

ADVANCING EVIDENCE-BASED PUBLIC HEALTH:

*A Scoping Review of Trainings
for Public Health Practitioners*

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EXECUTIVE SUMMARY

Translation of public health research into practice is critical to improving health outcomes. The extent to which research evidence is used in public health practice, however, is limited.

Evidence-based public health (EBPH) has emerged as a model of practice promising a range of benefits, including better understanding of programs and policies that work in specific settings, improved efficiencies in the use of public health resources, and ultimately, better population health outcomes.

Despite the benefits of EBPH implementation, there are significant barriers to advancing this approach in public health practice, including workforce skills gaps, lack of leadership support and resources, and competing priorities in practice settings. Implementing EBPH training programs is an efficient means of addressing skills gaps and has thus emerged as an important approach for advancing EBPH uptake.

A scoping review was undertaken to explore the range of training programs available to optimize EBPH uptake in the United States. Studies included in the scoping review most frequently cited use of in-person training delivery formats, though findings also suggested that greater exploration of distance modalities may be a promising approach to scale up training delivery. Participants were most often identified as state and local health department staff. Instructors, on the other hand, generally were affiliated with universities, suggesting an opportunity to increase engagement of public health practitioners in developing and delivering trainings. Finally, further exploration is needed to determine the training preferences of public health practitioners in executive leadership positions, as these individuals may be instrumental in advancing EBPH adoption in the agencies they lead.

Findings from this study may be used by EBPH curriculum developers, public health practitioners, and the organizations that serve them to inform future development or expansion of effective training programs, with the end-goal of accelerating EBPH implementation and improving health outcomes in the United States.

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I am also grateful to the Association of State and Territorial Health Officials (ASTHO) for their support of my continued education. The organization's prioritization of evidence-based public health has provided a space for me to learn and test new theories, complementing my research with practice-based experience. Many thanks to my supervisor, Dr. Meredith Allen, for her guidance during the program, and for affording me the opportunity to participate in evidence-based public health workgroups at ASTHO, which have augmented my experience in this field.

ALIGNMENT WITH CORE COMPETENCIES & GOALS ANALYSIS

The following paper addresses several of the core competencies for the Johns Hopkins Bloomberg School of Public Health MPH program, including:

- Integrating and synthesizing information to solve problems, inform policy, formulate appropriate questions, generate hypotheses, and practice evidence-based decision-making in public health.
- Preparing and delivering effective written and oral communications for scientific and professional public health audiences.
- Identifying, accessing, and displaying in tables or graphs data relevant to disciplines of public health.
- Analyzing and evaluating the process of public policy-making and how it affects the design, implementation and performance of health policies.

At the outset of the program, I hoped to gain a stronger knowledge and skillset in epidemiology, research methods, analyzing and interpreting data, and developing scientific papers. The exercise of conducting a scoping review of trainings on evidence-based public health has supported these goals, while also addressing the core competencies described above. In exploring the field of evidence-based decision-making, I have a better understanding of the process by which research and epidemiological evidence can inform policy and programming in public health. The process of summarizing findings also allowed me to solidify skills in data analysis, interpretation, and scientific writing. The following paper represents the integration of many of the skills and interests that I developed during the MPH program, and I appreciate the opportunity to share the results of this work.

I. BACKGROUND

The role of evidence in public health

Public health achievements in the 20th century are credited for increasing life expectancy in the United States by approximately 25 years.¹ The translation of research into public health practice was critical to these achievements, and accelerating the implementation of evidence-based policies and programs may result in further gains to population health.^{2,3} Despite the benefits of adopting an evidence-based public health practice, the extent to which research evidence is used in public health is limited. A 2011 systematic review was unable to reliably quantify the use of evidence in public health practice, but cites studies from Canada and Australia that found only 23% and 68% of public health staff, respectively, reported using academic research to inform their decision-making.⁴ In the United States, a 2008 survey estimates that 58% of public health programs in health departments are evidence-based (i.e., use current scientific research to inform practice),⁵ highlighting an important research-to-practice gap that warrants increased attention.

Following the introduction of the paradigm for evidence-based medicine in the early 1990s,⁶ interest in advancing the role of evidence in the public health sphere also grew.^{7,8} Public health evidence exists in a variety of forms, including—but not limited to—scientific literature, surveillance data, program evaluations, and experiential information. These forms of evidence fall on a spectrum of objectivity and can be further classified to describe how the evidence contributes to an understanding of the etiology and prevention of disease, effectiveness of the interventions to mitigate disease, and adaptability of interventions.²

Evidence-based public health and decision-making

Evidence-based public health (EBPH) has emerged as a model of practice promising a range of benefits, including better understanding of the types of programs and policies that work in specific settings, improved efficiencies in the use of public health resources, and ultimately, better population health outcomes.² Early explorations of EBPH identified the central nature of epidemiology in developing and advancing the evidence-base,⁷ and subsequent studies expanded the concept to acknowledge additional steps in the development, implementation and evaluation of programs and policies, and the importance of community involvement in selecting appropriate interventions.^{8,9}

