HHS Public Access

Author manuscript

J Public Health Manag Pract. Author manuscript; available in PMC 2024 August 12.

Published in final edited form as:

J Public Health Manag Pract. 2014 ; 20(Suppl 5): S7–S16. doi:10.1097/PHH.0000000000000107.

Preparedness and Emergency Response Learning Centers: Supporting the Workforce for National Health Security

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Abstract

The importance of a competent and prepared national public health workforce, ready to respond to threats to the public's health, has been acknowledged in numerous publications since the 1980s. The Preparedness and Emergency Response Learning Centers (PERLCs) were funded by the Centers for Disease Control and Prevention in 2010 to continue to build upon a decade of focused activities in public health workforce preparedness development initiated under the Centers for Public Health Preparedness program (http://www.cdc.gov/phpr/cphp/). All 14 PERLCs were located within Council on Education for Public Health (CEPH) accredited schools of public health. These centers aimed to improve workforce readiness and competence through the development, delivery, and evaluation of targeted learning programs designed to meet specific requirements of state, local, and tribal partners. The PERLCs supported organizational and community readiness locally, regionally, or nationally through the provision of technical consultation and dissemination of specific, practical tools aligned with national preparedness competency frameworks and public health preparedness capabilities. Public health agencies strive to address growing public needs and a continuous stream of current and emerging public health threats. The PERLC network represented a flexible, scalable, and experienced national learning system linking academia with practice. This system improved national health security by enhancing individual, organizational, and community performance through the application of public health science and learning technologies to frontline practice.

Keywords

competencies; education and training; public health preparedness; workforce development

Developing and maintaining a competent public health workforce was acknowledged in the 1988 Institute of Medicine report *The Future of Public Health* as a critical aspect of ensuring the health of the nation.[1] Updated reports published in 2003 reviewed progress and gaps[2,3] including requirements in the 21st century for new skills to address emerging health

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No conflicts of interest were declared by any of the authors.

threats including terrorism. More importantly, these newer reports outlined responsibilities of federal agencies, academia, state and local governments, and professional organizations for enabling a systematic and sustainable approach to workforce development for those performing public health duties, regardless of organizational affiliation.

The terrorist events of September 11, 2001; subsequent anthrax attacks; and national disasters such as Hurricane Katrina in 2005, the 2009 H1N1 pandemic, and annual tornadoes, wildfires, and flooding continue to underscore the importance of a robust public health system where a competent and prepared workforce is foundational. Over the past decade, policy, science, practice, and the public have shaped expectations for disaster mitigation, preparedness, response, and recovery at local, state, and federal levels. As part of the Department of Health and Human Services (HHS), the Centers for Disease Control and Prevention (CDC) has the responsibility to provide support for public health preparedness and response at local and state levels through funding and technical assistance.[4,5] This article outlines a specific area of programming directed toward enhancing the knowledge, skills, and attitudes (KSAs) of the current and future public health workforce. In addition, strategies to strengthen the sustainability of improvements made in workforce development through academic and practice community partnerships for lifelong learning are discussed. The primary programs highlighted in this article are the Preparedness and Emergency Response Learning Centers (PERLC)[6] and its predecessor program the Centers for Public Health Preparedness (CPHP).[7] Figure 1 displays major events that shaped the PERLC and CPHP programs as well as workforce development activities for public health emergency preparedness and response to date. The CDC had a long history of funding academic CPHPs beginning in 2000 with 4 Centers, growing to 27 Centers by 2005. With the initiation of these Centers came a national network of academic-practice partnerships that addressed a growing need for training and technical assistance tools for frontline practitioners in support of public health preparedness.[8] Over the decade the CPHPs were in existence; the Pandemic and All-Hazards Preparedness Act (PAHPA),[9] Homeland Security Presidential Directive (HSPD) 21,[10] the National Health Security Strategy (NHSS),[11] and Presidential Policy Directive (PPD) 8[12] all had a significant impact on current workforce development strategies for preparedness and response. Most notably, the intent of PAHPA, which was signed into law in 2006 and reauthorized in 2013, was to improve the nation’s public health and medical preparedness and response capabilities for emergencies, and had broad implications on national preparedness programming. Within PAHPA, Section 304(d) called specifically for the implementation and quality-improvement of core competency-based curricula and training that meets the need to improve public health security capabilities of state, local, and tribal public health entities, including state and local health departments. The PAHPA was the legislative impetus for the implementation of the PERLC program through its formal authorization of CPHPs within accredited schools of public health. With this, the PERLCs built upon a decade of cumulative accomplishments by the CPHP program, which ended in 2010 with the culmination of the CPHP cooperative agreement. The PAHPA also called for the creation of the NHSS, of which its goals are to build community resilience and strengthen and sustain health and emergency response systems. Strategic objective 2 of the NHSS was to specifically “develop and maintain the workforce needed for national health security.” The NHSS highlights the importance of competency-based education, access to

