

**Academic Centers of
Public Health Preparedness**

**Progress Report
on the
State of the
A-CPHP Network**



2004

Table of Contents

Executive Summary	1
Introduction	2
Program Background	2
Successes, Lessons Learned, and Challenges of the A-CPHP Network	4
Theme 1: Developing and Maintaining Partnerships are Keys to Success	4
Partnerships Lessons Learned	5
Partnership Successes	5
Partnership Challenges	7
Theme 2: A-CPHP Have Strengthened the Preparedness Capacity of State and Local Health Departments and Strengthened the Schools of Public Health Capacity to Respond to the Needs of the Public Health Workforce	11
Capacity-building Lessons Learned	11
Capacity-building Successes	11
Capacity Challenges	13
Theme 3: A-CPHP Are Delivering Preparedness Training Based on the Assessed Needs of the State and Local Public Health Workforce	14
Training Delivery Lessons Learned	14
Training Lessons Learned	14
Training Delivery Successes	15
Learning Management Systems Used	16
Training Delivery Challenges	16
Theme 4: Coordination and Development of the A-CPHP Network Is An Evolving Process	17
Network Successes	17
Network Challenges	18
Theme 5: Reorienting the Public Health Workforce to Address Bioterrorism is a Work in Progress	19
Reorienting the Public Health Workforce Successes	19
Reorienting the Public Health Workforce Challenges	19
Theme 6: Long-Term Funding Is Vital To Meet National Preparedness Goals	20
Funding Lessons Learned	20
Funding Successes	20
Funding Challenges	21
Conclusions and Opportunities for the Future	21
References	23
Appendix A: Academic Centers for Public Health Preparedness at Schools of Public Health	24

Executive Summary

The need to address bioterrorism, emerging infectious diseases, and environmental threats presents a range of challenges for the public health workforce in the United States. Recent incidents, September 11 and the anthrax-laced letters have highlighted this need; however, the Centers for Disease Control and Prevention (CDC) had previously recognized the risks and begun a proactive plan to deal with these evolving threats. The CDC implemented a program, the Centers for Public Health Preparedness, comprising local exemplar centers, specialty centers, and academic centers to train public health professionals to deal with bioterrorism, emerging infectious diseases, and environmental threats.

This report summarizes the major accomplishments of one part of this program, the network of 21 Academic Centers for Academic Public Health Preparedness (A-CPHP), since its inception in 2000. Besides covering what has been done during the A-CPHP network's first four years, the report addresses six themes:

- Developing and maintaining partnerships are the keys to success.
- A-CPHP have strengthened the preparedness capacity of state and local health departments and strengthened the schools of public health capacity to respond to the needs of the public health workforce.
- A-CPHP are delivering preparedness training based on the assessed needs of the state and local public health workforce.
- Coordination and development of the A-CPHP network is an evolving process.
- Reorienting the public health workforce to address bioterrorism and other threats is a work in progress.
- Long-term funding is vital to meet national preparedness goals.

Significant steps have been taken to address the training needs that have developed as new threats have appeared, but much work remains to be done and some challenges still exist. The A-CPHP have addressed the emergent training needs, providing opportunities and training to link schools of public health with the frontline public health workforce; they will continue to do so as new threats to the nation's health are identified and met.

Introduction

Since the targeting of the World Trade Center and the Pentagon on September 11, 2001 and the subsequent anthrax bioterrorism events, emergency preparedness has dominated the national public health agenda. However, long before these incidents the Centers for Disease Control and Prevention (CDC) recognized and responded to the need to prepare the nation's public health workforce to face the potential challenges of the future. Through its partnerships with state and local health departments, professional organizations, and the academic community, CDC initiated a three-pronged program (local exemplar centers, specialty centers, and academic centers) to provide training in bioterrorism concepts and emergency preparedness along with updated training on emerging infectious diseases and environmental threats.

Through the development of a national system of Centers for Public Health Preparedness (CPHP), CDC intended to strengthen the capacity of local and state public health professionals to respond to new health challenges. The Centers for Public Health Preparedness program is an integral component of the Department of Health and Human Services (HHS) initiative to enhance bioterrorism preparedness and strengthen the nation's public health infrastructure.

"The funding of these centers comes at a crucial period as the nation moves forward to improve its public health infrastructure to respond swiftly and effectively to threats and emergencies. This new funding will help centers identify, assess, and improve critical gaps in preparedness for the state and the localities that they serve." HHS Secretary Tommy Thompson at the announcement of \$20 million in additional funding for the CPHP Program (DHHS, 2002)

This report summarizes the major accomplishments of one prong of the CPHP program—the network of 21 Academic Centers for Public Health Preparedness (A-CPHP)—since their inception in 2000. By reaching and teaching the public health workforce, the A-CPHP help to ensure a strong public health system when and where it is needed.

Program Background

More than 500,000 physicians, nurses, laboratorians, health educators, environmental health scientists, and administrators make up the national public health workforce (Gerzoff et al., 1999). Besides delivering the day-to-day essential services of public health, the workforce joins first responders such as firefighters, emergency medical technicians, and police in responding to community crises. These professionals are the ones upon whom we all depend when a natural disaster strikes or when an epidemic occurs. The public health workforce is asked with increasing frequency to respond to unanticipated threats from emergent diseases such as West Nile Virus and SARS, natural disasters, terrorist and bioterrorism attacks such as the anthrax outbreaks.