As a whole, EBPH involves accessing the best available research to inform decisions, systematically using data and information systems, applying appropriate frameworks in program planning, engaging the community in assessment and decision-making activities, evaluating the program, and disseminating lessons learned to key stakeholders.^{2,8} Competencies in epidemiology, communication, and political mapping are also useful in supporting effective assessment and communication of evidence, while rooting evidence-based strategies in the context of what is feasible in a given setting.^{2,7}

The process of making program or policy decisions based on evidence, while weighing population attributes, resources, and context is referred to as evidence-based decision-making

(EBDM).^{2,10} EBDM is inherently connected to, and flows from, processes outlined in EBPH. Both recognize the importance of a critical analysis of the existing evidence and contextual realities to inform program planning, and a reasoned decision-making process to select appropriate interventions amongst a group of options.⁹ EBDM is a critical skill for all levels of the public health workforce broadly—and public health leaders in particular, as they are responsible for setting programmatic and policy priorities, and directing resources for implementation.

Evidence-based public health in state and local health departments

State and local governmental public health consists of 59 state and territorial health departments and almost 3,000 local health departments.^{11,12} These agencies hold primary responsibility for protecting and promoting the public's health in the United States,¹³ and in that role, they serve an array of diverse communities with varied population distribution, geography, resources, and health needs.^{11,12} Health departments are instrumental in ensuring that the populations they serve receive appropriate public health services, and as such, they are a critical setting for operationalizing EBPH.

Facilitators

EBPH is recognized as a foundational component of health departments and a critical competency of the public health workforce these agencies employ. The Public Health Accreditation Board (PHAB), which sets voluntary standards for tribal, state, territorial, and local health departments, includes an accreditation domain dedicated to contributing to, identifying, applying, and promoting EBPH practices.¹⁴ By including this measure in health department accreditation standards, PHAB has taken a significant step towards institutionalizing EBPH in state and local health departments. From a workforce standpoint, EBPH skills are recognized as core competencies for public health professionals. For example, the Council on Linkages between Academia and Public Health Practice includes assessing evidence for use in decision-making as a key skill for public health professionals broadly,¹⁵ as do the Centers for Disease Control and Prevention and Council of State and Territorial Epidemiologists in their guidance for applied epidemiologists in governmental public health agencies.¹⁶

Beyond the inclusion of EBPH in workforce and organizational standards, financial incentives further reinforce the drive towards evidence-based programs. PHAB accreditation, for example, improves a health department's competitiveness for funding opportunities,¹⁷ thus promoting uptake of EBPH practices. Similarly, the 2009 American Recovery and Investment Act and 2010 Patient Protection and Affordable Care Act allocated resources for advancing evidence-based programs and strategies.¹⁸

Challenges

While a growing body of stakeholders are aligned in acknowledging the importance of EBPH, there are an array of barriers to implementing this practice, including those at the individual level (e.g., skills needed to operationalize EBPH), organizational level (e.g., leadership support, organizational culture, and resources), and systems level (e.g., funding, competing priorities, political will).¹⁰ At the individual level, studies have highlighted gaps in state and local health

department staff awareness, skills, and translation of EBPH into day-to-day work. National surveys conducted with state and local staff between 2008 and 2013 identified EBDM competency gaps that were consistent over time,¹⁹ and a 2017 survey found that overall awareness of EBPH practice was fairly low (62%).²⁰ When stratified to examine state health departments only, the 2017 survey found that EBPH awareness was notably higher (77%), but only 60% of staff perceived the concept as impacting their day-to-day work.²¹

Over time, the governmental public health workforce has reported increased awareness and impact of EBPH in their daily work²² and improved perceptions regarding importance and availability of EBDM competencies.¹⁹ Nevertheless, these national surveys highlight the need for continued promotion of EBPH to raise awareness of the concept amongst state and local health department staff, in addition to focused training to support translation of theory into routine practice.

Evidence-based public health training and tools

In recognition of the need for public health workforce capacity building in EBPH, training programs and tools have been developed and disseminated throughout the country. Trainings can address skill gaps in the short-term,¹⁰ and are thus viewed as an efficient means of supporting EBPH uptake. Some of the well-recognized trainings and tools are described below. In 1997, the Prevention Research Center in St. Louis (PRC-StL) developed a training, 'Evidence-Based Public Health,' which has been offered to public health professionals through state-based courses since 1998, and internationally since 2002.^{10,18,23} The training modules introduce participants to the EBDM process, outlined in Figure 1. Though the original training was offered in-person by PRC-StL researchers, subsequent iterations of the training also have been provided through train-the-trainer models, adapted to local contexts, and delivered through alternative course formats (e.g., distance, or a blend of distance and in-person), greatly expanding the reach and impact of the course.^{10,24}

In addition to evidence-based practice training courses, other tools, such as the Guide to Community Preventive Services and the Cochrane Library, are available online to orient public health practitioners to evidence-based population-level interventions.^{18,25,26}

