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Equipping the Public Health Workforce of the Future: Evaluation of an Evidence-Based Public Health Training Delivered Through Academic-Health Department Partnerships

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Abstract

Objective: Maintaining a skilled public health workforce is essential but challenging given high turnover and that few staff hold a public health degree. Situating workforce development within existing structures leverages the strengths of different organizations and can build relationships to address public health challenges and health equity. We implemented and evaluated an innovative, sustainable model to deliver an established evidence-based public health (EBPH) training collaboratively among Prevention Research Centers (PRC), local and state health departments, and Public Health Training Centers (PHTC).

Design: Quantitative data: quasi-experimental, 1-group pre-post. Qualitative data: cross-sectional. Data were collected between December 2021 and August 2022.

Setting: Four US sites, each a partnership between a PRC, local or state health department, and a PHTC.

Participants: Governmental public health staff and representatives from other organizations that implement public health programs in practice settings.

Main Outcome Measures: Course participants completed a pre- and postcourse survey self-rating 14 skills on a 5-point Likert scale. Differences were analyzed using mixed effects linear models. In-depth interviews (n = 15) were conducted with course faculty and partners to understand: (1) resources contributed, (2) barriers and facilitators, (3) benefits and challenges, and (4) resources needed to sustain this model. Interviews were transcribed verbatim, and a thematic analysis identified themes.

Results: Statistically significant increases in all skills were observed from pre- to postcourse (n = 241 at post, 90% response). The skills with the largest increases were understanding economic evaluation enough to inform decision-making (mean change = 1.22, standard error [SE] = 0.05) and developing an action plan (mean change = 1.07, SE = 0.07). Facilitators to delivering the course included having a shared goal of workforce development, existing course curricula, and dedicated funding for delivering the course.

Conclusions: Collaborative delivery of the EBPH training can ameliorate the effects of high staff turnover, strengthen academic-practice relationships, and promote population-wide health and health equity.

Keywords

capacity building; chronic Disease; population health; public health education; public health practice; scale-up

Introduction

Sustaining a skilled public health workforce is essential to promoting community-wide health. Recently, the workforce has experienced significant turnover, from planned retirement and transitions among younger professionals, beginning before and accelerated

by the COVID-19 pandemic.¹ Along with COVID-19, new public health topics and challenges, eg, climate change and centering health equity, have expanded the roles and responsibilities of governmental public health staff. Additionally, only 14% of public health staff hold a public health degree.² Ongoing workforce development is critical to ensuring that staff have the skills to conduct sound public health practice.

Many workforce development opportunities are available from national organizations.^{3–6} One training, focused on the skills to plan, implement, evaluate, and disseminate chronic disease-related programs and policies is the evidence-based public health (EBPH) training. The course was developed in 1997 to address gaps in governmental public health staff's knowledge and skills in evidence-based decision-making, the use of which is associated with improved delivery of essential public health services including implementing and evaluating programs and policies.^{7–9} The EBPH training has been delivered across the United States and internationally and has consistently resulted in increases in individuals' skills to use evidence-based decision-making and in agency-level changes.^{10–13}

Though successful, the reach of the current delivery model is limited because course delivery is centralized at Washington University in St. Louis. Instead, situating workforce development within existing academic and public health structures is promising because the distinct strengths of different organizations can be leveraged to deliver the training and address local and state public health challenges.

In this paper, we describe an innovative, collaborative model to deliver the EBPH training and present quantitative and qualitative evaluation results. Findings can identify future work needed to enhance the public health workforce's ability to implement programs and policies to prevent and manage chronic disease and improve population-wide health.

Methods

The EBPH training model developed in this project was a collaboration between Prevention Research Centers (PRCs), local or state health departments, and Public Health Training Centers (PHTCs). Three PRCs: the Center for the Study of Community Health (Alabama), the Rocky Mountain Prevention Research Center (Colorado), and the Yale-Griffin Prevention Research Center (Connecticut) partnered with their respective health departments and PHTCs to deliver the EBPH training to public health practitioners. The PRC at Washington University in St. Louis coordinated the partnership, trained course faculty, and delivered the training as well. We collected quantitative survey data from course participants and qualitative interview data from key informants from the participating state health departments (SHDs), PRCs, and PHTCs between December 2021 and June 2023. The Washington University in St. Louis Human Research Protection Office approved all study protocols for this study.