training, and the evaluation of its impact on workforce performance. The work of the PERLCs aimed to contribute to frontline public health workforce development in alignment with 2 of the 4-year outcomes under strategic objective 2 of the 2012 NHSS implementation plan.[13] These include ensuring staff and volunteers can effectively and efficiently perform their roles and responsibilities during all stages of preparedness and response, and that they have received competency-based training in support of national health security.

In 2010, CDC conducted a competitive, external peer-review selection process among applicants to the PERLC program funding opportunity announcement.[14] Eligible applicants were limited to schools of public health accredited by the Council on Education for Public Health (CEPH). Figure 2 displays the location of the 14 PERLC awardees across the United States. The PERLCs were developed as part of a 5-year program, starting in 2010 and extending through 2015. Total federal investment in the PERLC program to date (fiscal years [FY] 2010-2014) was $34 015 646. The average award per center ranged from $937 657 in program year 1 (FY 2010) to $250 000 per center in program year 4 (FY 2014).

Expectations of the PERLCs

The concept for the PERLC program was derived from the intent and directives of PAHPA, the NHSS, and experiences implementing the CPHP program.[15,16] The Learning Office, within CDC's Office of Public Health Preparedness and Response, is responsible for establishing internal and external partnerships to sustain and advance evidence-based learning strategies to improve the preparedness of the public health workforce. In line with this responsibility is the management and monitoring of the PERLC cooperative agreement. Table 1 outlines the programmatic objectives and priorities that guided the PERLC to provide (1) core competency-based training to state, tribal, and local public health authorities; (2) meet their partners' unique workforce development needs in the area of public health preparedness and response through the provision of specialized training, education, exercise consultation, and products not addressed through core competency-based curricula; and (3) serve in a national capacity through collaboration and sharing of resources across the PERLC network of awardees. Therefore, each of the 14 PERLCs must document results in all 3 of these areas.

Core Competency-Based Training for the Workforce

Core competency-based education is the basis for ensuring workers are trained to a standard that can be measured. The mandate set forth within PAHPA to develop "a competency-based training program to train public health practitioners" was acknowledged through the development of the Preparedness and Response Core Competency Model.[17] This core competency framework was developed and vetted through a consensus-based process involving more than 400 federal, state, local, and tribal public health practitioners and academics[18] and was used by the PERLCs as a standard for the development, execution, and evaluation of training. Funded activities conducted by the PERLCs under this area of the program aligned to 1 or more of these public health preparedness and response core competencies and therefore PERLC-generated products and materials were developed with this national set of standards in mind. The PERLCs have conducted numerous activities

including needs assessments and training that have identified areas for improvement in individual worker competency within their partner organizations at the state, local, and tribal levels. The PERLCs have developed nearly 690 learning products that align to 1 or more of these core competencies and include education and training activities delivered to learners via a variety of modalities, such as online or distance-based, face-to-face, or through an experiential component. Examples of this work can be accessed through the PERLC Education and Training Resources Web page[19] and others are described throughout this journal supplement.

Partner-Requested Education and Training

The PERLCs also provided technical assistance and developed customized training for their partners on the basis of a specific need or circumstance. Partners consisted of a variety of organizations including state and local health departments, tribes, and faith-based organizations, among others. Examples of unique partner-requested technical assistance provided by the PERLCs include a Walk-Up Point of Distribution Plan and exercise for dispensing prophylaxes and medication to a large university population.[20] An additional example includes pre- and post-disaster support after Hurricane Sandy including emergency risk communication assistance, deployment of PERLC staff to conduct field-based health care needs assessments, after action response assistance, and participation in post-event “hot washes” with local and state health organizations.[21] Other PERLCs developed numerous trainings and toolkits to distribute directly to their partners, and some adapted these for broader use, making them available on their PERLC’s Web site or a national, state, or university learning management system.