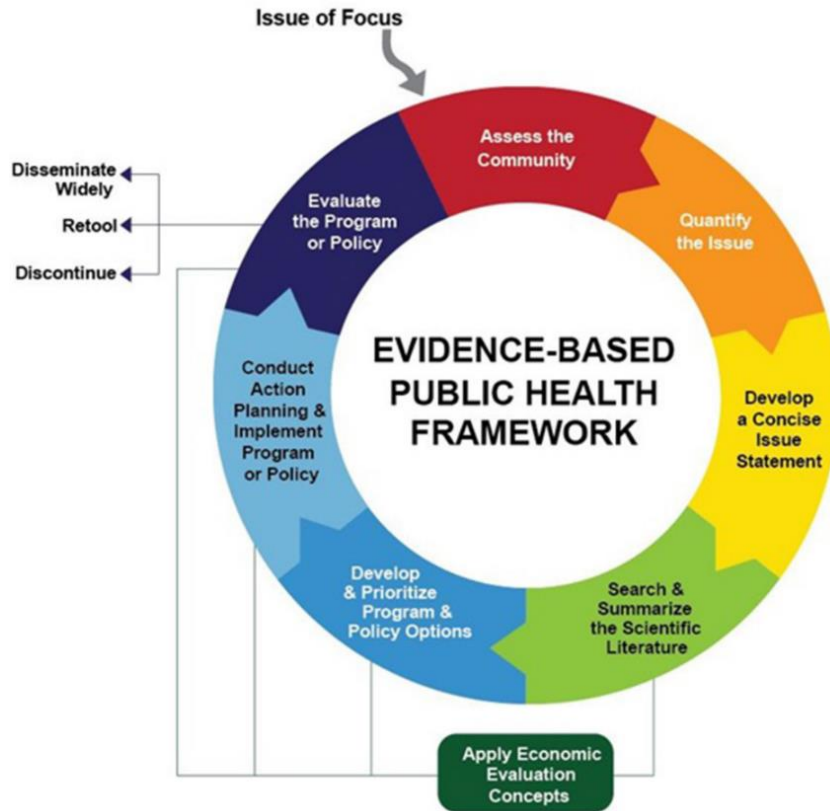


Figure 1. Framework for training public health professionals in evidence-based decision making. Reproduced from Jacob et al.¹⁰

The role of governmental public health leadership

To understand the influences on EBPH uptake and implementation in state and local health departments, an exploration of the role of governmental public health executive leadership is also appropriate. Leadership support of EBPH has been identified as a critical facilitator for incorporation of these concepts into practice. For example, in a 2013 national survey of state health department staff, most respondents (67.9%) identified prioritization of EBDM by their leadership as a supportive factor for EBDM implementation.¹⁹

Conversely, the lack of knowledge or prioritization of EBPH amongst senior staff, and an organizational culture that is not supportive of EBPH practice have all been cited by public health professionals as barriers to implementation of evidence-based skills and programs.^{9,27-29} Health department leadership may exert influence to address these and other organizational-level barriers—including a perceived lack of incentives to use EBPH and inadequate staff knowledge of EBPH concepts—by committing resources to encourage application and skills-building.²⁷⁻²⁹ Public health leaders can serve as agents of change within their own organization by enabling an environment in which staff are encouraged to adopt a reflective, evidence-based approach to their work.³⁰

II. OBJECTIVES

Advancing evidence-based public health: a training lens

Given the known gaps between public health research and practice, and the benefits promised by improved implementation of EBPH, this study was undertaken to further explore opportunities to optimize EBPH uptake in public health practice settings in the United States. EBPH training courses were identified as the focal point for exploration, because the background research suggested that trainings were an effective strategy to address knowledge and skills gaps in the short-term.

Characteristics of the trainings (e.g., content, delivery mode) are studied, in addition to the audiences to which they were delivered (e.g., professional setting, staff level). Professional setting was of interest due to the central role of state and local health departments in implementing programs and policies that impact the public's health, as was staff level, due to the role executive leadership may play in addressing organization-level barriers to EBPH implementation. While some EBPH trainings, such as the PRC-StL curriculum have been referenced widely in the literature, additional study is warranted to characterize this training in context with other trainings and adaptations, to more fully describe audiences reached and components included in U.S.-based EBPH trainings as a whole.

It is the author's hope that findings from this study may be used by EBPH curriculum developers, public health professionals, and the organizations that serve public health practitioners to inform future training development and/or scale-up of effective training practices, with the end-goal of optimizing adoption and implementation of EBPH practices.

III. METHODS

Scoping review

To explore the stated research objectives, the author conducted a scoping review—a form of literature review that aims to map the breadth and nature of existing research in a particular field of inquiry. This exploratory approach for reviewing literature was deemed appropriate for this study, as scoping review techniques allow for: assessment of a relatively broad topic area where a variety of study designs may be appropriate; examination and summary of the current evidence base on a particular topic; and identification of gaps in knowledge where further research may be warranted. Scoping reviews do not evaluate the quality of the evidence, unlike systematic reviews, but rather can be seen as step towards determining the value or feasibility for a full systematic review.³¹

The iterative review process underpinning the scoping review methodology was used to inform recommendations for further research and action relating to evidence-based trainings for public health practitioners. The methods outlined below were informed by the scoping review framework developed by Arksey and O'Malley³¹ and refined by Levac, Colquhoun, and O'Brien.³²

Identifying the research question

While scoping review research questions may be relatively broad in nature, Levac, Colquhoun, and O'Brien³² note the importance of defining clear inquiry parameters (e.g., inclusion and exclusion criteria) to inform the research strategy. The following research questions guided this review:

1. What types of trainings are available for using evidence in public health practice?
2. What are the key components of these trainings?
3. How do these components vary by public health audience type?

