North Carolina Public Health
EveryWhere. EveryDay. EveryBody.

A Report on the Public Health Workforce in North Carolina

October 2004

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Introduction

The North Carolina Division of Public Health's logo includes the motto: "EveryWhere. EveryDay. EveryBody." Although its original context relates to serving the state of North Carolina, it also becomes an appropriate title for this report as we talk about everybody *doing* the work of public health every day and everywhere across the state.

More than 10,000 people work in governmental public health jobs across North Carolina. Who are we and what jobs do we perform every day? And in a time of uncertainty, what do we need to know in order to keep the public healthy and secure?

The public health workforce in North Carolina is strong, reliable, and capable of responding to many traditional and emerging public health problems. However, we must continue to monitor and address workforce composition and training needs if we are to assure the health of all North Carolinians. Now more than ever, public health workers are called upon to increase their knowledge base, strengthen awareness of emerging health threats, and respond quickly and effectively.

Our state has made great strides in addressing the need for training and workforce preparedness through partnerships between practice and academic units. One such partnership, between the Office of Public Health Preparedness and Response (PHP&R) in the North Carolina Division of Public Health and the North Carolina Center for Public Health Preparedness (NCCPHP) at the North Carolina Institute for Public Health, has assessed the public health workforce by asking North Carolina's public health workers to identify their training needs in core public health and emergency preparedness and response competencies.

As part of a national response to terrorism activity, these institutions collaborated with the University of North Carolina School of Public Health to develop an online training needs assessment and learning management system called the Public Health Workforce Development System available at publichealthpreparedness.org (Figure 1).

> An almost universal priority for workforce development is ensuring that all public health practitioners have mastery over a basic set of competencies involving generalizable knowledge, skills, and abilities that allow them to effectively and efficiently function as part of their public health organizations or systems (CDC-ASTDR, DHHS, CDC).
>
> Institute of Medicine report, The Future of the Public's Health in the 21st Century

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A baseline assessment of self-identified training needs for public health workers in core public health and emergency preparedness and response competencies was completed on October 1, 2004. Unlike some workforce assessments that focus on specific occupational groups, this effort was designed to gather information from the entire public health workforce.

Information from this training needs assessment provides demographic details about the composition of the workforce and identifies training needs for public health workers. This report prioritizes the top self-identified training needs for all public health workers in North Carolina and for 12 major occupational classifications. Data on top priority training needs will also be available for each local health department and for the 7 Public Health Regional Surveillance Teams (PHRSTs), to assist with the development of local and regional training plans.

Figure 1. Screen Shot of the Public Health Workforce Development System Assessment

Developed by UNC SPH Instructional and Information Systems, 2002.

Background

The 2003 Institute of Medicine report, *The Future of the Public's Health in the 21st Century*, highlighted the need to assess the public health workforce to determine gaps in knowledge and need for training. One section emphasizes that training, education, and competency of the public health workforce are critical components of public health infrastructure.

In addition to noting the importance of competency-based training for all public health workers and building an effective pipeline of new public health leaders, the Council on Linkages between Public Health Practice and Academia also highlights a growing crisis with regard to retirement trends in our public health workforce over the next decade.[2]

To address the need to improve public health capacity in bioterrorism and other public health emergencies, questions about emergency preparedness and response were included as the first section of the online training needs assessment. The Center for Health Policy at the Columbia School of Nursing developed the emergency preparedness competencies used in this section (Figure 2).[3]

> The issue of workforce training and competency is central to the success of any public health system. Governmental public health agencies have a responsibility to identify the public health workforce needs within their jurisdictions and to implement policies and programs to fill those needs. In addition, an assessment of current competency levels and needs is essential to develop and deliver the appropriate competency-based training, as well as to evaluate the impact of that training in practice settings.[1]

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[1] Institute of Medicine, National Academy of Sciences. *The Future of the Public's Health in the 21st Century.* Washington, DC: National Academy Press; 2003.

[2] *Developing Strategies to Assure a Pipeline of Skilled and Competent Public Health Workers for the Future.* Council on Linkages Between Academia and Public Health Practice Web site. Available at: http://www.trainingfinder.org/competencies/index.htm. Accessed October 7, 2004.

[3] Center for Health Policy, Columbia School of Nursing. *Local Public Health Competency for Emergency Response.* April 2001. Available from: http://www.mailman.hs.columbia.edu/CPHP/cdc/COMPETENCIES.pdf. Accessed April 15, 2004.

A significant number of nationally recognized agencies, including the Centers for Disease Control and Prevention, have recently heightened the importance of providing training for the public health workforce in the essential services and core public health competencies (Figure 3).[4]

The emergency preparedness and core public health competencies guide what public health should be responsible for and present a framework for developing and enhancing knowledge, skills and abilities through training. These competencies were the basis for the content in the training needs assessment.

The assessment was arranged in 11 required sections. Section 1 listed 10 specific competencies associated with emergency preparedness and response. For sections 2-11 of the assessment, competency activities were organized using the 10 essential services of public health.

Figure 2. Emergency Preparedness and Response Competencies

Define situations that require an emergency response

Describe the responsibilities of a health department during an emergency situation

Describe your health department's emergency response plan

Describe the incident command system in your community

Carry out your role and responsibilities in an emergency response

Use emergency communication equipment

Perform your communication role in an emergency (communication within the health department, with media, or with the community)

Find resources that will help you carry out your responsibilities during an emergency

Describe the signs and symptoms of biological agents that may be used in a bioterrorist attack (eg, plague, anthrax, smallpox) and respond appropriately when you suspect someone in your community has been exposed to one of these agents

Describe the signs and symptoms of exposure to chemicals that might be used in a terrorist attack (eg, sarin, ricin), and respond appropriately when you suspect someone in your community has been exposed to one of these agents

Adapted from: Center for Health Policy, Columbia School of Nursing.