Overview of the evidence-based public health training and the new, collaborative delivery model

The EBPH training is a 10-module course focused on building an individual's skills to apply the principles of EBPH to their work (Figure 1). The typical in-person EBPH training

lasts 3½ full days, whereas the virtual version has been delivered through 2-hour weekly sessions for 10 weeks. One site provided in-person EBPH training through half-day training sessions, once per week, for 7 consecutive weeks. Each module focuses on a different topic of the process by which programs and policies are implemented, from assessing the assets and needs of a community to evaluating a program or policy and disseminating findings. Some topics, such as health equity, are integrated within all modules; thus, even though they do not appear in the wheel, they are central to the training. The course was developed as an in-person training and modified to a virtual format during the COVID-19 pandemic. In the past, the course developers at Washington University in St. Louis trained public health staff directly, in a centralized manner. In an attempt to scale the training and make it available to more public health practitioners, train-the-trainer iterations of the course have been implemented over time, with the understanding that health department staff and their academic partners would take on the future delivery of the course; however, this model has been challenging to sustain due to the turnover in public health practice and the additional time and financial burden of implementing the course. In an effort to address these barriers, a new model was developed in 2021. This model of replication expands the delivery network by bringing in the complementary expertise of PRCs, health departments, and PHTCs.

SHDs oversee the public health operations within a state or region, leading a variety of initiatives related to disease surveillance, health promotion, emergency response, and policy and regulatory actions. Often, they serve as pass-through agencies to distribute funds to local health departments (LHDs) and community-based organizations that work to deliver programs and policies within a local area. Staff are typically well-connected within governmental health agency structures, including potential participants in the EBPH training. Also, staff have expertise in implementing public health programs and policies outside of research settings, ie, within the context of their state.

PHTCs are a network of “the nation’s most comprehensive resource for public health workforce development”¹⁴ who have the existing infrastructure to develop, deliver, and sustain trainings for public health professionals. Funded by the Health Resources and Services Administration, 10 regional training centers support different areas of the country by providing professional development to public health professionals, experiential learning to students via field placements, and consulting and technical assistance to community partners. They bring expertise in instructional design and adult learning, as well as administrative expertise in organizing in-person and virtual trainings.

PRCs are a network of 26 academic research centers across the United States that are funded by the Centers for Disease Control and Prevention to conduct community-based public health research to address chronic diseases and other leading causes of death and disability.¹⁵ Additionally, a central role of the PRCs is to provide capacity building opportunities to public health professionals and community members. Situated within academic institutions, PRC faculty have expertise in conducting high-quality community-engaged research and subject matter expertise in chronic and other diseases and health behaviors that are relevant to public health.

In this study, the Washington University team served as the coordinating center and recruited 3 other PRCs to participate, each bringing with them their PHTC and SHD colleagues. Health Department staff and PRC faculty from each site completed a train-the-trainer iteration of the course so there was a critical mass of facilitators for course replications. PRCs then worked with their health departments and PHTCs to recruit participants for each training. Participant recruitment was done through the existing relationships between the PRCs and the health departments. Once a key contact person was identified, eg, a Director of Chronic Diseases or of Training, the PRC staff worked with them as they reached out to our primary target audience—mid-level supervisory and managerial staff in chronic disease programs and other major program areas of the health department, as well as key partners. The PHTCs coordinated course enrollment, reproduction of course materials provided by Washington University, and served as course coordinators throughout the delivery of the course.