The above research questions specifically define the intervention (i.e., trainings for evidence-based public health) and population (i.e., public health practitioners) of interest, which informs the inclusion and exclusion criteria used in subsequent stages of the review.

Identifying relevant studies

Literature searches were conducted in October 2019 through the PubMed database. Relevant Medical Subject Headings (MeSH) terms were identified through a preliminary scan of articles that appeared consistent with the research questions, and included: evidence-based practice; evidence-based practice/education; education, public health professional; and decision-making. No limits on date or language were placed on the searches.

Because initial searches yielded an abundance of articles focused on evidence-based medicine, a specific search for “evidence-based practice” in the *Journal of Public Health Management and Practice* was also implemented, in recognition of the journal’s emphasis on public health—rather than medical—practice and research. The three searches conducted are summarized below:

1. “Decision Making” AND “Evidence-Based Practice/education”
2. “Evidence-Based Practice” AND “Education, Public Health Professional”
3. “Evidence-Based Practice” AND “Journal of public health management and practice: JPHMP” [Journal]

Covidence, a web-based platform, was used to manage screening and deduplication of studies identified through the PubMed searches. Studies imported into Covidence underwent a two-part title and abstract screening process to assess relevance for the scoping review research questions.

In the first screening stage, studies were excluded if the research objectives did not include improving evidence-based practice in public health settings. This criterion removed all studies summarizing interventions in medical settings only. Studies were also excluded if the research was more narrowly focused on the evidence available for program-specific implementation (e.g., vaccination, tobacco control) without explicitly calling out training models or tools that could be applied more broadly across public health topic areas.

The second screening stage further narrowed the list of relevant studies by excluding studies that did not have the following key words in the title or abstract: train; educate; teach; course; or variations with the same root (e.g., trainer, training, education, educator, etc.).

The search for studies was an iterative process and also involved the addition of references that were identified by key word search.

Study selection

The remaining studies (n=20) underwent a full text review. This stage involved iterative refinement of the inclusion and exclusion criteria, as the reviewer became more familiar with the content. During the full text review, studies were included if: the paper focused on describing and/or assessing a training on evidence-based public health; training recipients included state and/or local health agency staff; and the intervention described took place in the United States. Studies that provided broad commentary on evidence-based public health training without examining specific training programs were excluded, as were studies where the intervention targeted only non-state/local health agency staff or did not take place in the United States. While state and local health agency staff were not explicitly called out in the research questions, the research objectives did note a special interest in these practice settings, so this criterion was used to narrow the total number of studies included in the data extraction process. Following the full text review, 12 studies remained.^{5,9,10,24,27-29,33-37} A diagram of study identification through inclusion is represented in Figure 1.

Charting the data

A data extraction form was developed to record key information from the selected studies. Identifying relevant components to include in the data extraction form is critical, as this determines the depth of analysis that is applied across all selected studies.³¹

Overarching domains (e.g., participants, intervention, content, evaluation) were informed by Philips, et al.,³⁸ who outline reporting guidelines for educational interventions for evidence-based practice. The overarching domains included in the final data extraction form included fields for more general information about the study, in addition to more narrow fields that specifically addressed elements of the research questions. Domains included:

- *General:* Authors, title, year of publication, study country, study aims, study design
- *Participants:* Learners (training recipients), instructors
- *Intervention & Content:* Training description, delivery format, duration, content
- *Evaluation:* Training assessment methods
- *Results:* Study results and key findings that relate to scoping review questions

When possible, categorical response options were included in the data extraction form to ensure consistency of the data that was charted across the selected studies. Response options were informed by existing categories that had been used in the literature to describe EBPH training delivery format²⁴ and content.^{9,10} In the subsection describing training delivery format, for example, categorical response options included: distance only; blended (distance and live web-based learning sessions); blended (distance and face-to-face training); and in-person only.

Subcategories for training content were informed by the framework used in the PRC-StL curricula (Figure 1) and the sequential framework for enhancing evidence-based public health described by Brownson et al.⁹