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[4] Council on Linkages Between Academia and Public Health Practice Web site. Available at: http://www.trainingfinder.org/competencies/index.htm. Accessed October 7, 2004.

Figure 3. The Ten Essential Public Health Services and Corresponding Competencies

1) Monitor health status to identify community problems

Be aware of amount of each important health problem in your community
Use reports from disease surveillance or vital registry systems to identify important health issues
Determine appropriate uses and limitations or gaps of existing health data for your community
Conduct community assessments including identifying needs, assets, and priorities
Communicate with other agencies to identify new disease cases in your community
Recognize a disease outbreak in your community or nearby communities
Use statistics to analyze health data and make relevant inferences from the data
Present information or data on health issues to other health professionals or to the general public
Solicit input from individuals and organizations about important health issues in the community
Use public health software like EPI-INFO
Maintain the security and confidentiality of personal and public health information

2) Diagnose and investigate health problems and health hazards in the community

Design research studies to identify risk factor for a health problem
Read scientific literature to keep up-to-date with knowledge of new diseases and risk factors
Understand strengths and weaknesses of published research
Collect biological or environmental samples to better understand a health problem
Perform environmental health risk assessments
Explain your technical/computer needs to the appropriate people

3) Inform, educate and empower people about health issues

Communicate effectively both in writing and speaking
Meet with professionals and community members to gather opinions about how to promote the health of the population to address a priority health problem
Identify cultural, social, and behavioral factors that affect health problems in your community
Provide health promotion and disease prevention information to groups or individual
Use media (newspapers, radio, TV) to communicate health information
Use a computer-based catalog like Medline to identify articles or books related to a health topic

4) Mobilize community partnerships and action to solve health problems

Interact effectively with people from diverse cultural, socioeconomic, educational backgrounds
Help conduct health promotion campaigns and programs
Use health promotion models to design or evaluate a health intervention program
Use the internet to make health information available to the community
Advocate for public health programs and resources
Apply principles of group dynamics to develop effective partnerships
Establish and maintain community partnerships to maximize use of community assets

5) Develop policies and plans that support individual and community health efforts

Collect, summarize, and interpret information relevant to a health issue
Formulate policy options
Understand the feasibility and expected outcome of each policy option
Use current techniques in decision analysis and health planning
Develop long-range plans for health programs
Plan and implement effective emergency response services

Figure 3, continued. The Ten Essential Public Health Services and Corresponding Competencies

6) Enforce laws and regulations that protect health and ensure safety

Stay informed of public health laws and regulations

Monitor enforcement of public health laws and regulations

Work with law enforcement agencies to enforce regulations that protect health and ensure safety

Use regulations to promote health in your community

Explain public health regulations to community

7) Link people to needed personnel services and assure the provision of healthcare when otherwise unavailable

Identify healthcare service needs in your community

Work with interpreters to provide public health services to non-English speaking members

Coordinate with other groups and agencies to ensure appropriate health care services are provided

Refer clients to other agencies where appropriate to receive personal health services

Develop a clinical health or social service plan for clients

Negotiate contracts

Write proposals to obtain funding

Develop a budget

Adapt healthcare service programs to take into account cultural differences in the population

8) Assure an expert public health workforce

Create appropriate staff development and training plans for employees

Recruit and interview applicants for positions in your agency

Use organizational theory to improve professional practice in your agency

Ensure that staff have and maintain appropriate licenses and credentials

Translate state or local policy into organizational structure and programs

9) Evaluate effectiveness, accessibility, and quality of health services

Develop surveys and studies to measure cost effectiveness, accessibility, or quality of health care services in your community

Understand factors that influence use of health services

Follow-up with clients to ensure that they have received health or social services

Evaluate programs to ensure that objectives and performance goals are met

Monitor day-to-day operations of programs that provide health services

10) Research for new insights and innovative solutions to health problems

Conduct research or interventions to develop unique approaches to solving health problems

Educate legislature on new policy options

Create partnerships between public and private organizations to deliver public health services

Source: Public Health Functions Steering Committee, Council on Linkages Between Academia and Practice.

In *Developing Strategies to Assure a Pipeline of Skilled and Competent Public Health Workers for the Future,* the Council on Linkages Between Academia and Public Health Practice states that for the nation:

> …the average age of the public health nurse, a major component of the public health workforce, is 49.5 years. Furthermore, up to 43% of the state public health department workforce will retire or be eligible for retirement by 2006. To curb this growing crisis, public health leaders have begun discussing potential strategies to:
>
> - Strengthen the skills and competencies of the existing workforce to fill the "experience" void left behind as workers retire;
> - Expand the type and amount of training available to address new challenges in public health such as emerging infectious diseases, responding to terrorist events, and other public health threats and emergencies; and
> - Effectively prepare and recruit students and professionals from other disciplines to enter and remain in the practice of public health to ensure our nation has adequate numbers of workers, in the right places, with the right skills, at the right time to protect and improve the health of all Americans.[5]

A State Public Health Employee Worker Shortage Report by the Association of State and Territorial Health Officials (ASTHO) echoed the retirement and worker shortage crisis by citing data from a workforce survey by the Council on State Governments and the National Association of State Personnel Executives. This ASTHO survey collected information about the public health workforce from 37 states and confirmed other national data trends. The ASTHO report also indicated that epidemiologists and public health nurses would be the occupational groups most affected by workforce shortages and would be most in need of formal academic training.[6]

> **State governments could lose more than 30% of their workforce to retirement, private-sector employers, and alternative careers by 2006, and health agencies would be the hardest hit.[6]**

[5] *Developing Strategies to Assure a Pipeline of Skilled and Competent Public Health Workers for the Future.* Council on Linkages Between Academia and Public Health Practice Web site. Available at: http://www.trainingfinder.org/competencies/index.htm. Accessed October 7, 2004.