Quantitative evaluation

Course participants completed a pre- and postcourse survey measuring on a 5-point Likert scale their self-rating of 14 skills that comprise evidence-based decision making. We derived the survey items from previously administered surveys developed by the study team and practitioners using literature reviews and cognitive response testing with SHD practitioners.^{7,16–20} Psychometric properties of these constructs (ie, test-retest reliability and Cronbach's alpha) have been published elsewhere.²¹ Participants also reported the type of organization with which they were affiliated, eg, SHD and community-based organization.

We analyzed changes in pre- and postcourse individual skills using mixed effects linear models, accounting for within-person and within-state variation. We considered the participant's organization type as a confounder, but its inclusion did not change the point estimates of the models. Thus, unadjusted models are presented, using an alpha of .05 to designate statistically significant changes.

Qualitative evaluation

We conducted in-depth interviews with PRC, PHTC, and SHD partners to understand the organizational-level factors that influence the success of implementing the EBPH course through this partnered model.

We developed an interview guide to understand: (1) what resources each partner contributed to implementing the EBPH course; (2) the barriers and facilitators to getting the partnership off the ground or its continuation; (3) the benefits of delivering EBPH training through partnerships between PRCs, SHDs/LHDs, and PHTCs, including other collaborative work the partnership has conducted or will conduct; and (4) what is needed to sustain the partnership over time (Supplemental Digital Content 1, available at <http://links.lww.com/NE/B593>). Then, we pilot-tested the interview guide with 2 former chronic disease directors who had implemented EBPH training and revised the guide based on their input to improve the clarity and specificity of the interview questions. By email, we invited key partners identified by each PRC to participate in an interview. Interviews took place after each site's course offering. In total, we (S.M.-R. and C.A.B.) conducted 15 phone interviews and

received written responses from 1 participant by email. Interviews lasted an average of 57 minutes (range: 40–74 minutes).

We made field notes after each call to guide the interpretation of interview coding. Data saturation was reached once no new information was provided by additional interviews, as decided by the research team. The 2 members of the team who conducted the interviews met after each interview to debrief about each interview. Toward the end of data collection, we reflected how close we were to saturation with a perspective of diminishing returns, that we were getting largely repetitive information after so many interviews (eg, no new barriers and facilitators were discussed).²² We conducted two additional interviews after we considered data saturation to be reached to confirm, and data collection ended after that. An online service ([rev.com](https://www.rev.com)) was used to transcribe interviews verbatim, and we conducted a thematic analysis to identify major themes common across the interviews.²³ We used NVivo (version 11) and a content analysis approach to analyze the transcripts using a common codebook developed deductively based on the interview guide (Supplemental Digital Content 2, available at <http://links.lww.com/JPHMP/B370>). Two individuals trained in qualitative analysis (S.M.-R. and a research assistant) double-coded each transcript and synthesized coded comments into overall themes. We report findings by topic, using selected, anonymized quotes to illustrate key themes.

Results

Ten iterations of the course took place between the fall of 2021 and the summer of 2023. A total of 240 participants completed the pre-course survey (90% response for the postcourse survey). Most participants were from SHDs (66%) and LHDs (20%) (Table 1). Participants were a mix of practitioners from metro, large urban, and rural areas and represented various supervisory and managerial experiences and disciplines.

Individual-level skills

In the pre- and postcourse surveys, the highest-rated skills were learning about an issue through scientific literature (pre-course mean = 3.97, SD = 0.77) and describing health equity and its relevance to their work (pre-course mean = 3.97, SD = 0.68) (Figure 2). At both time points, the lowest-rated skill was understanding economic evaluation enough to use findings to inform decision-making (pre-course mean = 2.76, SD = 0.87). Statistically significant increases in all skills were observed from pre- to postcourse. The two skills with the largest increase were understanding economic evaluation enough to use findings to inform decision-making (mean change = 1.22, SE = 0.05) and developing an action plan for the program or policy (mean change = 1.07, SE = 0.07).

In-depth interviews

Illustrative quotes for each theme are found in Supplemental Digital Content 3, available at <http://links.lww.com/JPHMP/B371>.

