

VIEWPOINT

Evidence-Based Practice for Public Health Emergency Preparedness and Response

Recommendations From a National Academies of Sciences, Engineering, and Medicine Report

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The coronavirus disease 2019 (COVID-19) pandemic has brought national attention to the importance of the work of state, local, tribal, and territorial public health agencies in protecting and securing the nation's health. These agencies are routinely making difficult decisions about how to respond effectively to COVID-19, such as implementing nonpharmaceutical interventions and addressing the needs of at-risk populations. As in other fields, knowing what is effective requires scientific evidence. Yet, the evidence base that informs the actions of public health agencies in preparing for and responding to emergencies is limited and uneven and fails to meet the needs of public health emergency preparedness and response (PHEPR) practitioners for clear and accessible guidance. These deficiencies not only impede the efforts of these practitioners who are working to protect the lives and health of US residents during the COVID-19 pandemic, but also threaten the health security of the nation.

As the nation approaches the second decade since the events of September 11, 2001, and especially now in the midst of the COVID-19 pandemic, it is an opportune time to consider the improvements that are necessary to move the field forward and to strengthen the PHEPR system. A new report from the National Academies of Sciences, Engineering, and Medicine

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provides recommendations aimed at transforming the infrastructure, funding, and methods of PHEPR research to enhance the nation's capacity for effective response to public health emergencies and to ensure that PHEPR practice is grounded in robust evidence for what works where, why, and for whom.¹

A National PHEPR Science Framework

The committee found that funding for and prioritization of research before, during, and after public health emergencies are currently fragmented and disorganized, spread across multiple funding agencies, and inconsistent, and do not encourage the progression of quality research and the sustainable development of research expertise. The foundations of scientific progress in PHEPR

must be based on building and sustaining a research enterprise. Therefore, the committee recommends that the Centers for Disease Control and Prevention lead the development of a National PHEPR Science Framework to establish goals and objectives for improving coordination, integration, and alignment among existing but fragmented PHEPR research efforts, specifically to direct and coordinate available research funding to address prioritized PHEPR knowledge gaps.

Strong leadership at all levels, but especially at the federal level, is central to the framework and essential to support systems-level change and mobilize agencies to transform the way PHEPR research is funded, conducted, and coordinated. Crucial to a National PHEPR Science Framework will be support for meaningful partnerships between PHEPR practitioners and researchers, as well as strong community partnerships. Such partnerships could ensure that research addresses knowledge gaps that are important to practitioners and policy makers and can help bridge the gap between research and practice.

Methodological Improvements to PHEPR Research and Practice Evaluation

The PHEPR system is inherently complex, in part because of the nature of public health emergencies, and encompasses policies, organizations, and programs. PHEPR practices also may be complex, featuring multiple interacting components that target multiple levels (eg, individual, population, system) and with implementation that should be tailored to local settings and conditions. Such complexity adds to the inherent challenges of conducting research during public health emergencies. The committee identified important gaps related to designing and rapidly executing scientific research during a public health emergency response, which have been further illustrated by the COVID-19 pandemic.

There is a need for clear guidelines for evaluation methods and study designs that will produce credible answers to the various types of questions important to the PHEPR field. Such guidance needs to incorporate the full range of research and evaluation methods, including exploratory case studies, randomized trials, and modeling studies. Qualitative research methodologies can inform why and how practices may or may not be effective, which may help explain study results or inform intervention design, and can be useful in generating theories

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that can be tested empirically. Design methodologies used in such fields as public health services and systems research, operations research, organizational research, and quality improvement can also provide evidence for understanding PHEPR practices that are more organizational and operational in nature, such as activating emergency operations centers or communicating with diverse audiences. Comprehensive guidance will include suggestions for the strategic use of mixed methods to enhance understanding of the findings, including their breadth and limitations.