[6] *State Public Health Employee Worker Shortage Report: A Civil Service Recruitment and Retention Crisis.* The Council of State Governments, the National Association of State Personnel Executives, with the Association of State and Territorial Health Officials. 2004. Available at: www.ASTHO.org.

Who We Are

The North Carolina Public Health Workforce

The composition of the public health workforce in North Carolina represents a broad range of occupational classifications and specialty areas. The demographic section of the workforce training needs assessment collected basic but vital information that helps describe North Carolina's workforce.

Information from 7087 public health workers in North Carolina are summarized in this report. Demographic questions were not required for completion of the assessment; therefore, individual numbers of responses included in analysis are given with each figure below.

More information on Methodology and Response Rates can be found on pages 38-41 of this report.

Consistent with national trends, nearly 50% of the public health workforce in North Carolina is 45 years of age and older (Figure 4).

Figure 4. Age of Public Health Employees in North Carolina (n=6055)

Who We Are
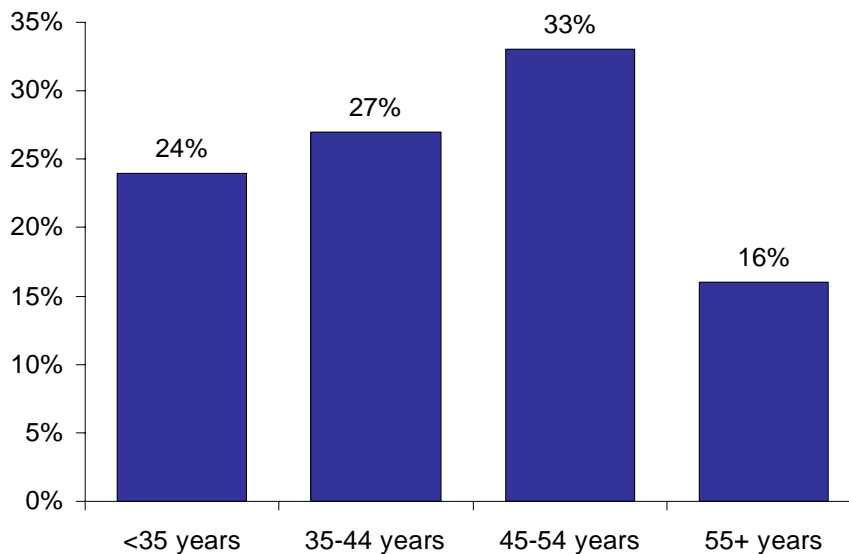
Figure 5. Gender of Public Health Employees in North Carolina (n=6008)

Male 12%
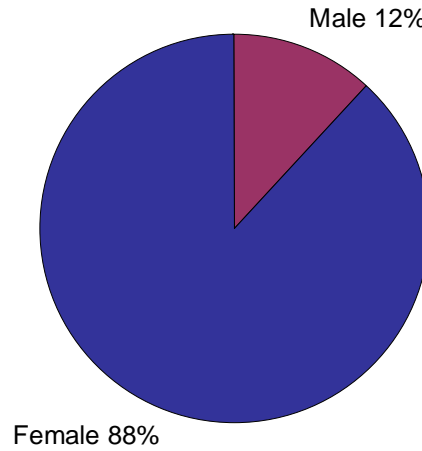
Female 88%

North Carolina's public health workforce is predominantly female (88%), and non-Hispanic white (72%) (Figures 5 and 6).

The overall racial makeup of our workforce (Figure 6) closely mirrors the racial composition of the general population in North Carolina (Figure 7). In order to effectively serve a culturally and linguistically diverse population with a wide array of health needs, the public health workforce must continue to diversify along with the population.

Figure 6. Race of Public Health Employees in North Carolina (n=5268)

Other 4%

Hispanic 6%

Non-Hispanic Black 19%

Non-Hispanic White 72%
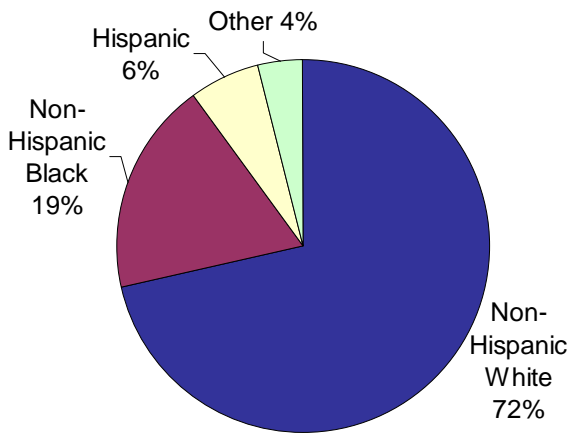
Figure 7. Race of Adults in North Carolina, 2000