Key resources contributed by each partner organization

Interviewees described several resources that were provided by the partner organizations: grant funding, a training course with proven effectiveness, credibility and expertise, faculty instructors for the course from the PRCs, and infrastructure for course delivery from the PHTCs. One PHTC staff member commented that “we’re the scaffolding . . . providing the structure . . . the technical side of it, the day-to-day management, as well as the coordination part. . .” SHD staff contributed staff time and relationships with LHDs and thereby access to practitioners to recruit as course participants, demand for the course, recruitment coordination, and faculty instructors for the course who have on-the-ground experience.

Facilitators and barriers to delivering the EBPH course collaboratively

The existing EBPH course materials and resources developed by the PRC at Washington University saved facilitators time on course planning (Table 2). Also, the funding provided for organizing and delivering the course was essential to pay for course materials, training spaces, accommodations for trainees (for in-person courses), and stipends for trainers, among other costs. While not a barrier specific to the collaborative delivery of the EBPH course, the COVID-19 pandemic created a great deal of uncertainty and slowed course planning, resulting in courses being delayed or rescheduled as public health practitioners continued to support COVID-19 mitigation efforts.

Specific to the partnership between PRCs, SHDs, and PHTCs, interviewees described some communication barriers that had varying degrees of impact. Some were small things such as not being kept in the loop about how the course went, whereas others noted bigger topics like progress on recruitment of course participants or timeliness of communication. It was also reported that the time demands of organizing the EBPH course are notably higher compared to other, short-term continuing education courses that are typically offered to public health practitioners.

Benefits of delivering the evidence-based public health course collaboratively via the PRC-PHTC-SHD partnership

Interviewees noted several benefits of delivering the EBPH course in partnership between the PRCs, PHTCs, and SHDs/LHDs. First, this approach leverages the unique strengths of each partner so that the EBPH course can be delivered efficiently and effectively. Interviewees discussed that tasks were assigned to the partner based on what each organization already does, eg, relying on the PRCs to present up-to-date, evidence-based information within the training, on the SHDs/LHDs to connect to trainees through their relationships with public health practitioners who can benefit from EBPH training, and on the PHTCs to manage the technical aspects of course delivery and apply strong instructional design approaches. This collaborative approach allows each partner to contribute according to their strengths and avoids unnecessary duplication of efforts. Additionally, the collaborative delivery of the EBPH course broadens the expertise of the PRC facilitation team to meet the training needs of participants and is an opportunity for the facilitators to learn from their academic or practice cofacilitators.

Interviewees also noted that collaborative delivery of the EBPH course can also have a positive influence on the reach and impact of the PRC/public health practice network, ie, the individuals and organizations in the region that are working to improve public health. Having a dedicated project to work on collaboratively allows PRCs, SHDs/LHDs, and PHTCs to create and strengthen connections among different sectors and regions, eg, among PRCs and practice organizations that are in their state or who work regionally with the training centers. With enough momentum, delivering EBPH training can create a community of public health researchers and practitioners with an evidence-based mindset that can shift the culture of public health to one of innovation and consistent application of evidence-based practices. Lastly, working together on the EBPH training offers SHDs/LHDs and PRCs an opportunity to move beyond the desire to collaborate to a tangible project and purpose for working together, which creates relationships that can lead to additional joint efforts between PRCs and SHDs/LHDs.

Factors that support continued collaboration between academic and practice partners

Interviewees shared several factors that would increase EBPH collaboration, as well as other academic-practice collaborations. Strong relationships are critical, as is stable funding to deliver the training, including funding to pay for dedicated staff to coordinate course planning, implementation, and evaluation and serve as liaisons to partnering agencies. More specifically related to funding, there was a discussion that funding has to be available at the right time to support collaborations beyond the EBPH course. Often, the funding for program implementation (led by the SHD) and evaluation (led by academics) of a program are funded by separate grant opportunities that do not align in their timing. Additionally, the lag time between applying for and receiving funding can mean that a program's implementation may be completed by the time an evaluation grant is funded. Support from SHD/LHD leadership and EBPH champions throughout the public health network was also discussed; leaders normalize the expectation for building a strong culture of EBPH in their departments and champions spread information about the value of EBPH across their networks and serve as mentors and collaborators with their peers.