As much as 80 percent of the public health workforce lacks specific training in public health and needs enhanced preparation to respond to the potential challenges of public health in the

21st century (Gerzoff et al., 1997); CDC and its partners are working to remedy this by implementing the recommendations of two CDC strategic documents:

- Strategic Plan for Public Health Workforce Development
- A National Strategy for Terrorism Preparedness and Response: 2003–2008 Strategic Plan.

The A-CPHP program began in 2000 as a response to the workforce training challenge. Initially, with federal funding from CDC, four training centers at Schools of Public Health were created. The initial program guidance focused on improving the preparedness of frontline public health workers to respond to current and emerging health threats in general, and bioterrorism and infectious disease control and prevention in particular. Since its inception, the program has seen an exponential growth in the number of centers and in the funding allocated. The program has grown from four to 21 centers (a 400% increase) situated in 23 Schools of Public Health located across the United States. See Figure A.

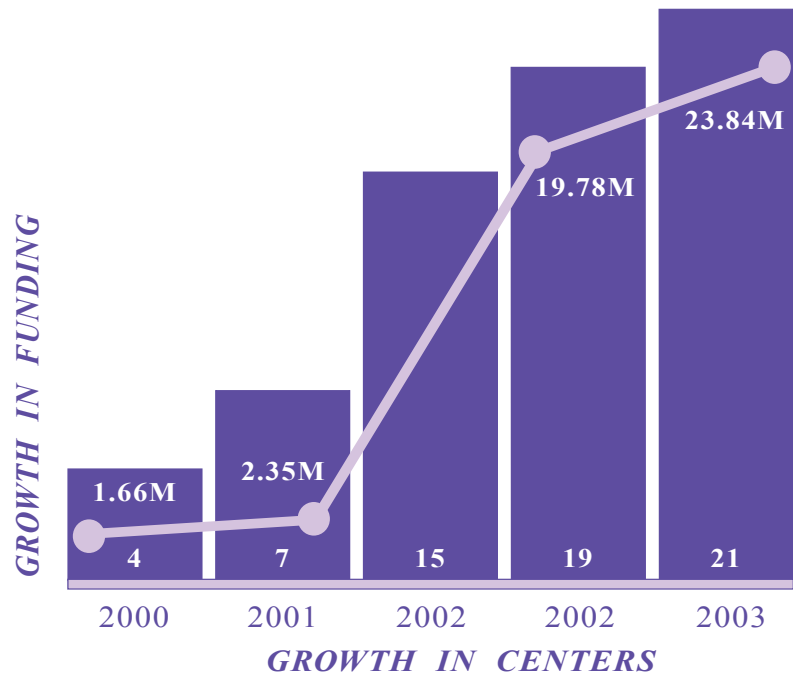


Figure A

Crucial to the development of the A-CPHP was the CDC's adoption of "Bioterrorism and Emergency Readiness Competencies for All Public Health Workers" in April 2001. The delineation of bioterrorism competencies was critical to A-CPHP success. It provided common criteria from which A-CPHP could design training, provide measurable criteria to evaluate a student's progress, support the development and updating of job descriptions, and act as a self-assessment tool for public health employees. Developed by the Columbia University School of Nursing, these competencies build on the bioterrorism (<http://www.nursing.hs.columbia.edu/institute-centers/chphsr/btcomps.pdf>) and emergency readiness core competencies and designated guidelines for public health leaders, public health communicable disease staff, public health clinical staff, environmental health staff, public health laboratory staff, medical examiners or coroners, public health information staff, other public health professional staff, and public health technical and support staff.

As preparedness efforts gained importance on the national agenda, CDC and ASPH sought to assess the progress of the A-CPHP program in meeting their original intent and to capture information on lessons learned to help guide future activities. In February and March of 2004, ASPH sponsored a series of Peer Review and Practice Evaluations (also called "reverse site visits") in Atlanta, GA. During the visits, each of the 21 A-CPHP, along with their practice partners, presented information on successes, challenges, and lessons learned to a diverse review panel of five public health professionals. The panel included representatives of CDC, the practice community, and the A-CPHP network.

A-CPHP presentations targeted five evaluation criteria, which were used by the reviewers as a framework for recording their comments:

- Leadership and strategic planning,
- Customer and market focus,
- Information and analysis
- Systems development, and
- Business focus.

Tape recordings of the presentations, background information, and reviewer comments were summarized as a final report by an independent consultant. The report, "Final Report Qualitative Evaluation of the Academic Centers of Public Health Preparedness Reverse-site Visits," was released in May 2004. A summary of the final report is provided below. It is organized to describe lessons learned, successes, and challenges of the A-CPHP network according to six key themes:

- 1) Building partnerships
- 2) Strengthening School of Public Health capacity
- 3) Building training and infrastructure
- 4) Developing the A-CPHP network
- 5) Reorienting the public health workforce to address bioterrorism
- 6) Addressing funding issues

Successes, Lessons Learned, and Challenges of the A-CPHP Network

Based on the findings in the final report, it is clear that A-CPHP funding has enabled Schools of Public Health to be part of the national preparedness strategy in response to September 11, 2001 and the subsequent anthrax threats. The individual A-CPHP have had the opportunity to strengthen the preparedness levels of state and local health departments and to build within the Schools of Public Health the capacity to support national workforce preparedness needs.

Theme 1: Developing and Maintaining Partnerships are the Keys to Success

Each A-CPHP has a shared goal:

To partner and build relationships with state and local public health agencies, and support the bioterrorism training needs of the public health workforce.

Each A-CPHP has established partnerships with state and local partners in their self-identified geographic target areas. There are numerous lessons learned and successes attesting to their impact and value to the practice community.