Beginning in 2011, many of these requests came from awardees of Office of Public Health Preparedness and Response’s Division of State and Local Readiness *Public Health Emergency Preparedness (PHEP) Cooperative Agreement*.[22] The PHEP awardees, consisting of state, local, tribal, and territorial health departments, are provided funds by CDC through this cooperative agreement to help strengthen their ability to respond to public health emergencies. The *Public Health Preparedness Capabilities: National Standards for State and Local Planning*[23] (henceforth referred to as the PHEP capabilities) provided standards for the PHEP cooperative agreement requirements by outlining the functions, performance measures, tasks, and resource elements (which include skills and training as a component) for each of the 15 PHEP capabilities that range from community preparedness, to mass care, to volunteer management. The PHEP awardees are required to prioritize and build their preparedness capabilities at an organizational level, and many turned to the PERLCs for assistance with this. An example of collaboration across PHEP and PERLC programs was the development of the Texas Public Health Risk Assessment Tool created by the Texas Training and Education Collaborative System Preparedness and Emergency Response Learning Center.[24] Used across Texas and available to other states, the Texas Public Health Risk Assessment Tool was made possible by combining fiscal and staffing resources from both academia and practice and has been utilized successfully to guide local community engagement and mitigation planning within Texas.[25]

Program Core and Network Activities

The 14 PERLCs, located throughout the United States (Figure 2), provided training and technical assistance for state, local, and tribal partners across the country. However, as a national network of learning and training centers, the PERLCs collectively participated in collaborative activities that enhanced the PERLC program as well as contributed to a national public health preparedness learning system. A key partner of the CDC and national organization representing CEPH-accredited schools and programs of public health, the Association of Schools and Programs of Public Health (ASPPH),[26] formerly known as the Association of Schools of Public Health, helped to routinely convene the PERLC network for information sharing and coordination of network activities. Together, in partnership with ASPPH and CDC, the PERLCs represented a strong national training and workforce development infrastructure that has supported a wide array of network activities. A critical contribution was the collaboration of all PERLCs on teams which defined the KSAs[27,28] that support each of the 18 public health preparedness and response core competencies.[17] A total of 172 KSA statements were developed during this process. These are accessible via the ASPPH Web site, available for use by the broad public health community, and provide a basis for consistency in the development, provision, and evaluation of public health preparedness training across the nation. In addition, the PERLC evaluation workgroup, composed of representatives from each of the 14 PERLC, developed standardized training evaluation measures for use across the entire network, as described in the article by Lisle Hites and colleagues in this supplement.[29] Members of the PERLC network also routinely shared lessons learned, best practices, training plans, and educational products and materials at annual meetings, monthly calls, and CDC- and ASPPH-sponsored seminars and webinars. The work of the PERLCs was promoted via PHEP awardee meetings, routine CDC and ASPPH communications, and through CDC blogs. The Learning Office engaged the Public Health Foundation (PHF) through their TrainingFinder Real-time Affiliated Integrated Network (TRAIN)[30] learning management system as well as the HHS Health Resources and Services Administration's (HRSA) Public Health Training Center Network database of training[31] in disseminating information about the PERLCs and their products nationally for use by state and local health departments, and other audiences within the larger public health community.

The PERLC program was a "sister" program of the CDC-funded Preparedness and Emergency Response Research Centers (PERRCs), which included 7 centers located within CEPH-accredited schools of public health across the United States. The PERRCs used the public health systems research approach to examine the organization, function, capacity, and performance of components in the public health system in preparing for and responding to all potential threats and hazards.[32] As a core activity, the PERLCs were expected to both inform and utilize the work generated by the PERRCs. There were 5 schools at which both a PERLC and a PERRC were located; however, any PERLC could collaborate with any PERRC to accelerate translation of science to practice. An example of specific translation to practice is the work of Johns Hopkins Bloomberg School of Public Health (a funded PERLC and PERRC) in assessing readiness and willingness to respond through their "ready, willing, and able" research[33] and subsequently developing and testing educational interventions to affect desired behavioral changes through their *Road Map to Preparedness* training.[34]

Another example comes from the South Central PERLC at the University of Alabama at Birmingham School of Public Health and the Emory University Rollins School of Public Health PERRC, which collaborated on the delivery of a satellite broadcast titled "Successful Strategies for Integration of Immunization and Emergency Preparedness Programs in Planning and Practice."[35] This broadcast provided a venue for training at the state and local levels, while simultaneously enabling the distribution and dissemination of Emory PERRC research findings from their 2010 Immunization Program Manager Survey to a broader public health audience. Results discussed included ways to improve relationships between immunization programs and emergency preparedness personnel in state and local health departments during public health crisis events, specifically those involving the distribution of vaccines or other countermeasures.