Other 3%

Hispanic 4%

Non-Hispanic Black 20%

Non-Hispanic White 73%
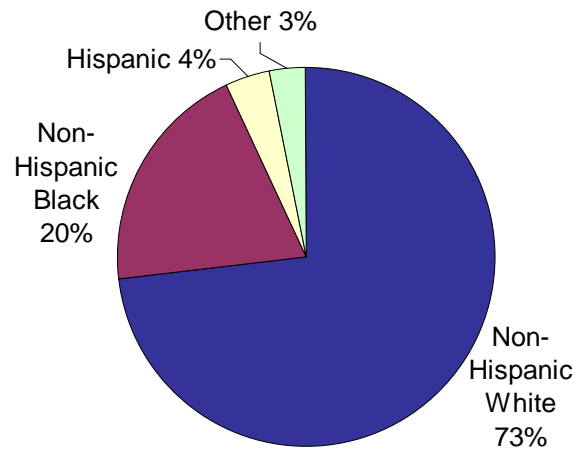
Source: US Census 2000

Where we are…

The ratio of public health workers to population varies from county to county (Figure 8). As one might expect, the more populous counties such as Mecklenburg, Wake, Durham, Guilford, and Cumberland, have a lower proportion of public health workers per 10,000 population. The highest number of public health workers per population is seen in more rural and less populated counties.

Public health workers, occupational classifications, and programs vary by county and are related to the unique combination of services each local health department provides, therefore, results should be considered and interpreted with care.

Figure 8. Number of Public Health Employees Per 10,000 Residents

Key
- 4.0-8.9 workers per 10,000 residents
- 9.0-10.9 workers per 10,000 residents
- 11.0-15.9 workers per 10,000 residents
- Greater than 16.0 workers per 10,000 residents

Who We Are

Figure 9. Years Worked in Public Health (n=5202)
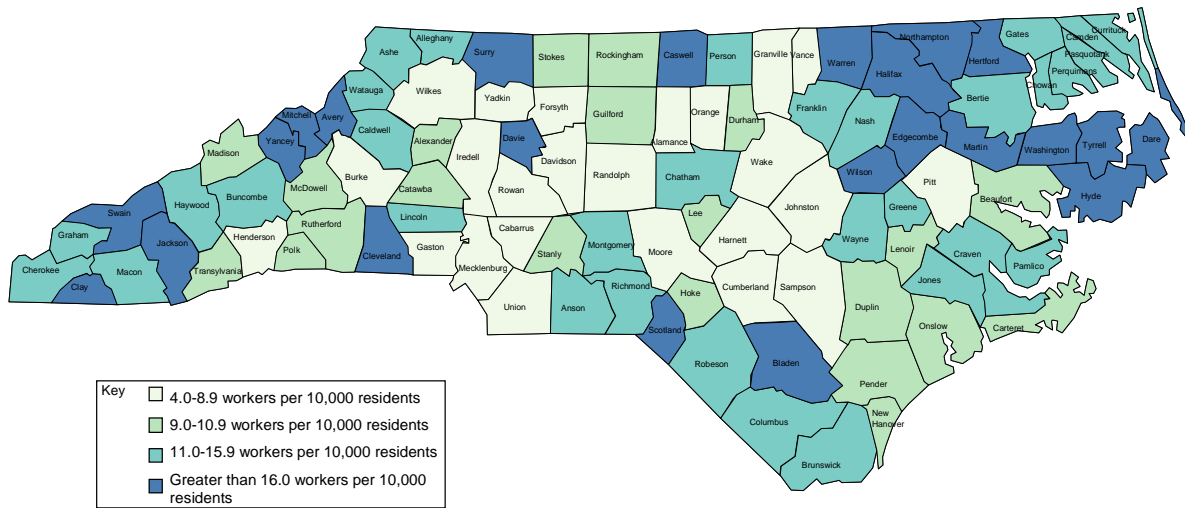
As Figure 9 illustrates, about a third of North Carolina's workforce has less than five years of experience, but 42% of the workforce has been in public health for 10 years or more.
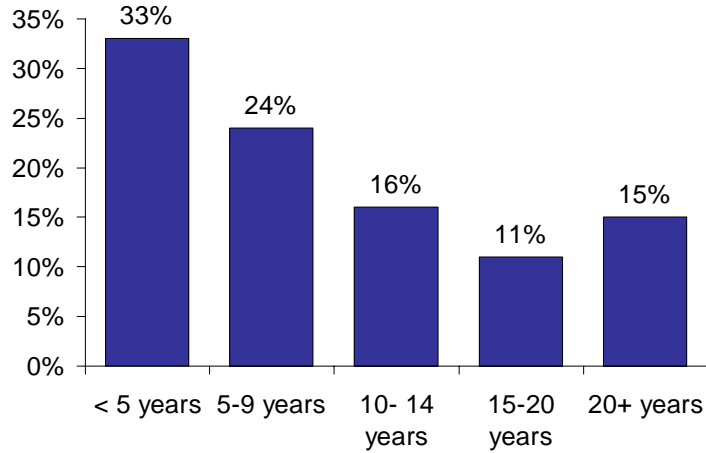
Figure 10. Years Worked in Current Health Department (n=5199)
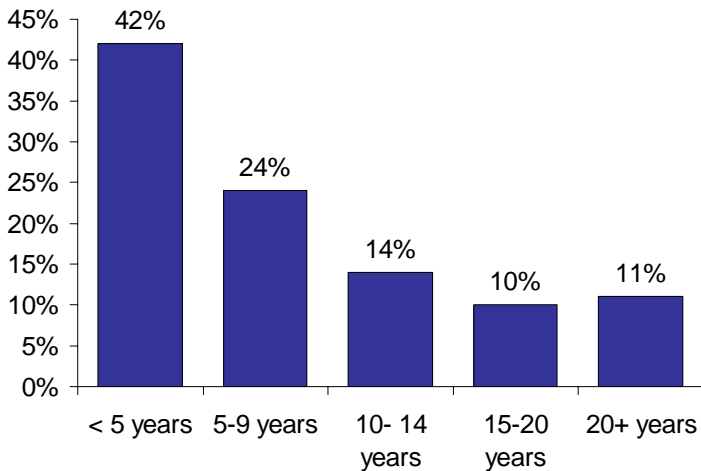
While 42% of the workforce has been with their current employer for less than 5 years, 35% of the workforce has been in the same department for 10 years or more (Figure 10).

