovery"?
Partnership	• PHEPR is not nimble; it's too slow. The community is really fast, but it doesn't have any resources. PHEPR doesn't give the community resources because of concerns about fraud, usually. We need to study what happens when community have the power and resources to surge and respond.	• What would happen if rather than trying to incorporate community into PHEPR frameworks, PHEPR supported existing community infrastructure to surge and respond rather building a competing structure within which they all need to integrate?
Equity	• To understand how PHEPR perpetuates inequities, research must consider things like 1) the biases of those leading response (e.g., ICS command), 2) the assigned roles and responsibilities of BIPOC and other oppressed groups within response, 3) the distribution of PHEPR resources and assets, and 4) the extent to which decisions reflect the needs and preference of the recipient communities.	• What is the impact of having an equity officer in ICS or other PHEPR response structures?

	• In a response environment, no one is responsible or accountable to racial equity. It needs to be named as a public health charge within formal response objectives. • PHEPR research must account for power structures, how the they are in play, and how amplifying inequities lessens the social functioning of a community after a disaster.	
Leadership		• What kind of a leader do we need during disruptions? • How can we foster thoughtfulness rather than expediency in decision-making?
Measuring and Monitoring PHEPR Outcomes	• The PHEP capabilities are flawed. They are all at different scales of measurement. Some of them are response and some are preparedness; they're muddled. They don't measure equity. They don't measure leadership. They don't measure environment. You can't make a dashboard because they're all very different.	• Can we build a logic model (building on previous efforts from Quarantelli and the NASEM report) that distinguishes between preparedness, response, and recovery as well as the strategies used to combat the disaster vs sustain the response?

Discussant 6

Theme	Comments	Research Inquiries
Equity	• Our current frameworks and language imply that the old paradigm, the pre-existing status was equitable, functional, collaborative, and that just really isn't the case.	• How can frameworks and models be adjusted to acknowledge preexisting inequities? • What are the facilitators and barriers to addressing inequities during and after an emergency or disaster?
Partnerships	• One particular challenge is a limitation to be able to fund communities for their time and participation. I can't in good faith ask somebody to continuously volunteer and not fund them for their participation.	• What implementation guidance can we provide for community-driven planning, response, and recovery? • Do models like community health boards enhance PHEPR outcomes?
Research Design		• How can we ensure that all research efforts result in outputs that are immediately useful on a practice level (e.g., frameworks, policy briefs, how-to guides, checklists)? • How can we ensure that research always draws from an intersectional lens and cross-disciplinary evidence base? It's just the nature of the way that research questions are asked. They're much more specific, but the reality is in practice these things don't live in isolation. • Can we design prospective or retrospective longitudinal studies to understand the cumulative and/or long-term effects of both disruptions and PHEPR interventions in specific communities? • How can we incentivize and support research from communities without academic partnerships? • How can we foster and enhance community-practice-academic partnerships?
Measuring and Modeling PHEPR		• How can we improve upon assessments like CASPER to make them reflective of what a community deems necessary and valuable and to provide routine, baseline data about a community?

Outputs and Outcomes		
Evidence Base for PHEPR Practice		• How can we better anticipate the potential consequences of PHEPR actions (e.g., legal, societal, SDOH, health, environmental, political) to better inform planning and decisionmaking? • How can we facilitate real-time learning and sharing among communities that are implementing innovative or novel PHEPR practices (e.g., ECHO model)? • What are the best frameworks and models for organizing for local response (i.e., what is out there besides ICS)? • What are the best frameworks and models for organizing across multiple responses (i.e., an ICS of ICSs)?

Discussant 7

Theme	Comments	Research Inquiries
Research Design	• The vast majority of PHEPR research is simply correlation, surveys, and qualitative research. Correlational data help us understand processes, but they can't speak to causality. • PHEPR needs longitudinal research that is done over three, four, five years. That would provide the number of data points needed to help us figure out the causal connections, say, between a certain type of message and whether trust erodes or is enhanced or coordination or public understanding of science.	
Measuring and Modeling PHEPR Outputs and Outcomes	• PHEPR must incorporate outcomes and impacts beyond morbidity and mortality. Health is related to many other social and societal determinants.	

Evidence Base for PHEPR Practice	• PHEPR seems to be heavily reliant on the technical solution, but the potential harm of those solutions is not well understood. For example, if we have a community-wide quarantine, we must anticipate and provide mitigation for the "side effects" like income loss, caregiving needs, access to food and shelter, and social isolation. • PHEPR needs evidence for what actions to take to prevent immediate morbidity and mortality from a disruption and how to mitigate the potential negative or unintended consequences of those PHEPR actions.	• How can PHEPR be prepared for the side effects of our policies and have policies in place to counter the negative side effects (e.g., impact assessments for PHEPR interventions)?
Partnerships	• Top-down, one-way models might erode trust because if the strategies don't work, then for any future event, the community doesn't trust the government or the authorities as much.	• How can local public health form partnerships with community before disruptions so that they can be more easily "activated" or enabled to respond during disruptions?
Communication	• Experts know the correct thing and accurate thing, but lived experience that may or may not coincide with what experts think is the correct. We know that experts need to be truthful, acknowledge uncertainty, and acknowledge limitations of knowledge to build trust with the public, but we don't fully know how messaging truly operates under conditions of uncertainty or stress or anxiety or time limitations.	• How can PHEPR messaging reconcile science and lived experience during disruptions?
Equity	• The two-way interaction of expert knowledge and lay knowledge is critical to developing and integrating the expertise of community groups without dismissing them. • Most PHEPR policies and practices are created by white-collar professionals who are probably not affected by the policies and practices personally. PHEPR has to heed the voice of folks who will be directly affected the public health policies.	

Discussant 8

Theme	Comments	Research Inquiries
Workforce		• What are the characteristics of PHEPR staff? How much time do they dedicate to PHEPR activities? What else are they responsible for? • How are state and local health departments using federal PHEPR funding for workforce? • How can existing PHEPR competencies be improved? • How can agency staff and volunteers be better prepared to step into PHEPR roles (i.e., not just ICS modules)? • How can policies and practices be adjusted to more easily allow for surge workforce (agency and volunteer)? • What would it take to quickly onboard a huge group of volunteers in an appropriate way?
Data Collection and Sharing		• How can policies and practices be adjusted to more easily allow for data sharing during disruptions (e.g., a university offers to map data to aid in response)?
Research Design		• How can we better facilitate research ideas from the bottom up?
Integration and Intersectionality	• PHEPR funding requirements encourage agencies to adopt a "checkbox" mentality. Rather than integrating with other agency assessments, exercises, trainings, and other activities serve a single purpose, which reinforces silos.	• How can agency assessments, exercises, trainings, and other activities help provide baseline training for response mode?
Communication		• How can agencies get access to better frameworks and messaging for PHEPR communication?
PHEPR Evidence		• Are HSEEP exercises requirements based in evidence? How can exercises be more inclusive of real-life

		response issues (equity, trust, misinformation, leadership issues, politics)?
Data Collection and Sharing	• Local data systems must be able to communicate more easily.	•
Leadership		• What does it take for PHEPR leaders to be taken seriously by other stakeholders? For a ton of preparedness coordinators, relationships don't even get off of the ground because of sexism, ageism, "I've been here longer than you"-ism, and racism.
Equity		• Can C-MIST be adapted for community-level equity considerations?