Discussion

This study describes an innovative, sustainable model for delivering workforce development to public health practitioners, in partnership between PRCs, SHDs/LHDs, and PHTCs. All these organizations have a shared mission of workforce development, and the complementary skills and expertise can improve the efficiency and increase the reach of EBPH training and other opportunities. The results from this study highlight the potential for this model. Statistically significant increases in all 14 individual EBPH skills were observed, and the in-depth interviews identified important strengths and determinants of the success of this delivery model.

In the model described in this study, training is delivered collaboratively between 3 key players in the public health infrastructure: (a) PRCs, which are academic-based research centers focused on practice-based research and capacity building; (b) SHDs and LHDs, which have expertise in on-the-ground public health practice and coordinate the delivery of

evidence-based programs and policies within their states, counties, and cities in partnership with community organizations; and (c) PHTCs, which have expertise in the initiation, implementation, and evaluation of professional development for public health staff. This delivery model was conceived to streamline workforce development by engaging partners with unique strengths that could improve training delivery and reduce redundancies, as described in our results. For example, PHTCs have existing structures to build and execute training programs, so it is more efficient to rely on their expertise and resources than to have PRC faculty and staff stand up a training program on their own. This model can be used to deliver other types of workforce development opportunities beyond the EBPH training as well, which can contribute to the overall strengthening of the public health workforce and community capacity.

As described in the interviews, in addition to workforce development, these partnerships can spur other types of initiatives (eg, partnered implementation of programs and policies or practice-based public health education). In this capacity, the EBPH training delivery model is an academic-health department partnership, or Academic Health Department, which is defined as “an arrangement between an academic institution and a governmental public health agency that provides mutual benefits in teaching, research, and service,”²⁴ analogous to the teaching hospital model of health care and medical education.²⁵ There has been a growing recognition of academic-health department partnerships as a strategy to improve public health practice and education.^{26–28} Academic-health department partnerships have many benefits to public health education and practice. For example, bringing academics and public health practitioners together is also important to address health inequities. Since the PRCs and health departments are working in the same areas, these organizations can come to a shared understanding of the specific health inequities that need to be addressed in the communities they serve and how to approach health equity. Then, localized examples of addressing health equity can be built into the curriculum. Investing in the development of partnerships that start with a project like the EBPH training has the potential for long-term benefits to public health via the creation of academic-health department partnerships. To date, several spinoff projects benefiting public health education and practice have already begun because of these partnerships, detailed in Table 2.

Results from this study are in line with previous research to evaluate the impact of training on individual practitioners’ EBPH skills and research to understand what is needed to implement initiatives in state and local public health departments. Previous studies have demonstrated the benefit of different EBPH training approaches for individuals’ confidence and skills related to evidence-based decision making.^{29–32} While a direct quantitative comparison is outside the scope of this paper, there have been similar findings from previous iterations of the EBPH course that competencies related to economic evaluation are typically the lowest-rated and most highly increased skills among practitioners.^{7,18,33,34} Unique to this study is the larger increase in skills to develop an action plan. Our qualitative findings support prior research that has highlighted the importance of funding, dedicated staff, and leadership support in efforts to implement workforce development or programs through governmental public health agencies.^{18,34–37}

Several strengths and limitations must be considered when interpreting the results of this study. The evaluation of the delivery model itself was a short-term evaluation based on self-report that may be subject to social desirability bias; benefits such as the sustainability of the model remain a potential until longer-term studies can be conducted. The use of a previously developed survey to assess individual EBPH skills strengthens the study by increasing internal validity and allowing comparisons between this study and previous studies. Another strength is the geographic representation of the replication sites. Each of the 4 broad regions of the United States was represented as Northeast, South, Midwest, and West, which increases the robustness of the findings, especially that this delivery model is feasible in different areas of the country with modest funding. Last, we were able to train and survey workforce members across a wide range of organizational backgrounds, which demonstrates the generalizability of the EBPH training.