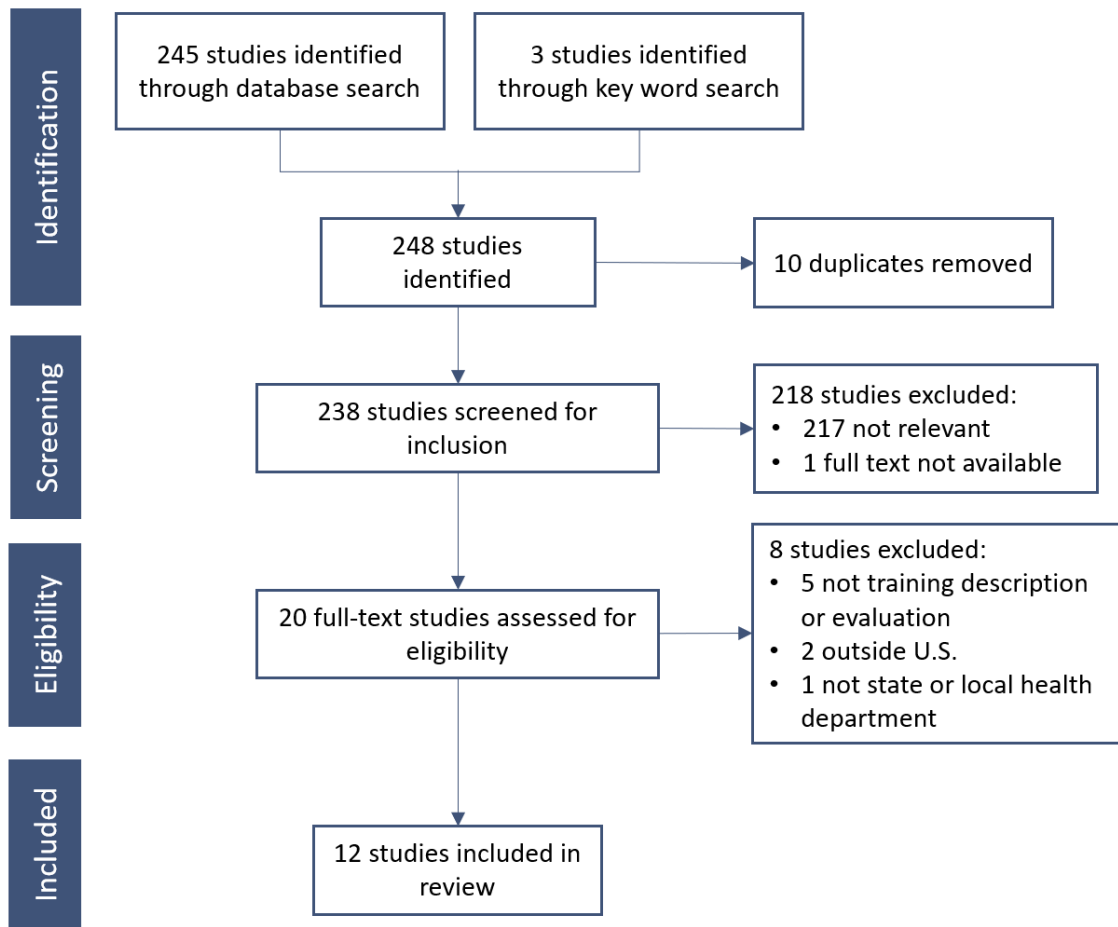


Figure 2. Flowchart of study selection process

Collating, summarizing, and reporting the results

Findings from the scoping review are outlined in section IV. Data were analyzed to describe the nature and breadth of the studies, in addition to key themes that addressed the research questions.

IV. FINDINGS

Characteristics of studies included in scoping review

All studies included in the scoping review were published between 1999 and 2018, with 83.3% (10/12) published between 2008 and 2018. The range of publication years for the studies are reported in Table 1.

Table 1. Publication year of studies included in scoping review (n=12)		
Publication year	Number (n=12)	Percentage (%)
< 2005	1	8.3
2005-2009	4	33.3
2010-2014	3	25.0
2015-2019	4	33.3

Each of the studies included in the scoping review described trainings that had taken place in the United States, or in the United States in conjunction with international sites. Figure 3 displays the distribution of the states in which trainings were conducted.