Program-level evaluation

Evaluating the results of the PERLC program was a priority for program funders and stakeholders. In line with strategic objective 10 of the NHSS, evaluation of the program was critical to ensuring its contribution to improving national health security is grounded in the best science, evaluation, and quality improvement methods available. The findings and methodological insights gleaned from the conduct of the CPHP program[16] informed the PERLC 5-year program evaluation strategy and grantee reporting requirements. Lessons learned were as follows: (*a*) ensuring evaluation was conducted from the inception of the program, including determining ways to measure impact; (*b*) developing a more meaningful measure for reach of the program; (*c*) ensuring grantees conducted outcome-level evaluations; and (*d*) establishing common measures across all grantees. As a result, the primary intent of the evaluation plan was to determine the value and effectiveness of the PERLC program by measuring progress toward meeting program objectives and ensuring established priorities are accomplished on an annual basis. To achieve this, detailed information about program processes, outputs, outcomes, and impact were collected, analyzed, and reported. The outcomes and impact components of the plan aligned with legislative mandates found in PAHPA (eg, public health preparedness and response core competencies) and the NHSS. The evaluation strategy was informed by Kirkpatrick's 4 levels of training evaluation[36] and framed within a basic logic model structure (Figure 3). In addition, the PERLC program-level evaluation strategy adhered to the steps and standards of the CDC Framework for Program Evaluation[37] and was designed to be both formative and summative.

While the Learning Office led program-level evaluation efforts, the process was participatory and necessitated input and engagement from multiple groups and stakeholders. The Learning Office administered and managed all methods related to the program evaluation in addition to generating and distributing reports. Activities and outputs were monitored through reporting methods that gathered detailed information on educational products offered by the PERLCs. Methods for reporting also included a framework for collecting success stories, allowing each PERLC to creatively highlight unique activities or outstanding accomplishments that have positively impacted recipients of their products and services. Awardees were held accountable for implementation of individual PERLC evaluation plans to include outcome- and impact-level evaluation. In addition, as part

of the evaluation strategy, each PERLC was required to participate in a Learning Office-coordinated evaluation working group, whose mission was to inform and promote use of common evaluation strategies across the PERLC network and to provide input into the Learning Office's program-level evaluation.[29] The outcomes of the working group and establishment of common measures are presented within this supplement.

In the first 4 years of the program, much work had been done to document program progress, outputs, and outcomes through the collection of PERLC product-related information and success stories, as well as information about partnerships and technical assistance offered. Improvements to routine PERLC reporting as well as the development of core, standardized measures were useful and successful; aggregate results across the 14 PERLCs have been frequently reported with more accuracy and better confidence than during the CPHP program. Finally, Learning Office staff constantly ensured that evaluation processes, results, and conclusions were used and disseminated to program stakeholders. Interim results have been used, for example, to document program progress in response to Congressional and CDC leadership inquiries, among others, throughout the length of the program to date.