Ensuring that the public health workforce is sufficiently trained to conduct high-quality public health practice is key to securing the public's health. This study described a model for delivering training to promote the use of EBPH by public health staff through a partnership between PRCs, SHDs/LHDs, and PHTCs. Through this model, 10 iterations of the course were delivered, and increases in all individual skills were observed. This innovative model has potential for sustainability and to scale the training up to extend reach beyond the previous delivery model, which was highly centralized. This new way of addressing public health workforce development can accelerate public health practice and research by bringing together key members of the public health infrastructure. Future work is needed to understand how to foster relationships between these organizations in areas where existing partnerships need additional support to deliver initiatives like the EBPH training or where collaboration has not occurred yet.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Implications for Policy & Practice

- Emerging public health issues, high turnover, and low rates of formal public health training among public health staff underscore the importance of workforce development so that governmental public health staff can conduct high-quality public health practice. Workforce development opportunities exist, including training to improve evidence-based public health (EBPH) skills developed and delivered by academic faculty, but are not widely available.
- We describe the implementation and evaluation of an innovative model to deliver the EBPH training collaboratively through Prevention Research Centers, local and state health departments, and Public Health Training Centers. Statistically significant increases in all 14 skills were observed, and interviews with course faculty highlighted benefits to this delivery model (eg, leveraging the unique expertise and promoting spinoff projects between the organizations) and facilitators to the successful delivery of the course (eg, having a shared mission of workforce development).
- This model of delivering the EBPH course is effective in improving individuals' skills to use EBPH. Spinoff projects including expanding the training to focus on specific areas of public health (eg, mental health) and linkages with the training to public health education programs show the promise of this model to accelerate public health practice and research and, in turn, improve population-wide health.