Recognizing the operational nature of the field, improving the evidence base for PHEPR also needs to include an emphasis on processes that support the collection of experiential evidence from responses to public health emergencies. After-action reports, which are generated after a response scenario and support quality improvement by documenting what was done and lessons learned, often in the form of recommendations for future responses, have the potential to offer rich information about what works in a practice setting. The use of after-action reports to advance PHEPR science could be greatly facilitated if the data they contain were more rigorously structured, reliable, and capable of being analyzed systematically. An expert panel should be convened to discuss ways to advance quality improvement in PHEPR and enhance the quality, value, and use of after-action reports as tools for evaluating the effectiveness of PHEPR practices.

Workforce Capacity Development for PHEPR Researchers and Practitioners

Improving and expanding PHEPR research will require incentives and a robust and sustained commitment to workforce capacity development for both PHEPR researchers and practitioners. Although there exists a network of researchers capable of conducting high-quality research on public health emergencies, ensuring a diverse, adequately trained, and interdisciplinary researcher workforce will require investment in improved researcher training programs and grants, such as career development awards. The capacity for practitioners to participate in and conduct evaluations could be enhanced through a combination of training, technical assistance, peer networking, and sustainable practitioner-researcher partnerships.

Ongoing PHEPR Evidence Reviews

The research and other evidence driven by the proposed National PHEPR Science Framework needs to be translated into clear evidence-based practices for public health agencies through an ongoing evidence review process. Without efforts to synthesize and evaluate PHEPR research in a coherent, transparent, and rigorous manner, it is likely that practitioners will continue to implement ineffective or inappropriate practices that waste valuable resources and fail to protect the public's health, researchers will continue to encounter

difficulty in identifying critical research gaps, and funders will continue to be challenged by deciding where to focus their resources.

Seeking to advance evidence-based practice within the PHEPR field, the Centers for Disease Control and Prevention asked the committee to conduct a systematic review and evaluation of the evidence for PHEPR practices. As part of its work, the committee developed a fit-for-purpose mixed-method evidence review methodology and systematically reviewed 4 PHEPR practices: engaging with and training community-based partners to improve the outcomes of at-risk populations after public health emergencies, activating a public health emergency operations center, communicating public health alerts and guidance with technical audiences during a public health emergency, and implementing quarantine to reduce or stop the spread of a contagious disease. Although the committee's reviews were not conducted in response to the COVID-19 pandemic, the likely applicability of many of the findings is noteworthy. For example, in response to COVID-19, different geographic areas have been implementing quarantine and other non-pharmaceutical interventions in various combinations. The committee's findings that quarantine can result in psychological harms (eg, posttraumatic stress, anxiety) and individual financial hardship will be just as relevant to the current quarantine experience as they are to past outbreak scenarios. It will be important to expand and update these reviews, as well as review the evidence of effectiveness of other PHEPR practices, once the field has rigorously collected, analyzed, and published the relevant data generated during and following the COVID-19 pandemic.

The committee recommended that an independent group be supported and charged with reviewing all relevant PHEPR research, distilling it into evidence-based practice guidelines for the benefit of practitioners, further developing the PHEPR evidence review methodology developed by the committee, and identifying evidence gaps.

Conclusions

The US is increasingly facing public health emergencies, such as the COVID-19 pandemic, that present opportunities to observe and learn and conduct real-time research to develop a strong empirical and analytical evidence base. It is essential for research and continuous learning to become the expectation, not the exception, for the PHEPR field. This will require adequate and stable research funding, robust design and conduct of research studies, support for the research workforce, and a commitment to collaboration between PHEPR practitioners and researchers. The unprecedented economic and human health costs of COVID-19 demonstrate that the nation cannot afford to ignore the calls for these critical investments in public health that have been made by this committee and many others before.

ARTICLE INFORMATION

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REFERENCE

1. *Evidence-Based Practice for Public Health Emergency Preparedness and Response*. Washington, DC: National Academies Press; 2020.