“The end result of this collaboration between [A-CPHP] and [city] is that we are far more knowledgeable, have learned specific skills, and ultimately, we are better prepared to respond to bioterrorism and other public health emergencies. We could not have accomplished this in this short time frame without the help of [A-CPHP]. Our entire staff is grateful to have had this opportunity.” Local Health Department Director

Partnerships Lessons Learned

Lessons learned by A-CPHP contribute to an understanding of current preparedness initiatives and will help inform future partnership activities. They are:

- Partnerships must balance the national agenda and local needs.
 - Differing geographic areas, governing structures, political environments, and cultural diversities tend to negate any “one size fits all” approach to relationship development. Practice partners and A-CPHP staff universally called for locally tailored approaches whose outcomes are directed to meeting national preparedness objectives.
- Partnership and product development must have a multi-year commitment of effort and funding to be successful.
 - Relationships between academia and practice, while making great strides, still require nurturing to maintain viability. These relationships require extensive time, effort, and resources to build, maintain, and develop.
- Partners must build on cooperation; a history of cooperation in one area leads to cooperation in other areas and successful partnerships enhance the strengths of each player.
 - Open, frequent, face-to-face, two-way communications with partners are the key to building trust. Prior working relationships allow A-CPHP to leverage trust, good will, and existing resources to hasten implementation of preparedness training. For example, A-CPHP whose schools of public health also had a Public Health Training Center (PHTC) funded by the Health Resources Services Administration were able to build on existing training activities and incorporate preparedness-specific modules.
- A-CPHP must meet state partners where they are now and provide appropriate training for the realities of the public health workforce environment.
 - The most successful partnerships occurred when the A-CPHP listened to and responded to partners’ input. Practice partners are more likely to listen to the A-CPHP if the A-CPHP respected the partners’ needs regarding the existing level of staff training, time schedules, organization structures, and preparedness needs and then worked to adapt training and technical assistance to meet those needs.

Partnership Successes

Ninety-three practice partners contributed to the 21 presentations in Atlanta, Georgia demonstrating the success of the partnerships. They traveled from as far as Alaska to be part of the presentation

team, or participated via video conference, audio conference, or videotaped testimonials. Each of the A-CPHP has established at least one state partnership, usually more, as well as numerous partnerships with local health departments. See Table I for a list of A-CPHP and their state partners.

From the discussions, it was apparent that academia plays an important role in serving the needs of their regional, state, and local partners. The amount of effort in preparing the presentations and the participants' commitment to travel to Atlanta, showed that this is a significant, serious, and permanent collaboration. The enthusiasm and collegiality was evident among the academics and practitioners. Practice partners were active participants in discussions highlighting both the successes and challenges of working with academic partners. However, it was also apparent that there was no one "model" for how relationships develop, grow, or thrive. Each relationship was dependent on a number of variables for success, including prior working relationships, regular communications, how long the A-CPHP was funded, distance between the academic center and the state or local health department, leadership at the practice or academic organization, and turnover of state or local health department personnel.

The progress in strengthening the relationships between the academic and the practice community can be linked to many factors. One is that many principal investigators or directors of this program are former local or state public health officials who provide an increased understanding of the practice community. The integral involvement of practice partners in every presentation was evidence that having academic leadership with practice experience in leadership positions has worked. A wide range of organizations, including state and local health departments, non-profit public health institutes, emergency services, the military, state public health associations, universities, and Federal agencies were represented. New and innovative relationships are being formed with medical societies, nursing associations, Head Start programs, fire departments, prison systems, school districts, community health centers, hospitals, and other partners.

All A-CPHP have contributed to the public health infrastructure through the communication systems they have developed and supported through their state and local partnerships. Practice partners participate in A-CPHP planning boards and A-CPHP are active participants in state and local planning activities. In one A-CPHP, the school of public health is in the same building as the state health department. This facilitates relationship building and communication sharing.

Perhaps the most telling example of the success of academic-practice partnerships is NACCHO's Project *Public Health Ready*. *Public Health Ready* is a collaborative activity between the National Association of County and City Health Officials (NACCHO), the Center for Health Policy at the Columbia University School of Nursing, CDC, and the A-CPHP program. This program, established in 2002, provides competency-based training to public health agency staff and recognition to local public health agencies. Their vision is of the public protected from bioterrorism, infectious disease outbreaks, or other public health threats and emergencies (NACCHO, 2004).

In its pilot phase, *Project Public Health Ready* linked 13 local public health agencies with 11 A-CPHP that provided education and training services including needs assessment, as well as training development, training delivery, and/or evaluation. See Table II for a list of pilot sites participants and the assisting A-CPHP. This is a model partnership-building project that brings together local, state, and academic public health partners.

Recognition as a *Public Health Ready* Pilot Site indicates that the community, in partnership with the State Health Department and A-CPHP, is committed to planning, training, and implementation through training exercises. To be successful, a community must develop an emergency management plan connected to other emergency response plans, train staff, and test the plan during an emergency drill. As of spring 2004, 11 of the 13 pilot communities were recognized for significant improvements in their ability to respond to public health emergencies.