Discussion

The past decade of dedicated efforts in national academic training centers (CPHP and PERLC) has yielded significant accomplishments in preparing the public health workforce to respond to events that adversely affect the nation's health. However, the intended implementation of the PERLC program was challenged on several fronts. First, the PERLC funding awards were made before the publication of the PHEP capabilities. This created an initial "misalignment" between the objectives of the PERLC program and the immediate needs of the PHEP awardees (ie, the need for trainings targeted to capabilities versus competencies and for technical assistance on risk assessments, for example). However, this was alleviated by the program's flexibility in allowing PERLCs to work with their PHEP partners to address training or technical assistance needs they had in relation to PHEP grant requirements. The transition process to a new preparedness competency model framework beginning in late 2010 also created challenges to implementation. Although the model was developed through a consensus process with hundreds of subject matter experts and leaders in the field of public health preparedness and workforce development,[18] there has not been substantial time since early 2011 for full validation, marketing, and adoption of the model by both academic and practice communities beyond the PERLC grantees and their constituents. This challenge has been continuously mitigated, by the Learning Office, the PERLC awardees, and our national partners: peer-reviewed publications and presentations on the competencies were made available,[18,38] and PERLCs worked with their partners individually to improve the implementation of the competencies into practice through training assessments and alignment of the competencies with training content.[28] In addition, the Learning Office sought guidance from the field through national partners such as PHF and their TRAIN Administrators and Training Affiliate Consortium,[30] ASPPH, and HRSA's Public Health Training Center program[39] on strategies to increase uptake of the competencies among the field. The CDC Learning Office and Division of State and Local Readiness program staff also collaborated on how to best match PERLC assets to PHEP

program needs for learning products and technical assistance. Through these collaborative partnerships, the Learning Office has been able to increase national distribution and access to competency-based training that also aligns to PHEP capabilities.

Despite the challenges encountered, the PERLC program continued to positively impact national health security through training, technical consultation, and its national network of academic-practice partnerships for public health. The PERLC program was composed of awardees who have decades of experience with public health preparedness and response efforts, who are experts in the field[8] and have amassed 350 distinct partnerships with state, local, and tribal public health organizations. The body of work developed by the PERLC has improved workforce readiness and competence through the development, delivery, and evaluation of nearly 690 distinct learning programs that align to preparedness core competencies, PHEP capabilities, and unique requested partner needs, reaching nearly 342 000 learners in less than 3 years. Eighty-one percent of these products are available on state, university, or nationally managed learning management systems and widely accessible to the public health workforce. In addition, the PERLC supported organizational and community readiness and capability through technical consultation, facilitated emergency planning, coalition development, exercises and practical tools that enable regions, states, tribes, counties, and communities to successfully build and test cross-sector emergency response. Ultimately, this vast amount of work is a rich and valuable resource for improving national health security. The PERLC network represented a nationally reaching infrastructure that was ready, willing, and able to contribute to improving public health preparedness through translation of science and educational technology to practice.

Next Steps

Although significant accomplishments have been made by the PERLC, more must be done to ensure that the public health workforce is adequately prepared. The Learning Office, in coordination with ASPPH and with the input of the PERLC and other subject matter experts, hopes to work on a draft model curriculum based on the Public Health Preparedness and Response Core Competency Model and its associated KSAs. This curriculum could serve as a guide for training midlevel public health practitioners (ie, those with 5 years of experience with MPH-equivalent or higher degree in public health, or those with 10 years of experience with a high school diploma, bachelors, or non-public health graduate degree) and be adaptable for use with entry-level practitioners, as well as baccalaureate, and graduate students in accredited programs and schools of public health. This process would continue to validate the competency framework through implementation and provide data for subsequent revisions. The PERLC program and its predecessor, the CPHP program, have provided support for lifelong learning on preparedness and response within the academic and practice communities. This will be sustained through implementation of both degree and certificate programs within schools and programs of public health, through enhanced access to training via national Web-based learning management systems such as TRAIN,[30] and through continued partnerships with PHEP awardees[40] for technical assistance and customized training. The unique accountabilities of academia, practice, and federal agencies to address “Who Will Keep the Public Healthy”[2] are still relevant today. Over a decade

later, we recognize that these cross-sector collaborations for workforce development are foundational to ensure both a healthy and secure nation.

Acknowledgments

The authors wish to acknowledge the sustained commitment of Preparedness and Emergency Response Learning Center awardees in achieving the objectives of the National Health Security Strategy for workforce development.