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More than half of the public health workforce falls into the categories of nursing or clerical/administration positions, while other occupational classifications represent a smaller number of public health workers (Figure 11).

Figure 11. Occupational Classification Reported by Public Health Employees in North Carolina (n=7087)

Occupational Classification	Percent
Non-Health Professional	2%
Laboratory	3%
Clinical / Epidemiology	3%
Management / Policy Analysis	4%
Nutrition	4%
Health Education	4%
Allied Health Professional	5%
Other	5%
Social Work / Mental Health	6%
Environmental Health / Occupational Safety	9%
Clerical/Administration	27%
Nursing	28%
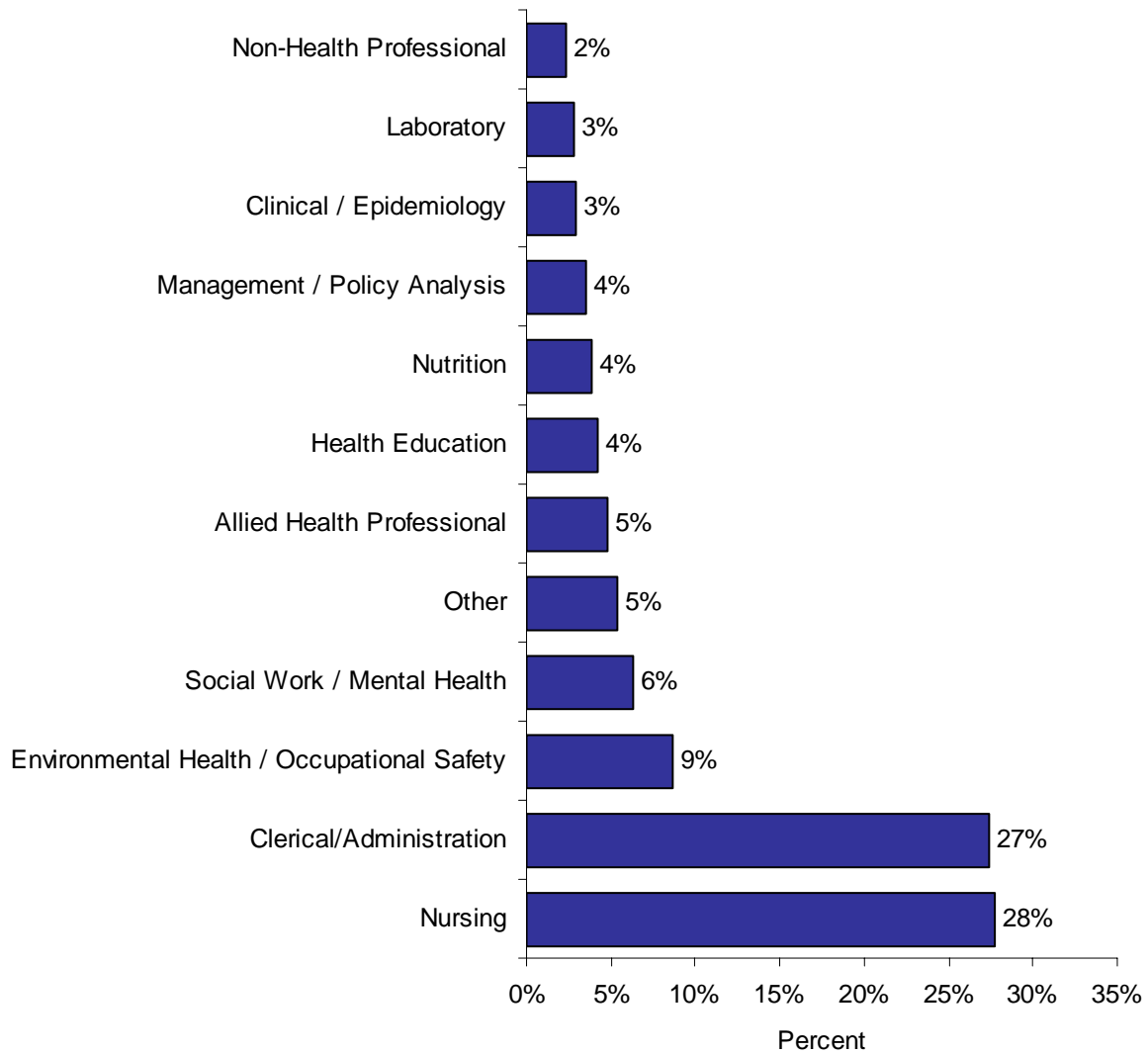
Percent

While almost 30% of the public health workforce completed their formal education with a high school diploma, 27% went on to receive an associate degree and nearly a third completed a bachelor's degree. Thirteen percent of the local public health workforce holds an advanced degree (Figure 12).

In terms of educational background, the public health workforce is quite diverse. However, only 2% of the workforce has a formal degree in public health. Notably, almost 40% of public health workers have a degree in nursing (Figure 13).