“...So [A-CPHP] helped us clarify our chain-of command rigorously and solidified our risk and crisis communication plan. In reviewing several plans from other Public Health Ready sites, ours ...has all the necessary elements, it is practical and one would actually use it in an emergency. To substantiate those claims, NACCHO staff asked for permission to use our plan as a model for other sites.” Local Health Department Director

Partnership Challenges

While it was evident A-CPHP have helped to make significant strides in bridging the historic gap between the academic and practice communities split, challenges still remain. They include:

- Public Health Workforce Crisis
 - There is an acknowledged concern in both the practice and academic communities that within the next decade a significant percentage of the public health workforce will be lost due to retirement. Within the next five to ten years, state and local health departments will lose 30% to 60% of their workforce (Council of State Governments, 2002). In addition, difficulty in recruiting and turnover in state and local workforce leadership and training positions makes it hard to sustain relationships. The significance of the role that the public health workforce is expected to assume during bioterrorism and disaster emergencies highlights the importance of training to fill the impending and recurring gaps in the workforce. The workforce crisis will require continued efforts by A-CPHP–practice alliances to assess preparedness training needs, retrain, and redrill the public health workforce so that they can be prepared as the workforce changes.
- Academic versus Practice Gap
 - The value of A-CPHP knowledge and expertise is acknowledged by practice partners, but the vestiges of an historic ‘town and gown split’ remain between academic institutions and the public health practice community. Differences are rooted in varied educational backgrounds, often-contrary orientations of research versus service, and differing levels of resources. As a result, the program has challenged the perspectives of both academicians and the practice community to work together to advance the national preparedness training goals.
- Emergency versus Public Health Terminology
 - Differences in terminology, training, education, equipment, and perceived role in emergency response can create tension and confusion when public health workers attempt collaboration with law enforcement, fire, and first responder emergency teams. A-CPHP

have addressed this issue by expanding the definition of the public health workforce and sponsoring joint training exercises and communication with these non-traditional allies. However, the wide differences in organizational culture and training among these organizations continue to present challenges.

- **Geographic Differences**

- The geographic distance between the center and center partners often influences the ease of communications and the quality of the working relationship. A-CPHP in close proximity to their partners are at an advantage in developing trusting and productive relationships with their state and local partners. Some A-CPHP cover vast geographic regions with multiple and remote state partners creating financial, staffing, and time barriers associated with traveling to partners. Some states expressed concern about charges for services from centers, especially when the center has added states to their service area without additional grant funding.

Table 1: Self-identified A-CPHP State Partners

A-CPHP	Number of State Partners	States, Territories Served
Columbia University__ The Center for Public Health Preparedness	2	New York City, New York State
Emory University Center for Public Health Preparedness and Research	2	Georgia, Puerto Rico
Harvard University Center for Public Health Preparedness – The LEAP Center	2	Massachusetts, Maine
Johns Hopkins University Center for Public Health Preparedness	3	Maryland, Delaware, District of Columbia
St. Louis University The Heartland Center for Public Health Preparedness	3	Missouri, Kansas
Tulane University/University of Alabama at Birmingham South Central Center Public Health Preparedness Training Center	4	Alabama, Arkansas, Louisiana, Mississippi
University of Albany Center for Public Health Preparedness	2	New York, Vermont
University of California-Berkeley Center for Infectious Disease Preparedness	2	California, Nevada

A-CPHP	Number of State Partners	States, Territories Served
University of California-Los Angeles Center for Public Health and Disasters	6	California, Colorado, Utah, Arizona, Nevada, Puerto Rico
University of Illinois-Chicago Illinois Center for Public Health Preparedness	2	Illinois, Indiana
University of Iowa Upper Midwest Center for Public Health Preparedness	4	Iowa, South Dakota, North Dakota, Nebraska
University of Medicine and Dentistry of New Jersey New Jersey Center for Public Health Preparedness	1	New Jersey
University of Michigan Michigan Center for Public Health Preparedness	1	Michigan
University of Minnesota Center for Public Health Preparedness	3	Minnesota, North Dakota, Wisconsin
University of North Carolina Center for Public Health Preparedness	5	North Carolina, South Carolina, West Virginia, Virginia, Tennessee
University of Oklahoma Southwest Center for Public Health Preparedness	3 + Inter-Tribal Boards	Oklahoma, New Mexico, Colorado
University of Pittsburgh/Ohio State University Center for Public Health Preparedness	2	Pennsylvania, Ohio
University of South Carolina Center for Public Health Preparedness	2	South Carolina, Tennessee
University of South Florida The Florida Center for Public Health Preparedness	1	Florida
University of Texas Center for Biosecurity and Public Health Preparedness	2	Texas, Hawaii, U.S. Affiliated Territories in the Pacific Islands
University of Washington Northwest Center for Public Health Preparedness	6	Alaska, Idaho, Oregon, Montana, Washington, Wyoming

Table II: NACCHO's Project Public Health Ready Pilot Site Participants

Partnering A-CPHP	Local Public Health Agency
Harvard University Center for Public Health Preparedness – The LEAP Center	Needham Health Department Needham, MA Wellesley Health Department Wellesley, MA
Johns Hopkins University Center for Public Health Preparedness	Montgomery County Department of Health and Human Services, Rockville, MD
St. Louis University The Heartland Center for Public Health Preparedness	Kansas City Health Department Kansas City, MO
University of California-Los Angeles Center for Public Health and Disasters and the University of California-Berkeley Center for Infectious Disease Preparedness	Berkeley City Public Health Department Berkeley, CA
University of Illinois- Chicago Illinois Center for Public Health Preparedness	Winnebago County Health Department Rockford, IL
University of Iowa Upper Midwest Center for Public Health Preparedness	Cerro Gordo County Public Health Department Mason City, IA
University of Oklahoma Southwest Center for Public Health Preparedness	Cherokee Nation Health Services Tahlequah, OK Tulsa City-County Health Department Tulsa, OK Tarrant County Public Health Department Fort Worth, TX
University of Pittsburgh/Ohio State University Center for Public Health Preparedness	Allentown City Health Bureau Allentown, PA
University of South Florida The Florida Center for Public Health Preparedness	Seminole County Health Department Sanford, FL
University of Washington Northwest Center for Public Health Preparedness	Thurston County Public Health and Social Services Department, Olympia, WA

Theme 2: A-CPHP Have Strengthened the Preparedness Capacity of State and Local Health Departments and Strengthened the Schools of Public Health Capacity to Respond to the Needs of the Public Health Workforce

One of the central goals of the A-CPHP network is to increase the capacity of schools of public health to provide professional education in bioterrorism, infectious diseases, and other public health threats to the public health workforce. For our purposes, we define capacity as the human resources, technical assets, and other resources within the organizations that would allow them to meet A-CPHP program goals.