The work described was supported by a Preparedness and Emergency Response Learning Center grant from the Centers for Disease Control and Prevention, under FOA CDC-RFA-TP10-1001. The findings and conclusions in this article are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

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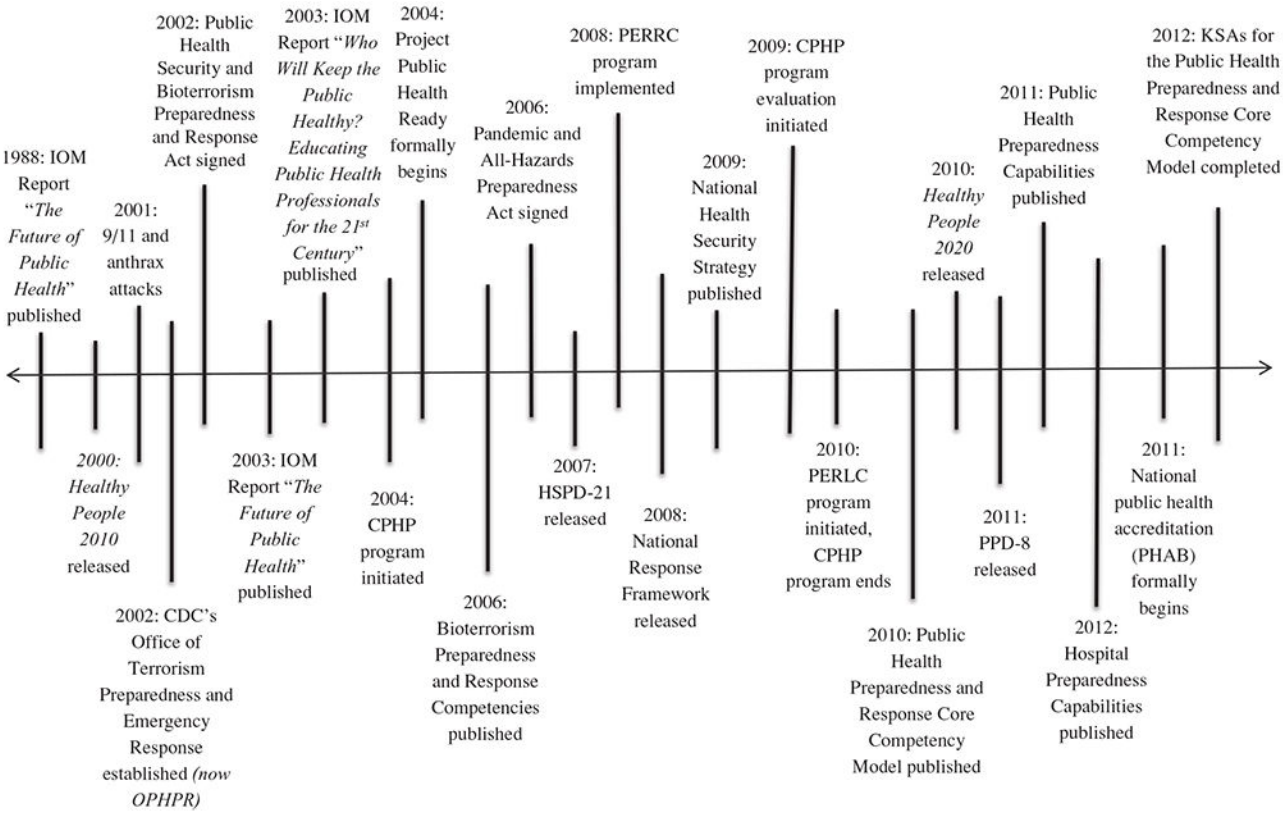

FIGURE 1.

Timeline of National Policy Milestones That Influenced Workforce Development Programs for Public Health Emergency Preparedness and Response