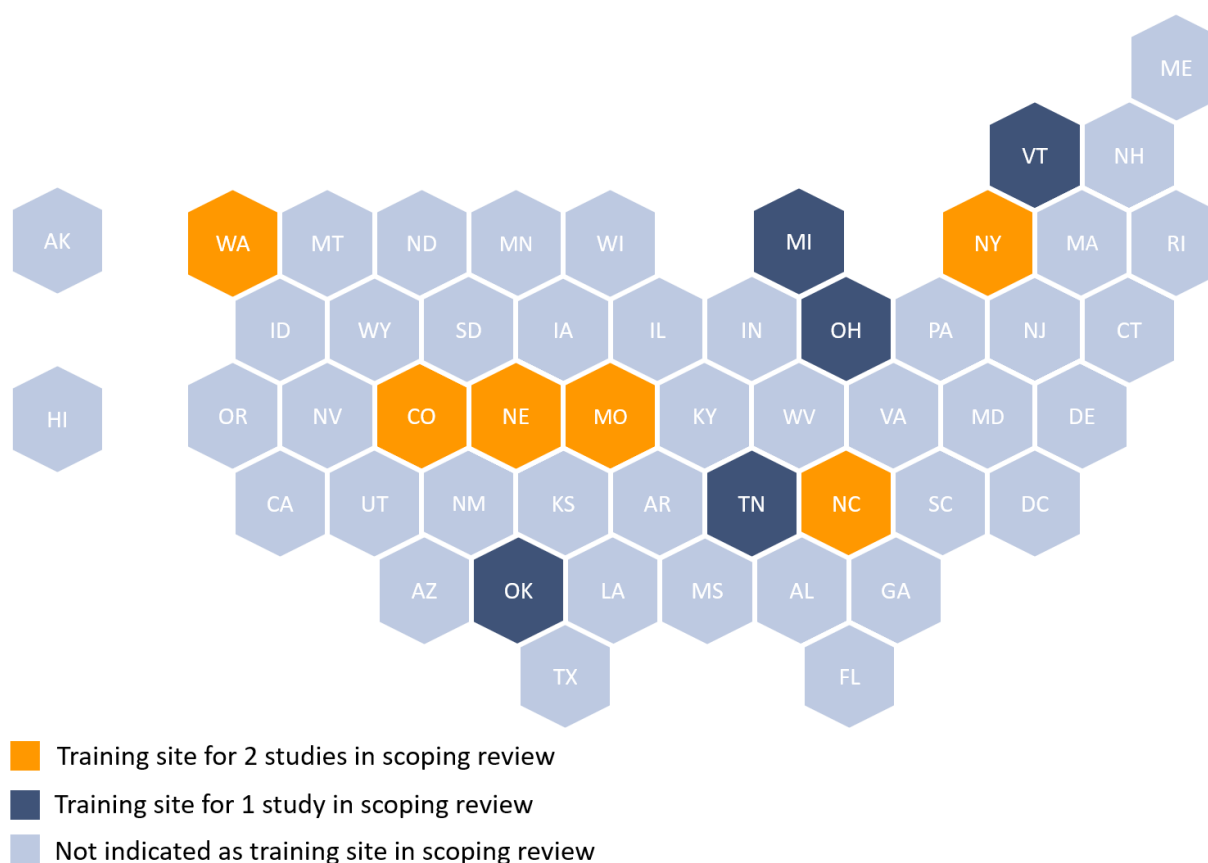


Figure 3. Distribution of training sites described in scoping review studies

Three studies indicated that the trainings had taken place in the U.S. but did not specify the state,^{24,28,33} and are therefore not reflected in the figure. In studies where training sites were specified, 11 states were identified overall. Six states (Colorado, Missouri, Nebraska, New York, North Carolina, and Washington) were noted as training sites in 2 studies; five states (Ohio, Oklahoma, Michigan, Tennessee, and Vermont) were identified as training sites in only one study.

Types of trainings available

The general characteristics of the trainings described in the scoping review are outlined in Table 2. The origin and development of the trainings varied, with studies most frequently citing trainings that replicated (41.7%; 5/12)^{5,28,29,33,36} or adapted (33.3%; 4/12)^{10,24,27,35} an established framework. Each of the replicated or adapted trainings used the PRC-StL EBPH training framework as a foundation, expanding the training to different audiences or settings, or adapting the length or delivery modality for scalability. In cases where the PRC-StL framework had been adapted (i.e., to target specific audiences or diversify delivery modes), evaluation findings indicated that the new trainings had retained effectiveness in building EBPH knowledge and skills.

Table 2. General characteristics of trainings described in scoping review studies (n=12)		
Characteristic	Number (n=12)	Percentage (%)
Curriculum development methodology		
Developed a new framework	3	25.0
Used an established framework	5	41.7
Adapted an established framework	4	33.3
Training recipients*		
State health department staff	8	66.7
Local health department staff	10	83.3
University affiliation	4	33.3
Other	6	50.0
Not specified	1	8.3
Training instructors*		
University staff	6	50.0
State/regional public health training center staff	3	25.0
State/local health department staff	4	33.3
Not specified	4	33.3
Public health topic area featured in training		
Chronic disease	1	8.3
Preparedness	1	8.3
Epidemiology	1	8.3
Not specified	9	75.0
Evaluation method reported*		
Post-course evaluation	3	25.0
Pre- and post-test	7	58.3
Interviews	3	25.0
Follow-up survey	4	33.3
Not specified	1	8.3

*Subcategories within this domain are not mutually exclusive (i.e., studies might describe a training—or multiple trainings—that are characterized by more than one subcategory type).

The most commonly reported training recipients were staff from local (83.3%; 10/12) and state (66.7%; 8/12) health departments. Four studies (33.3%) reported training participants that were affiliated with a university.^{5,10,28,35} Six studies (50%) described participant types that have been defined in this analysis as ‘other,’ as they were not mentioned with high enough frequency to be reported in a separate category. The participant affiliations that fell into this ‘other’ category included federal agencies, private organizations, national or regional health departments, healthcare facilities, and community-based organizations.

While participants were most frequently identified as being state and local health department staff, their training instructors, on the other hand, were most frequently reported as being affiliated with universities (50%; 6/12). Three studies (25%) also described the use of instructors who had taken part in ‘train-the-trainer’ programs, which served as a strategy to extend the instructor base.^{10,24,29} Instructors that participated in train-the-trainer programs were affiliated with academic institutions, state and regional public health training centers, and state health departments. Outcomes from trainings conducted by instructors who had participated in train-the-trainer programs were consistent with outcomes from the original trainings, indicating that increasing efficiencies in delivering EBPH trainings does not sacrifice effectiveness.

While the trainings described in the studies generally did not seem to focus on a specific public health program area (75%; 9/12), three studies described trainings in which chronic disease (i.e., cancer prevention),³⁵ preparedness,³⁴ or epidemiology²⁷ content were featured. Another study specified that participants were mostly comprised of chronic disease directors, suggesting that the course might have been tailored to this content area.⁵ Beyond specific programmatic content areas featured in some trainings, studies also described course curricula that were adapted to feature local examples and case studies, to better meet needs of participating learners.