Capacity-building Lessons Learned

The site visits demonstrated that capacity-building shared experience between A-CPHP, their school of public health, and the practice community. While schools of public health in the A-CPHP program serve a vital role as credible bioterrorism resources for their communities, it is clear that schools of public health are not just partnering with the state and local health departments. They are internally restructuring their organizations to meet the needs of practice partners.

The A-CPHP are bringing new faces into academic public health, including people with extensive public health management experience. They understand the needs of the local and state public health agencies, and they translate those needs for the academic community.

Capacity-building Successes

The A-CPHP program is leading to changes in the academic environment and enhancing “capacity” within schools of public health. In this context, capacity can be characterized as having the resources and expertise to educate and train the public health workforce. New programs being added to enhance capacity include:

- certificate programs in public health, and
- preparedness and degree programs, such as a master in public health (MPH) degree with a specialty in preparedness and emergency management.

Training certificates are recognition incentives that formally indicate that the learner has successfully completed a course or a program on a specific topic. These are not full degree programs but many times credit can be applied toward a degree, at the learner’s discretion. Training certificates are offered by more than half (12/21) of the A-CPHP. More certificate programs are being developed.

Internships are giving students first-hand experience in public health work. Half (11/21) of the A-CPHP offered special bioterrorism training experiences to MPH students. The dual purpose of student bioterrorism-related internships and fellowships is important. These internships and fellowships provide graduate students with community preparedness experiences to which they can apply their skills in public health theory. The internships help build students’ networking skills and introduce them to local public health professionals and organizations. These networking opportunities can help attract graduates to work in local and state public health positions.

In addition, A-CPHP faculty members are traveling to partners to deliver assistance and training. Academic theory on bioterrorism and other public health competencies have been applied to design and improve training methods and drills and to optimize the skills and performance of public health workers. In addition, the practice perspective of the health department has helped to ground the Schools of Public Health and link student, faculty, and community partners together.

There are examples of training of public health students in specific skills to assist with the surge capacity of local health departments during emergencies. In addition, scholarships, tuition waivers, and adjunct faculty appointments have contributed to the development of leadership potential. Nine centers have developed scholarships and tuition assistance mechanisms for state and local practice partners to further their public health education. The centers reported that having practice partners as students added value to the schools of public health. The professional practice experiences of these partners enrich the course work and enhance the learning environment for traditional MPH students.

The combination of these efforts has contributed substantially to the development of the capacity of the public health workforce.

Specialized technical capacity is being developed within schools. Since July 2003, A-CPHP have been asked to develop specialty or niche areas. These are areas in which the A-CPHP can offer particular expertise that can serve as a national model or resource to other A-CPHP, states, and localities. A-CPHP have identified specialty areas and are developing products and expertise to share with other centers to avoid duplication of efforts. This builds national capacity in numerous specialty areas. These specialty areas change and evolve as the needs of the clients, demands of the student body, the research, and interests of the faculty within the centers evolve (see Table III).

Table III: Frequency of Specialty Areas by Number of Centers

Specialty/Niche Areas	Number of Centers
Basic Bioterrorism Preparedness	1
Border Health & Security	2
Certification & Credentialing Programs	1
Chemical Threats and/or Response	1
Coastal Terrorism	1
Conflict Resolution/Connectivity/Problem Solving	1
Distance Learning/Instruction	4
Epidemiology/Surveillance	6
Equity & Preparedness	1
Evaluation	3
First Responders	1
Food Supply/Agricultural Preparedness	3
Forensic Epidemiology	1

Specialty/Niche Areas	Number of Centers
Global/International Preparedness	1
Governmental Administrative Officials	1
Hazards (all) Preparedness	1
Health care Professionals (MDs, RNs)	2
Incident Command System	2
Infectious Disease Control & Readiness	1
Informatics	2
Integrated Health System Preparedness	1
Leadership & Preparedness (includes Crisis Leadership)	5
Learning Management Systems	3
Legal Issues & Preparedness	2
Mental Health/Psychosocial Aspects of Preparedness	5
Microbiology	1
Native American Populations	2
Nuclear Threats and/or Response	1
Public Opinion Polling	1
Radiation Threats and/or Response	2
Risk/Crisis Communication	4
Risk Assessment	1
Rural Preparedness	4
Water Supply Safety	2
Worker Health & Safety	2
Zoonoses	1

Capacity Challenges

While significant strides have been made in advancing A-CPHP and state and local health department training capacity, challenges remain. Some specific challenges include:

- Limited Resources
 - All Schools of Public Health do not have the same institutional resources from which an A-CPHP can draw for trainers and topical expertise. This diversity of resources presents challenges, but also illustrates the value of advancing the A-CPHP network to leverage technical resources and expertise from one center to fill gaps.