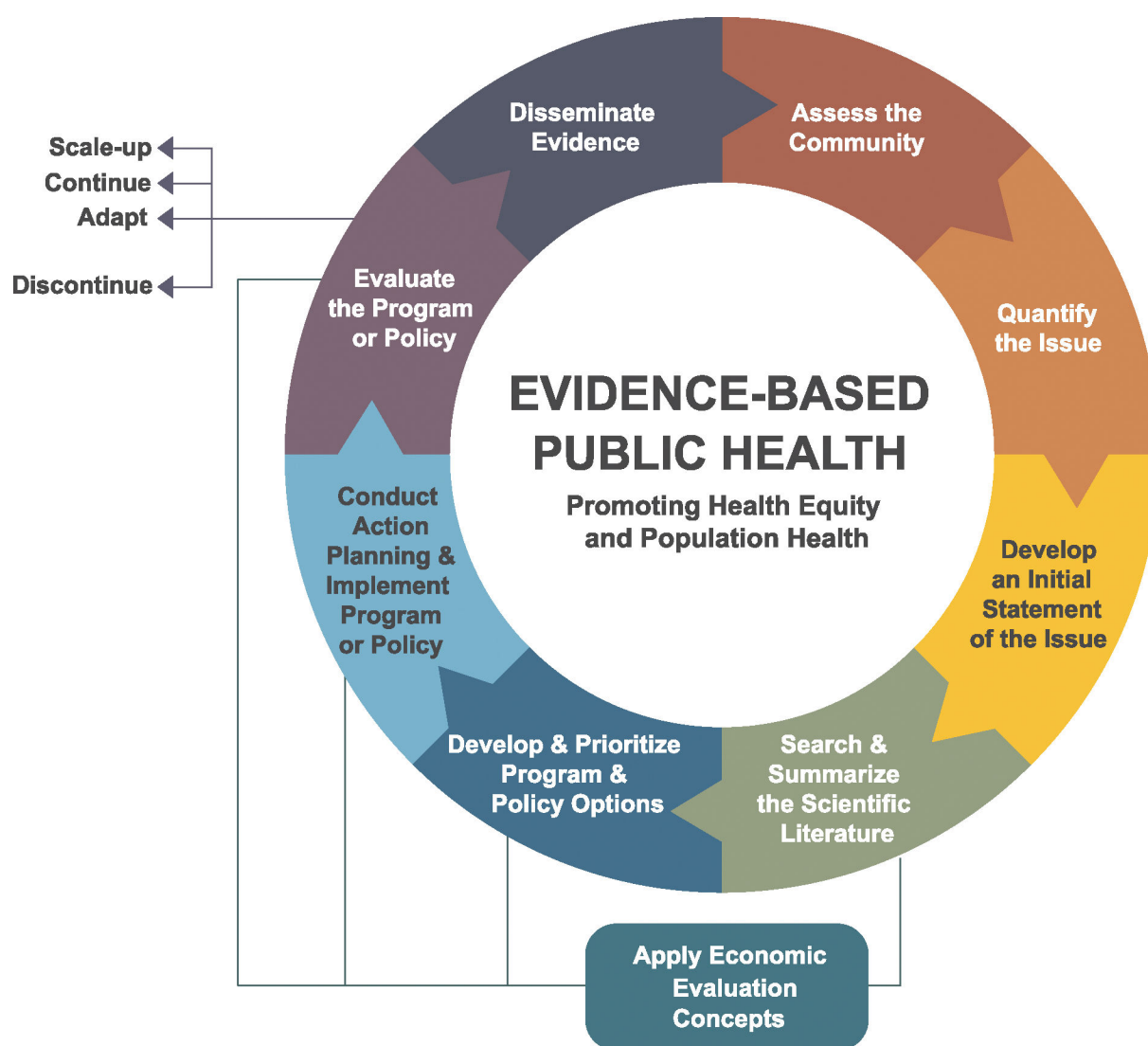
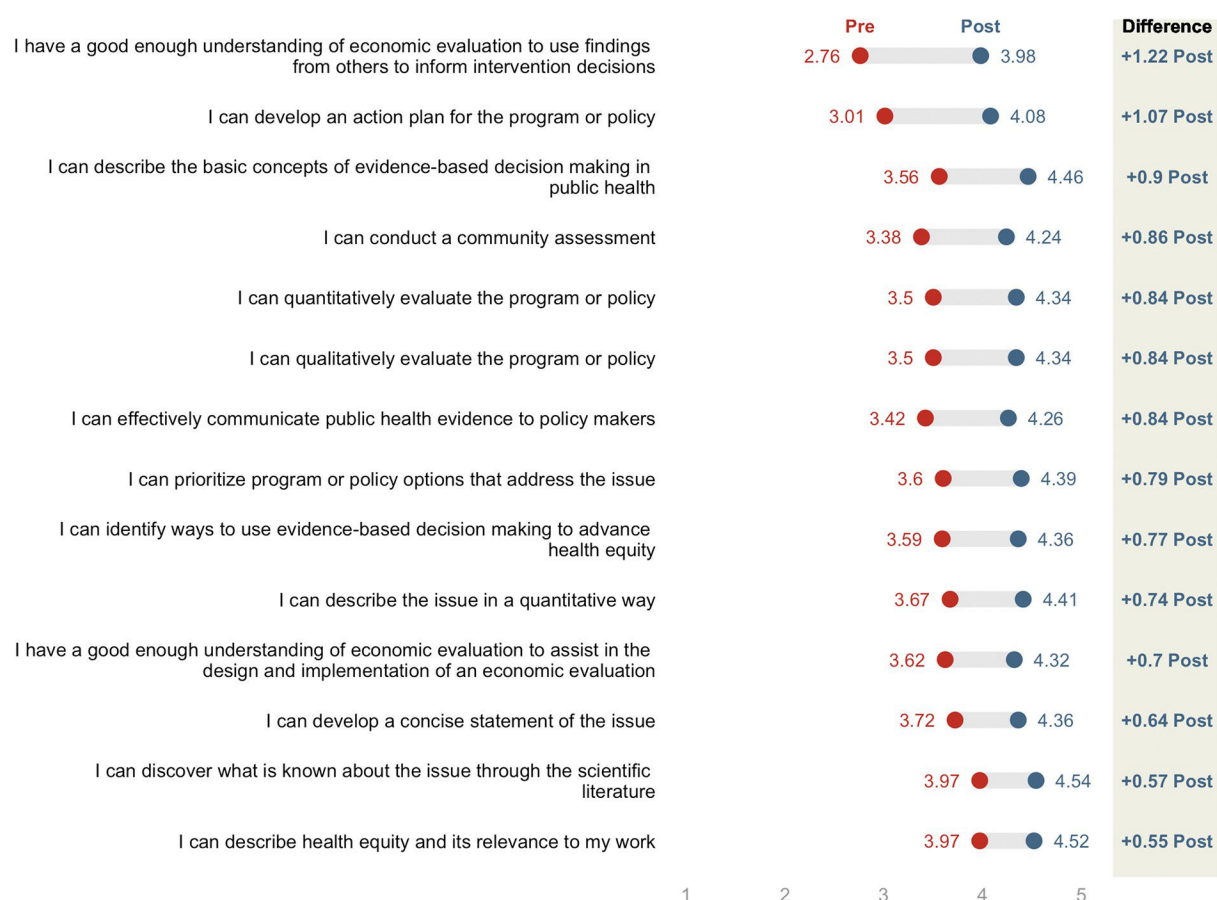