The most frequently reported method of training assessment involved the use of pre- and post-test evaluation methodologies (58.3%; 7/12). This approach was generally used to test participants at baseline, and again directly after completion of the course to assess change in knowledge. One study described a modified version of this approach whereby participants and control groups were tested at baseline, and again approximately 6 months after course completion to ascertain perceptions around importance and availability of EBDM skills.¹⁰

Course impact and utility were also evaluated through post-course evaluation, interviews, and longer-term follow-up surveys. Use of post-course evaluations was reported in three studies (25%), to collect information shortly after course completion on a range of topics, including how well the course met objectives, usefulness of information presented in the training, ability to apply information learned to job, and instructor ability.^{9,27,36} Interviews with course participants (16.7%; 2/12)^{33,37} were used to collect qualitative information regarding benefits and barriers to EBPH implementation and long-term impact of training, and another study interviewed course instructors (8.3%; 1/12)²⁴ to assess the pros and cons of adapted training modalities. Finally, follow-up surveys (33.3%; 4/12) were employed to collect longer-term information regarding impact and application of course competencies.^{5,27,28,33}

Key components of trainings

Table 3 reports key components of the trainings described in the scoping review studies, including training delivery format, training content areas covered, and analytical tools or processes featured.

Table 3. Key components of trainings described in scoping review studies (n=12)		
Training Component*	Number (n=12)	Percentage (%)
Delivery format[†]		
Distance only	4	33.3
Blended: distance and live web-based learning sessions	2	16.7
Blended: distance and face-to-face training	4	33.3
In-person only	6	50.0
Not specified	3	25.0
Content areas covered[‡]		
Assessing the community	6	50.0
Quantifying the issue	7	58.3
Developing an issue statement	7	58.3
Searching and summarizing scientific literature	7	58.3
Developing and prioritizing program/policy options	6	50.0
Action planning and program/policy implementation	7	58.3
Evaluating program/policy	8	66.7
Other	1	8.3
Not specified	2	16.7
Analytical tools and processes incorporated[§]		
Meta-analysis	1	8.3
Risk Assessment	2	16.7
Surveillance	2	16.7
Expert panels/consensus conference	1	8.3

*Subcategories within these domains are not mutually exclusive (i.e., studies might describe a training—or multiple trainings—that are characterized by more than one subcategory type).

[†]Informed by categories described in Brownson et al.²⁴

[‡]Informed by categories described in in Jacob et al.¹⁰

[§]Informed by categories described in Brownson, Gurney, and Land.⁹

In terms of delivery format, some studies reported on trainings with one consistent delivery format, while others reported on a group of trainings that had been adapted to a variety of delivery modalities, followed by evaluation to assess any differences in participants' knowledge and skills-building. The most frequently reported training delivery format was in-person (50%; 6/12), followed by a blend of distance and face-to-face learning^{10,24,29,34} and distance learning only^{10,24,35,36} (both 33.3%; 4/12).

The training content areas described in Table 3 were informed by the PRC-StL EBPH framework outlined by Jacob et al.,¹⁰ and reproduced in Figure 1. These content areas were present in half or more of the reviewed studies (50-66.7%). The most frequently reported training content area was program/policy evaluation (66.7%; 8/12). The study that reported on a training that fell into the 'other' category covered modules on epidemiologic study design.³⁴

The analytical tools and processes reported in Table 3 were informed by the categories described in the Brownson et al.⁹ sequential framework for enhancing evidence-based public health. Overall, these tools were mentioned less frequently than the content areas described above. It is unclear, however, whether this observation represents an actual absence of these tools/processes in the trainings, or a lack of detail in the training descriptions.

Training variations by audience type

Scoping review studies described a range of training recipient position types, including but not limited to: public health director; deputy assistant director; program manager; technical expert; and specialist. Reporting frequencies of training recipients by position was not possible due to the inconsistency and overlap in position categories described in studies. For example, some studies separated out executive leadership and program managers, whereas other studies grouped these positions together.

Studies generally did not indicate if or how trainings varied based on the position level of their training audiences. One study, however, did note in their findings that some participants found components of the training too basic, and suggested that trainings should be tailored to the audiences' knowledge level.²⁹ Only one study was explicitly targeted to health department executive leadership (defined as public health director and staff in decision-making positions)—though the descriptor of 'decision-maker' may be interpreted broadly.²⁷ This training used an in-person only delivery format, and was adapted off of the EBPH training framework established by the PRC-StL. Though the authors described how the curriculum was adapted to meet the local health department context, they did not identify if or how the components of the training may have been adapted to address their specific leadership audiences.

IV. DISCUSSION

Limitations

This scoping review is subject to limitations, including the fact that only one reviewer was involved in screening the studies that were incorporated into this paper. The use of two or more reviewers would have improved the thoroughness of the screening process and ensured that all relevant studies were included in the review.

In conducting a search for relevant articles, one of the searches was limited to articles that were published in the *Journal of Public Health Management and Practice*. While the prioritization of this journal was included as a search parameter due to the lack of public health practice-related studies yielded from initial searches, it likely resulted in reporting bias (i.e.,

location bias), as journal articles from this publication would have received greater attention than potentially relevant studies included in other publications.