- Administrative Barriers
 - Changes in a school of public health's curriculum can be time-consuming to implement. New courses or degrees (e.g., MPH with an emphasis in emergency management) require an adequate enrollment and tuition dollars to maintain the topic or the concentration within a school of public health.
- Defining Specialty Areas
 - As the needs of the public health workforce and the research interests of A-CPHP faculty evolve, developing a list of specialty areas that can serve as a network resource has been a moving target. CDC, ASPH, and the network will be challenged to develop criteria for defining specialty areas and methods for using the expertise to develop network products.

Theme 3: A-CPHP Are Delivering Preparedness Training Based On the Assessed Needs of the State and Local Public Health Workforce

A central objective of the A-CPHP program is to provide the public health workforce with training on bioterrorism preparedness in partnership with state and local public health agencies. Development and delivery of preparedness training requires the clear identification of training needs, the development of courses and educational materials to address those needs, and the adaptation of training format and content to suit specific target audiences and settings.

Training Delivery Lessons Learned

Results of the site visits strongly demonstrate that A-CPHP are customer focused. A-CPHP have assessed training needs of the workforce and developed training to meet those needs. Needs assessments have been completed through a variety of formats ranging from informal meetings to focus groups to written and online surveys. A-CPHP also evaluated the best modality to deliver training. In the states or localities that preferred direct in-person training, it was provided. In other communities, where it was difficult for public health professionals to take time away from work to attend training, courses are delivered via the Web, video, or CD-ROM technology. Meeting the workforce where they work and adapting training to how and where they best learn increases the effectiveness of training.

Training Lessons Learned

- Instructional materials require adaptation to meet the needs of the local public health workforce. Individual A-CPHP are using training modules developed by other centers and adapting to meet the needs of the local public health workforce. Standardized curricula do not necessarily meet the needs of the practice community.
- Center trainers need to know the training expectations of their audience to tailor educational material to their needs and preferences.
- Instructor-led courses cost more and are more time-intensive in terms of staff time than are technology-based courses.

- Public health leadership training should be provided; participation in training helps local leaders recognize what they don't know or don't have.
- Training incentives (e.g. continuing education credits, certificates, or credentials) motivate public health workers.
- Objective training evaluation assessments are critical to understanding the value of the training to reaching preparedness goals.
- Steps in disease and disaster response have applicability in responding to bioterrorism and terrorist events. Current threats can be used as training proxies to test response.

Training Delivery Successes

All A-CPHP have contributed to the public health infrastructure by supporting workforce development efforts, including training needs assessment activities and the subsequent design and development of educational activities. The training that has been developed is based on specific assessed needs of the public health workforce and is competency-based. There are also numerous efforts in progress to evaluate the change in knowledge and skills as a result of the training, as well as the improvement in performance during drills simulating emergencies.

All centers assess the training needs of the workforce. Results of the needs assessment were used to guide A-CPHP activities, including the selection of training topics, Grand Rounds topics, online and face-to-face courses, a 40-hour curriculum, Summer Institute courses, the prioritization of needs for Health Department and professional agencies, and the training development planning process. A-CPHP also frequently conducted assessments of health departments' technology. Findings were used to determine the most effective format for delivering assessments and training. In areas with adequate computer and Internet access, Web-based training assessments or training were used. This decreases program costs by eliminating printing, postage, and data entry and extends the reach of the training to hard to reach rural areas.

Over 467 bioterrorism-related course offerings and related materials were developed by A-CPHP and are available to the workforce. Courses are offered in a variety of formats:

- Web-based,
- satellite,
- video conferencing, and
- on-site instructional modules.

The Public Health Preparedness Resource Center developed and maintained by ASPH is an online catalogue (<http://www.asph.org/acphp/phprc.cfm>) of available training materials. This repository is a resource to public health professionals who seek training, as well as to course developers at other A-CPHP who seek to avoid duplication of effort.

Learning Management Systems Used

Learning Management Systems (LMS) are computer software programs that assist organizations and individuals in managing their education and training activities. Almost all (18/21) centers were involved in a LMS activity either by developing a system or working with the state to select a system. States use a variety of learning management systems. In addition, modifications are usually made to any standardized systems. The systems support A-CPHP training efforts by providing access to information on course offerings and by facilitating the tracking of individual learner's progress.

All A-CPHP have been evaluating the effectiveness of their training activities. Centers employ a variety of evaluation methods:

- subjective self-assessment satisfaction questionnaires,
- objective competency-based assessments,
- written course evaluations, and
- table-top exercises.

Evaluation criteria varied widely:

- customer satisfaction questions,
- changes in knowledge,
- changes in performance or behavior,
- changes in individual competency development.

Training Delivery Challenges

Despite success in training development and delivery, there are challenges that have to be addressed in the future.

- **Overlapping Course Content Areas**
 - There are instances where several courses were developed to cover the same content area. For example, epidemiology and surveillance, mental health or psychological preparedness and risk communication are content areas in which there are multiple course offerings. In many cases, courses are developed for specific audiences and meet the needs of individual communities. They may be offered using different modalities (e.g., satellite or CD ROM) tailored to the user. The challenge is to balance the need for courses tailored to community needs while being aware that efforts could be used to develop materials for content areas where little to no training materials exist.
- **Refining Bioterrorism Competencies**
 - The Bioterrorism Competencies are a useful starting point for developing training materials, although it was widely agreed that further refinement would be beneficial. One state health officer expressed the view that competencies should be regarded as evolution-

ary because the *“roles of public health professionals are changing on a weekly basis.”* There are some inconsistencies in the application of competencies to specific state conditions and in the development of specific training products.