Who We Are

Figure 12. Highest Educational Degree of Public Health Employees in North Carolina (n=5067)
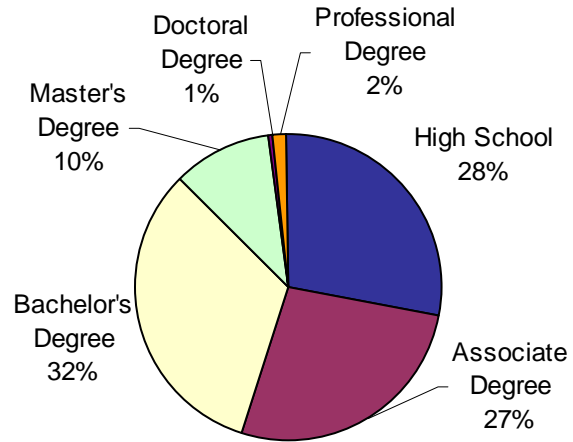
Figure 13. Educational Fields in Which Public Health Employees in North Carolina Hold Degrees (n=3200)

Percent of individuals with degrees
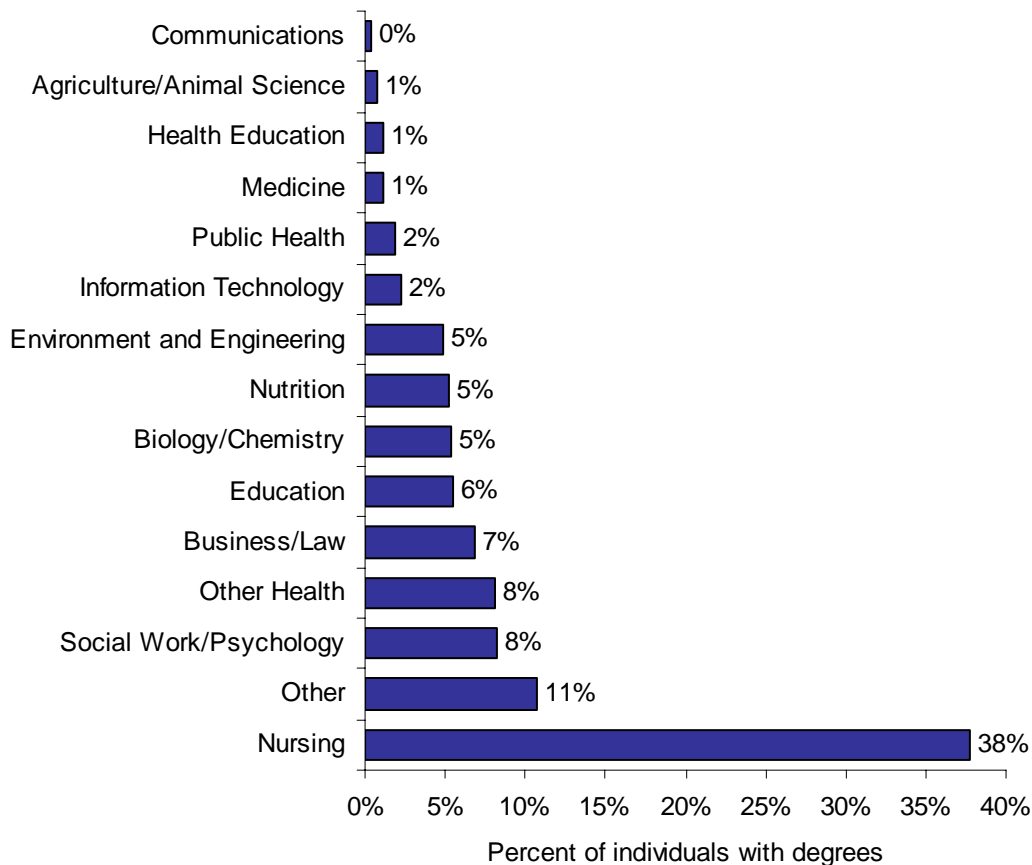
Figure 14. Licenses and Other Credentials Held by Public Health Employees in North Carolina[1]

	Number of respondents with this credential
Licensed Professions	
Registered nurse	**1243**
Social worker	**217**
Nurse practitioner	**93**
Licensed practical nurse	**52**
Physician	**25**
Dental hygienist	**24**
Dentist	**20**
Physician Assistant	**18**
Midwife	**7**
Pharmacist	**7**
Lawyer	**5**
Physical therapist	**5**
Certified Professions	
Nursing assistant	**255**
Dietitian	**79**
Medical technologist	**73**
Phlebotomist	**16**
Laboratory technician	**14**
Dental assistant	**11**
Other Credentials	
Registered sanitarian	**313**
Certified health education specialist	**43**
Certified medical assistant	**16**
Certified lactation consultant	**10**
Certified safety professional	**9**
Environmental health specialist	**7**
Medical office assistant	**6**
Teaching certificate	**6**

[1] Includes only certifications/credentials with at least 5 responses.

Registered nurses are the largest licensed group of public health workers in North Carolina (Figure 14). Nursing assistants make up the majority of certified professionals and registered sanitarians are the largest group with credentials specific to their job duties.

The majority of physicians working in local public health are board certified with most specializing in family practice and pediatrics (Figure 15).