Finally, the last—though optional—step in conducting a scoping review is a consultation exercise, whereby practitioners and consumers of the scoping review are involved in contributing additional references to the screening process and contextualizing findings. While the timeline for completing this scoping review precluded the author from soliciting stakeholder consultation, future opportunities exist through professional connections to review the methods and findings with national organizations such as the Association of State and Territorial Health Officials (ASTHO) and the National Association of County and City Health Officials (NACCHO), in addition to authors of several studies included in the scoping review.

The state of EBPH trainings in the U.S.

The scoping review found that a small but consistent number of studies were published highlighting EBPH trainings conducted in the U.S., with 3-4 studies published every 5 years since 2005. Only 11 state training sites were described in these studies, which might suggest that while EBPH trainings are taking place across the country, a smaller amount of states are dedicating resources to testing new training frameworks, adapting training delivery modalities (e.g., distance, blended), and publishing findings.

The trainings described in the scoping review studies underscored the vast impact of the PRC-StL training framework, as the majority of the trainings replicated this established curriculum or used it as a foundation from which to develop adaptations to meet audience needs. While the success of PRC-StL training modules is well-documented, more research might be useful in determining the value and impact of adaptations that focus on a specific public health topic area (e.g., infectious disease, environmental health, etc.). The PRC-StL EBPH curriculum was originally disseminated to chronic disease directors,⁵ and the translation of the framework to other public health programmatic areas is yet to be adequately described.

The most frequently reported training delivery format was in-person, which is in line with the original delivery modality of the PRC-StL EBPH training framework. However, greater exploration of distance and blended delivery formats may make the trainings more accessible to audiences and help accommodate busy schedules. After all, one of the barriers identified for adopting EBPH practices was lack of time.^{5,27,33} One study testing effectiveness of in-person versus distance and blended learning noted that each training format was successful in improving EBPH skills, signaling an opportunity to scale up the reach of EBPH trainings without compromising outcomes.¹⁰ Another study noted participants' desire for 'just-in-time' trainings (i.e., refresher courses that align with situations when the skills are needed).³⁷ Distance learning may be strategy to address this need, as it would allow public health practitioners to access relevant courses on-demand.

Who's engaged: instructors and participants

The scoping review found robust engagement from state and local health departments as participants in the EBPH training courses. This is encouraging, given the central role of state and local health departments in implementing programs and policies that impact the public's health. Instructors tend to be affiliated with universities, which, though not necessarily a weakness in training implementation, may point to an opportunity to further engage on-the-ground public health practitioners in developing and delivering trainings. Implementing more train-the-trainer programs, which were shown to broaden the instructor base, might be an opportunity to engage more public health practitioners (as opposed to researchers) as instructors. Doing so might support the development of trainings that are more responsive to participants' practice-based realities.

Overall, it is not clear if or how trainings might have varied by audience type, due to the lack of clarity and consistency in reporting participant position types. Standardization around how to report training participant positions would be helpful to better compare findings across studies. The finding in one study that participants requested trainings that were better tailored to their knowledge and skills levels reinforces the importance of taking into account diverse audience profiles when developing and implementing EBPH trainings.²⁹

Implications for governmental public health

Findings suggest that state and local health departments interested in building or expanding their EBPH practice can turn to established and tested EBPH training frameworks to do so. To improve the relevance of these trainings, curricula must be adapted to the local context, and should be responsive to pre-identified participant needs and skills levels. Pursuing a train-the-trainer model whereby health department representatives serve as instructors can be one approach to developing internal expertise and staff champions. This approach might also reinforce the relevance and applicability of the EBPH competencies, as the training would be more solidly rooted in the context of the health department practice. Distance or blended learning modalities should also be explored, to accommodate staff schedules and just-in-time training needs.

While staff trainings can address individual-level barriers to EBPH implementation, engagement of health department leadership may be a strategy to address identified organization-level barriers. Further exploration is needed to determine the training preferences of public health practitioners in executive leadership positions. National organizations that support executive leadership at health departments, such as ASTHO and NACCHO, may be ideally positioned to inform this research and support development of EBPH trainings that are tailored to the professionals they represent.

The central role of academic researchers in developing and—to large extent—instructing public health practitioners in EBPH reinforces the importance for strong linkages between health departments and local academic partners. These linkages may be promoted through increased operationalization of 'academic health departments,' a relationship whereby state/local health departments and academic partners formalize their collaboration through shared resources,

staff, and/or training programs. The November 2019 launch of the *ASTHO-Mason Collaborative for Applied Public Health Practice* serves as one recent example highlighting the growing momentum for grounding governmental public health in evidence-based leadership and practice. Stronger partnership between health departments and universities may also support the development of ‘practice-based evidence’ alongside evidence-based practice—that is, the expansion of an evidence base that is rooted in realities and context of frontline public health practitioners.^{39,40}

Conclusions

Over the past 20 years, a number of trainings have been developed and deployed across the United States to advance uptake of EBPH in public health practice settings. While several trainings have explored success factors and considerations for adapting delivery modalities and instructor training models, additional research is needed to better characterize training modifications that might be warranted to address specific public health audience levels and programmatic fields. Given the successes resulting from existing training programs, continued research to enhance the training curricula and increase audience reach promises to accelerate EBPH implementation, bridge the gap between public health research and practice—and ultimately, promote and protect the public’s health.

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