“The amplification of the competencies developed by the Columbia A-CPHP and School of Nursing demonstrates both the usefulness of the competencies and the need for further delineating them.”

- Lack of Standardization
 - A lack of standard approaches to needs assessment strategies, evaluation methods, and the use of LMS reflect the wide variations among center resources, the needs of the practice partners and the populations they serve, and the capacity of each school of public health. Balancing the needs of the clients and faculty preference for curriculum development with maximizing the benefits of using material that has already been developed will be continual challenge.

Theme 4: Coordination and Development of the A-CPHP Network Is An Evolving Process

The intent of the A-CPHP program is for all 21 centers to function as a coordinated, national network in partnership with their state and local health departments. Key functions of network coordination are to:

- support collaborative work,
- reduce redundancy in curricula materials development, and
- develop core, flexibly tailored educational programs, products and services.

This needs to be accomplished by actively and regularly convening Centers with similar expertise, and coordinating with CDC subject matter experts, to develop a strategy for dissemination and maximal outreach of network assets comprised of consistent and bundled information (“toolkits”).

Network Successes

The development of the communications network linking the centers has facilitated achievement of a number of significant successes for the A-CPHP program. These successes include the sharing of educational materials and products among the centers and the efforts to ensure open access in the public domain to A-CPHP materials.

A number of the A-CPHP already have technology-based training courses available either on the Web or through satellite or video conferencing. Centers have demonstrated collaboration with other A-CPHP by sharing training expertise and by referring partners to other centers. Several of the centers stated that they have used bioterrorism courses and products from other centers or from CDC. A number of them stated that they evaluated existing courses from other centers before developing their own version.

The A-CPHP network disseminates bioterrorism informational resources, center courses, and center products. It also facilitates communication among centers in numerous ways including email distribution lists, the ASPH Web site and ASPH's weekly newsletter. All center Web sites serve as bioterrorism resources for their respective schools of public health and their partners linking them to federal and state agencies and scientific information. A number of A-CPHP have published their work in peer-reviewed professional publications and presentations and serve on national advisory boards.

Network Challenges

While all of the centers stated a willingness to share course materials with other A-CPHP, some potential barriers and challenges were identified.

- **Competitiveness Between Centers**
 - Schools of public health, similar to other academic institutions, build their academic reputations on the quality of their courses and the expertise of their faculty. They compete with each other for funding, resources, expert faculty and students. This embedded entrepreneurial culture may impede the willingness to share of information and courses, which can be construed as intellectual property. However, experience has shown this is a rare occurrence. In addition, the role of former federal, state and local agency leaders in leadership roles in the centers has positively influenced the culture of sharing.
- **Differing Levels of Center Development**
 - Due to the staggered timing of funding awards, differences in state hiring restrictions, and institutional differences between schools of public health, the A-CPHP are at different levels of training development and capacity. These differences can affect network development as newly funded centers work to develop relationships with practice partners and develop the infrastructure that already exists in more established A-CPHP.
- **A-CPHP Role in the National Preparedness Plan**
 - Many center PIs and faculty members advocated more-specific direction from CDC for clarifying the A-CPHP role in national bioterrorism preparedness and how they relate to state and local partners. More specific direction from CDC could assist centers in identifying priority areas and opportunities for collaboration and sharing with other centers in the network.

“One of the things that the CDC funding did for the schools of public health was help ease some of the inter-mural competitiveness that exist at a university and we had the permission and the funding to create venues for cooperative meetings, bringing in experts across the different schools. This has helped make some schools a more coherent place for thinking about and responding to a bioterrorism emergency. Schools are a better source of expertise for the state and the nation because of what CDC has done.” A-CPHP Investigator

Theme 5: Reorienting the Public Health Workforce to Address Bioterrorism is a Work in Progress

An important goal of A-CPHP is to reorient the perceptions of the public health workforce in regard to their roles, responsibilities, and career opportunities as they relate to emergency preparedness. State and local health department partners indicated that the A-CPHP bioterrorism preparedness initiative has succeeded in highlighting the responsibilities of public health workers to national preparedness initiatives. The A-CPHP training activities and other interactions with state and local partners also appear to have raised the awareness of traditional first responder agencies and some legislators, in regard to the vital role of public health in emergency response.

Reorienting the Public Health Workforce Successes

In general, public health workers have responded positively to A-CPHP training. Anecdotal evidence suggests that training gives attendees a clear sense of their expanded roles and responsibilities in emergency preparedness. Public health workers are increasingly being recognized as vital members of the state and community emergency response team.

Beginning with the threat imposed by anthrax, emergency and law enforcement personnel have also become aware of the role and contributions that public health can bring to emergency response. This change in perception of the role of public health in emergency response has been shown by the requests of law enforcement and other emergency response personnel for A-CPHP training, including how to work with public health agencies.

Reorienting the Public Health Workforce Challenges

- Working Conditions
 - A-CPHP are working to reorient the workforce in times of state budget cuts and a workforce crisis. Despite these difficulties, public health workers are being trained to take on increased responsibilities for preparedness. These realities pose a challenge for attracting and retaining personnel at the state and local level and, as stated earlier, will require A-CPHP to prepare to assess, train, and drill continuously to ensure organizational competence.
- Personal Concerns of Staff During Emergencies
 - Needs assessment results indicated that many public health workers have personal safety and personal performance concerns that may affect their performance during an emergency. Several partners also reported that public health workers expressed a concern about being alone or making a mistake on the job in a disaster. Responding to these expressed needs, A-CPHP training has incorporated personal and family safety plans in training public health workers.