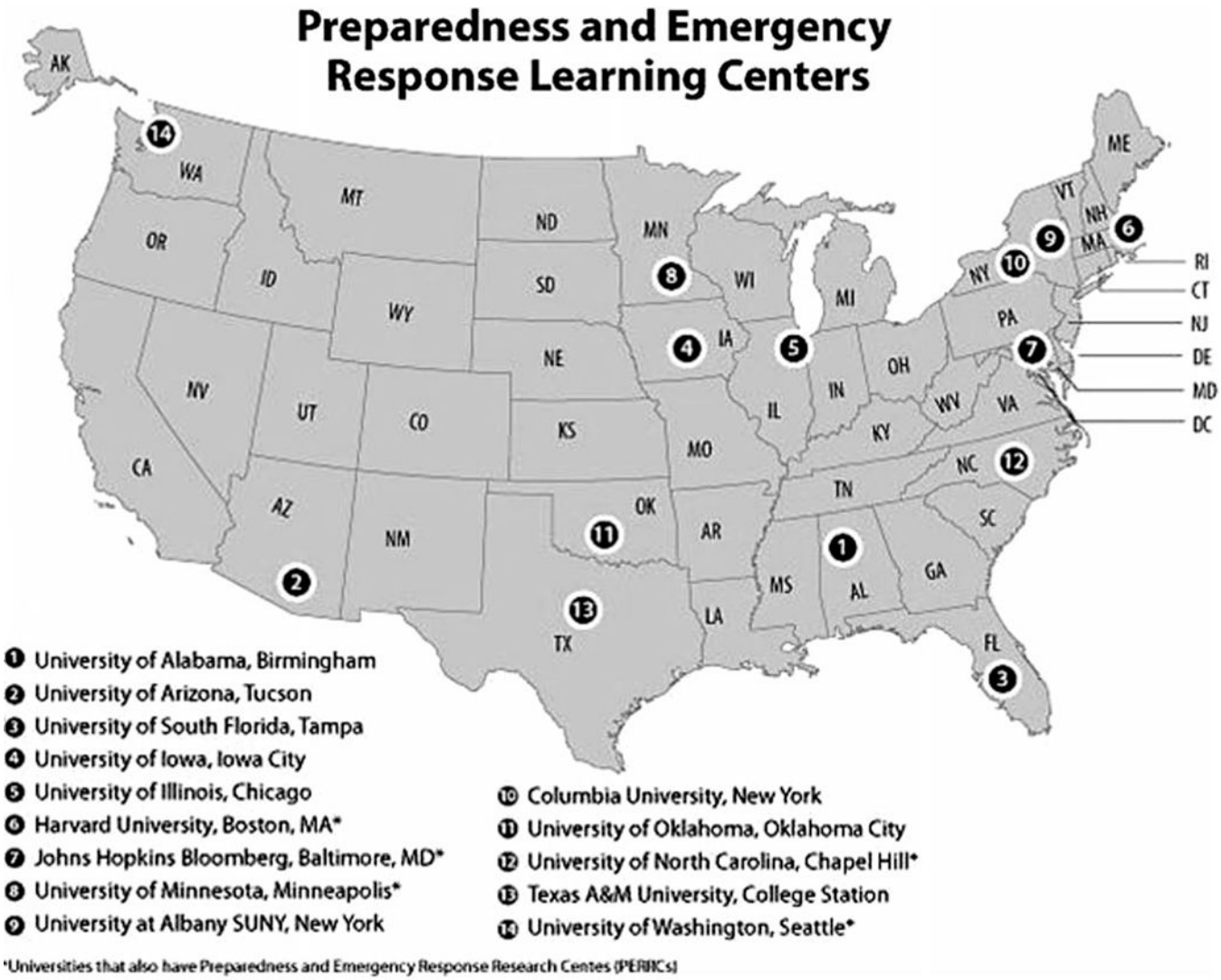

FIGURE 2.
Location of PERLCs in the United States

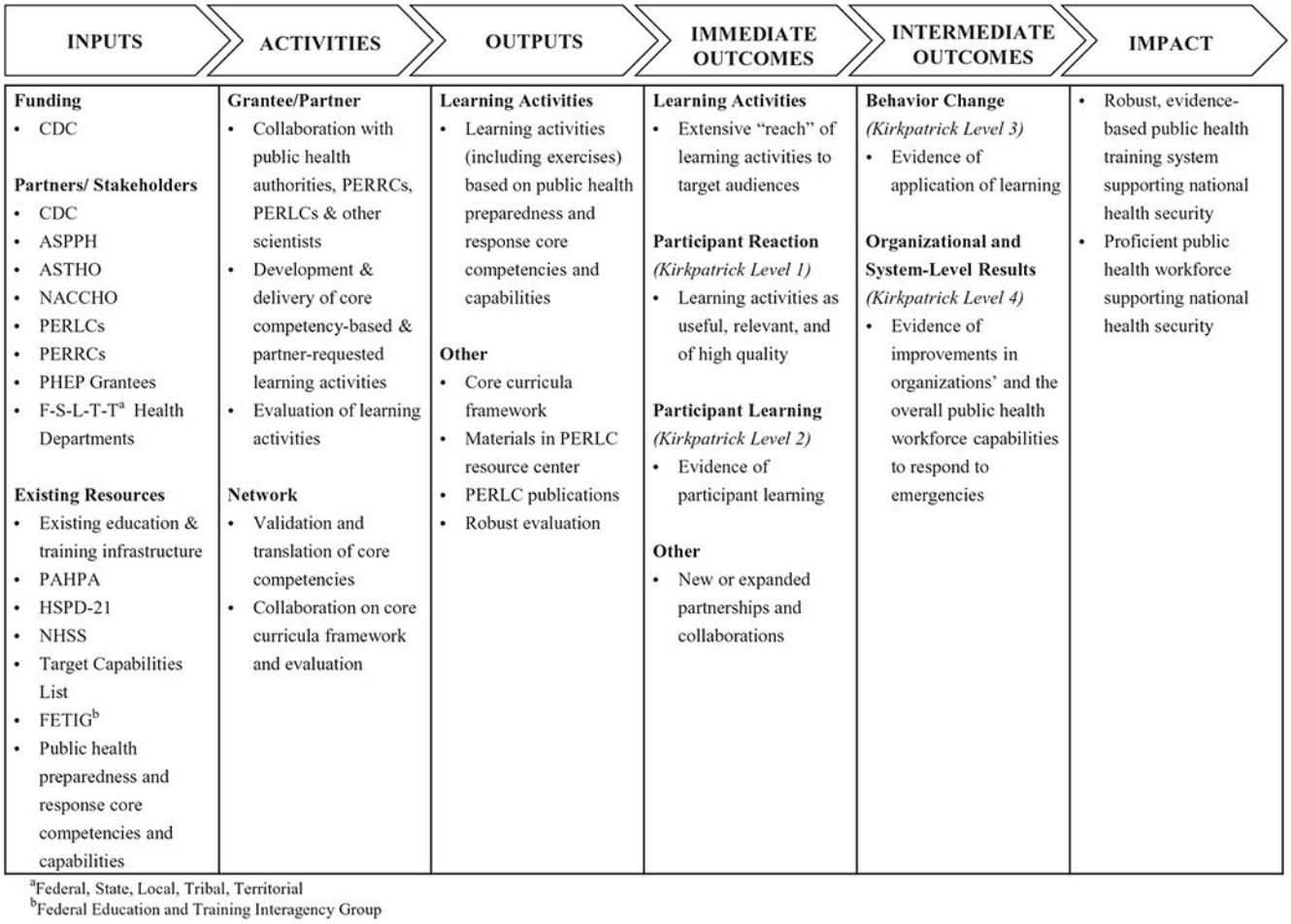

FIGURE 3. PERLC Program Logic Model

Abbreviations: ASPPH, Association of Schools and Programs of Public Health; CDC, Centers for Disease Control and Prevention; HSPD, Homeland Security Presidential Directive; NACCHO, National Association of County and City Health Officials; NHSS, National Health Security Strategy; PAHPA, Pandemic and All-Hazards Preparedness Act; PERLC, Preparedness and Emergency Response Learning Centers; PHEP, Public Health Emergency Preparedness

TABLE 1

PERLC Program Objectives, Priorities, and Alignment to NHSS Strategic Objectives

Preparedness and Emergency Response Learning Centers		
Program Objectives	**Program Priorities**	**NHSS Alignment**
Develop and maintain proficiency of the public health workforce in support of national health security	Collaborate with U.S. state, local, territorial, and tribal public health authorities to define and address gaps in worker competency and organization/system capabilities Share content and learning resources (existing and newly developed) within the PERLC network Develop core competency-based training in preparedness and response for the public health workforce	*Strategic Objective 2*[a] Develop and maintain the workforce needed for national health security
Ensure that public health training systems that support national health security are based on the best available science, evaluation, and quality improvement methods	Utilize a common curriculum framework based on the principles of instructional design Collaborate with the PERRC, PERLC network members, and other scientists to translate research to practice through training and exercising Plan and conduct evaluations for the purposes of continuous improvement of state, local, territorial, and tribal public health preparedness and response competencies and capabilities Participate in evaluation activities for the purpose of measuring the impact of the investment in the PERLC program	*Strategic Objective 10*[a] Ensure that all systems that support national health security are based upon the best available science, evaluation, and quality improvement methods

Abbreviations: NHSS, National Health Security Strategy; PERLC, Preparedness and Emergency Response Learning Centers.

[a]Department of Health and Human Services.[11]