Figure 15. Board Certification and Specialization for Public Health Physicians in North Carolina

	Percent (n) of physicians, n=25
Board Certified	**72 (18)**
Specialization	
Family/general practice	**33 (7)**
Pediatrics	**29 (6)**
Obstetrics/gynecology	**14 (3)**
Preventive medicine	**10 (2)**
Infectious diseases	**5 (1)**
Internal medicine	**5 (1)**
Occupational medicine	**5 (1)**

Who We Are

Who We Are

Figure 16. Educational Background of Public Health Employees in North Carolina by Occupational Classification

Environmental Health/Occupational Safety (n=373)

- Environment/Engineering 35%
- Biology/Chemistry 32%
- Other 33%

Health Education (n=183)

- Education 52%
- Health Education 13%
- Social Work/Psychology 9%
- Other 26%

Management/Policy Analysis (n=158)

- Nursing 28%
- Business/Law 18%
- Public Health 13%
- Nutrition 5%
- Other health-related degree 8%
- Education 6%
- Other 22%
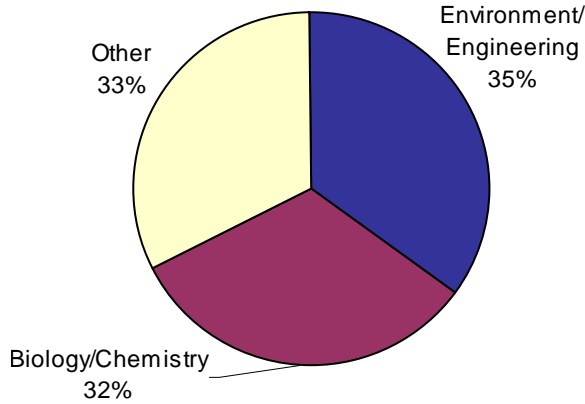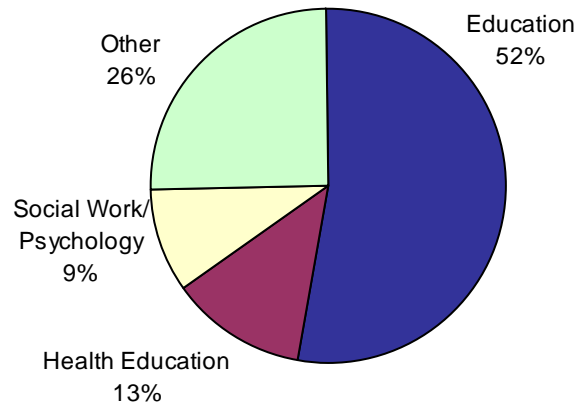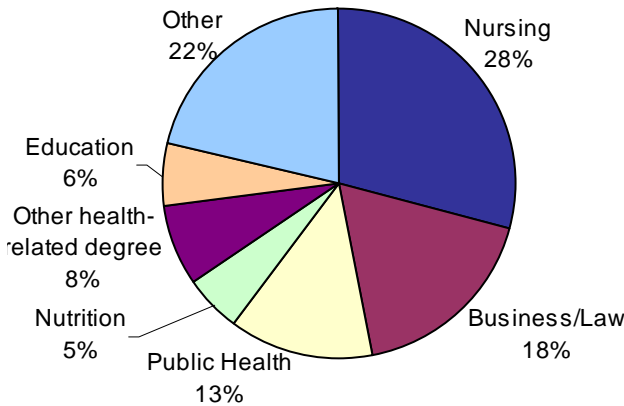
Public Health Nursing (n=1193)

- Nursing 90%
- Other 10%

Clinical/Epidemiology (n=95)

- Medicine 26%
- Public Health 8%
- Other health-related degree 43%
- Other 23%

Nutrition (n=168)

- Nutrition 82%
- Other 18%

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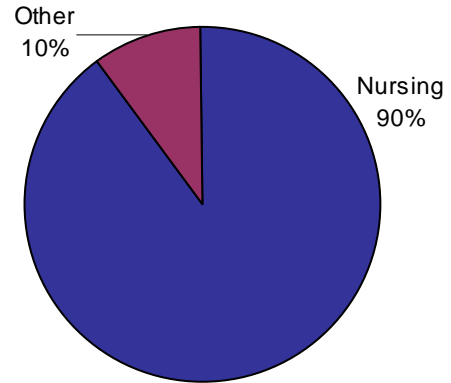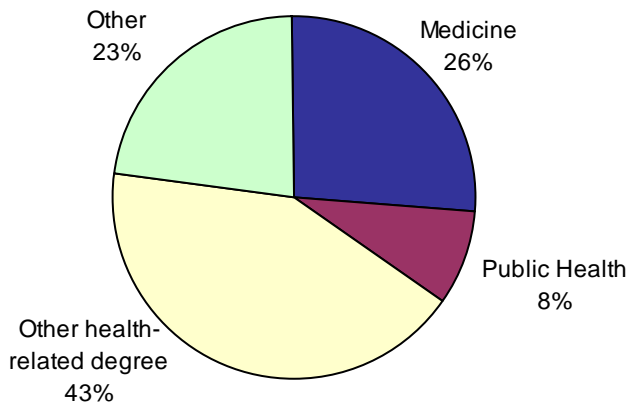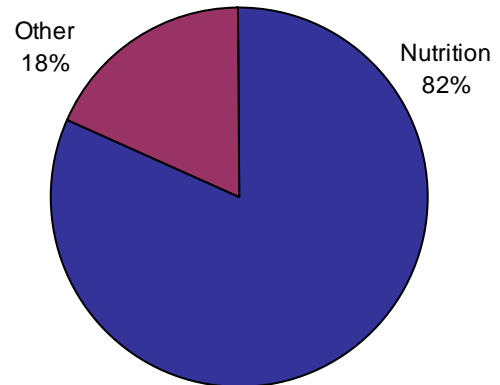
Figure 16, continued. Educational Background of Public Health Employees in North Carolina by Occupational Classification

Laboratory (n=103)