- Coordination with Other Agencies
 - Public health departments are now working with nontraditional allies such as fire departments, emergency management, first responders, and law enforcement officers to coordinate during preparedness response exercises and drills. Given that each emergency response agency, including public health, has its own terminology and procedures, attempting to train collaboratively with multi-disciplinary agencies is a significant challenge.

Theme 6: Long-Term Funding Is Vital To Meet National Preparedness Goals

The A-CPHP program has been an important program for Schools of Public Health. The multi-year funding has supported capacity building through the hiring of new faculty to develop and strengthen the bioterrorism expertise of the centers. The project contributed not only to the development of partnerships with states but also to long-range preparedness planning activities with them. Multi-year funding is essential to provide the opportunity to engage in long-term strategic planning with state and local partners and potentially to realize a greater impact and outcomes from program efforts.

Funding Lessons Learned

A-CPHP, in partnership with local and state public health, have enormous potential for improving the practice of public health in emergencies and disasters, as well as playing a critical role providing preparedness training for the public health workforce in redefining public health as a career opportunity.

Funding Successes

A-CPHP and their practice partners uniformly commented on the programmatic benefits of long-term funding. From the perspective of the state and local partners, A-CPHP funding and partnerships with schools of public health have made it possible for them to address the training needs of the public health workforce as required by their new preparedness responsibilities. Partners reported that state and local health departments do not have the funding, the staff, the expertise, or the time to design, develop, and conduct preparedness training for their staff. They noted the extraordinary potential of the A-CPHP program to have a long-term impact on public health practices.

“Bioterrorism funding through the partnerships that it fosters presents the opportunity of a lifetime.”

Consistent with A-CPHP program goals, most centers offered preparedness training or products for free or at a very low cost to their partners. To promote career development ladders, nine centers waived school of public health tuition or provided scholarships for practice partners to attend MPH classes.

Funding Challenges

- Issues Related to Year-to-Year Funding
 - When funding is short-term and not secure, it is extremely difficult to develop partnerships, products, and training programs. It was difficult to do strategic planning with state partners when funding was not secure for subsequent years. Furthermore, developing training credentialing mechanisms requires long-term funding for organizational coordination and standardization procedures.

Conclusions and Opportunities for the Future

The 21 Peer Review and Practice Evaluations documented substantial progress in the development of the A-CPHP program. State and local partnerships were established in at least 47 states, with the A-CPHP situated in 23 schools of public health. The A-CPHP have developed, tailored, and conducted a variety of competency-based bioterrorism courses for training of the public health workforce. The training content has been based on extensive needs assessment activities with their partners. As a result, the capacity of schools of public health to support state and local health departments to prepare to respond to terrorist threats, emerging diseases, and natural disasters has increased. Schools of public health are hiring new faculty with bioterrorism expertise, engaging practice partners as adjunct faculty, and organizing student internships and incentive programs for the public health workforce.

In the future, A-CPHP can encourage the sharing of the best approaches and lessons learned among A-CPHP to reduce duplication of efforts, promote efficient use of resources, and increase efficiencies of scale. To facilitate this information sharing, CDC and ASPH will support exemplar groups around a variety of content areas, special audiences, and methodological topics. These groups will be designed to assist CDC in developing standard training requirements and curricula.

Other opportunities for the future include:

- Supporting ASPH as the network coordinator to continue information sharing among all of the Centers for Public Health Preparedness through meetings and conference calls, as well as an electronic clearinghouse of training products, programs, and educational services.
- Developing standardized approaches to performance-based training evaluation methods, certificates and credentialing, and LMS systems to minimize duplication of efforts and promote national standards.
- Developing a nationally recognized definition of “workforce preparedness” that could be used to standardize objective, competency-based evaluation measures and procedures.
- Developing durable (e.g., technology-based: online, CD-ROM, satellite, or video conferencing) products and courses related to technical topics such as Incident Command Systems (ICS), at centers with technical expert trainers in those areas.

- Developing a national systematic system for tracking graduates of schools of public health to determine how many have elected to enter state and local public health departments and/or are working on preparedness initiatives. ASPH is working with their members to develop a periodic survey to track graduate career paths.

The A-CPHP program has made substantial progress and will continue to evolve with support and guidance from CDC and ASPH as the network coordinator. Continued and explicit direction from CDC on expectations, goals, and rules for the network; continued funding from CDC; active two-way communication grantees; CDC; and ASPH will significantly contribute to the evolution of a well-functioning network. With the substantial development of preparedness expertise across the A-CPHP network, it is clear that there is increased awareness of the assets the schools of public health bring to the national public health system. The A-CPHP are illustrating, in a very profound way, how relevant public health education is to our society and our nation.

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Appendix A

Academic Centers for Public Health Preparedness at Schools of Public Health

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About ASPH

The Association of Schools of Public Health (ASPH) is the only national organization representing the deans, faculty, and students of the accredited member schools of public health and other programs seeking accreditation as schools of public health. ASPH works for its membership to:

- Provide a focus and a platform for the enhancement of existing and emerging academic public health programs;
- Communicate with agencies of the federal government on projects to strengthen public health education and the public health profession;
- Assist its member schools in the development and coordination of national health policies;
- Serve as an information center for governmental and private groups and individuals whose concerns overlap those of higher education for public health; and
- Assist in meeting national goals of disease prevention and health promotion.

Through their commitment to providing lifelong learning opportunities to public health professionals, schools of public health prepare the public health workforce to meet health threats and emergencies.

To request more information on the Centers for Public Health Preparedness, please contact the Association of Schools of Public Health at (202) 296-1099 or visit the Web site at www.asph.org