FIGURE 1.

Evidence-Based Public Health Wheel—Overview of the Course Content. This figure is available in color online (www.JPHMP.com).

The wheel depicts the course content and sequence, beginning with Assessing the Community and ending with Disseminate Evidence. The process of evidence-based public health is intended to be nonlinear, instead cyclical as public health departments evolve their approach to implementing programs and policies.

**FIGURE 2.**

Individual Evidence-Based Public Health Skills Pre- and Postcourse. This figure is available in color online (www.JPHMP.com).

The 14 skills rated by course participants are shown, as well as the average pre- and postcourse ratings of each skill on a 5-point Likert scale. The mean difference in each skill is shown to the right, with all skills increasing at postcourse. All differences from pre- to postcourse were statistically significant ($P < .05$) based on mixed effects models accounting for repeated measures and clustering by state.

TABLE 1**Organizational Representation Among Participants**

	N (%)
State health department	158 (65.8%)
Local health department/agency	49 (20.4%)
University/Academia	9 (3.8%)
Community-based organization	7 (2.9%)
Health care organization	3 (1.3%)
Voluntary health organization	2 (0.8%)
Other, including statewide advocacy organizations, federal partners, and national professional organizations	13 (5.4%)

TABLE 2

Spinoff Projects Resulting From the EBPH Training Delivery Model

Rocky Mountain Prevention Research Center (Colorado)

- Targeted outreach to a high-need rural health area of the state
- Expanded EBPH curriculum from a focus on chronic disease to include case examples in mental and behavioral health to address local needs expressed by public health practitioners
- Across each session of the course, allowed participants to use either an example from their own work or a PRC-created behavioral health case study to practice the application of each concept

Center for the Study of Community Health (Alabama)

- Developed public health practice partnership with a neighboring, high-need state who participated in the EBPH training
- Continued integration of EBPH concepts into the Master of Public Health curriculum at the University of Alabama at Birmingham. EBPH is woven throughout the curriculum to prepare students for employment in public health practice organizations
- Enhanced capacity by training additional faculty to facilitate EBPH training courses

Yale-Griffin Prevention Research Center (Connecticut)

- Developed new case examples with Connecticut data making explicit an equity focus
- Expanded EBPH curriculum to include case examples focused on maternal and child health based on interest from public health practitioners
- Offered EBPH training as an option in public health workforce development training grant; the SHD is interested in training those new to public health
- Scheduled to pilot a summer EBPH course for MPH students and their preceptors
- Used modules to train PRC team members and Community Impact Lab staff and students

Abbreviations: EBPH, evidence-based public health; PRC, Prevention Research Centers; SHD, state health department.