Other
10%

Biology/Chemistry
13%

Business/Law
6%

Other
health-related
degree
71%

Social Work/Mental Health (n=278)

Other
31%

Social Work/
Psychology
69%

Clerical/Administration (n=396)

Business/Law
28%

Other
45%

Information
Technology
12%

Other health-
related degree
15%

Non-Health Professionals (n=56)

Environment/
Engineering
14%

Information
Technology
16%

Other
48%

Business/Law
13%

Biology/ Chemistry
9%
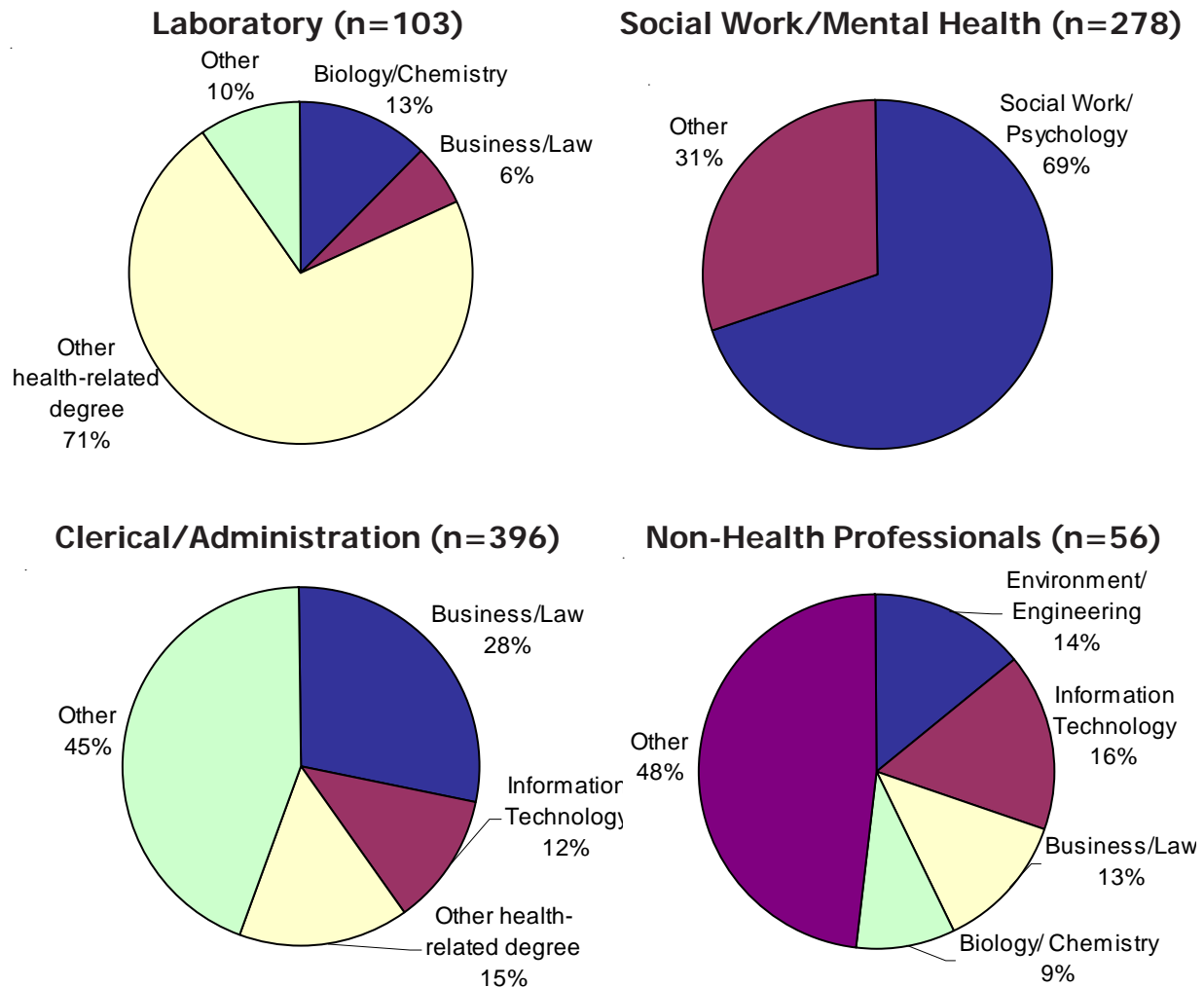
Fortunately, most public health employees in North Carolina have an educational background consistent with their occupational classification (Figure 16).

Who We Are

Figure 17. Training Programs Desired Among Public Health Employees in North Carolina (n=3041)

Who We Are
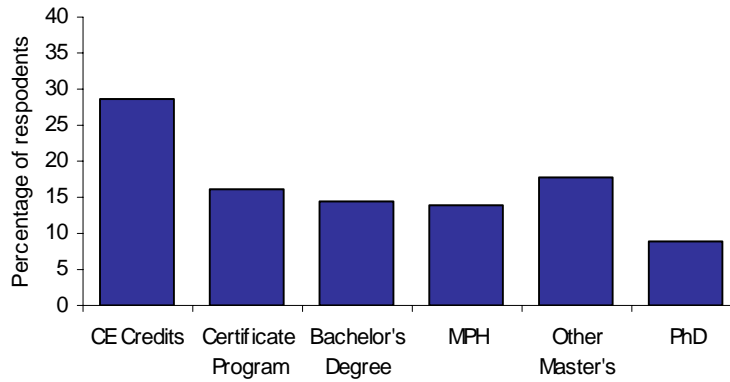
Among Those Whose Highest Degree is a High School Diploma or Associate's Degree (n=1333)
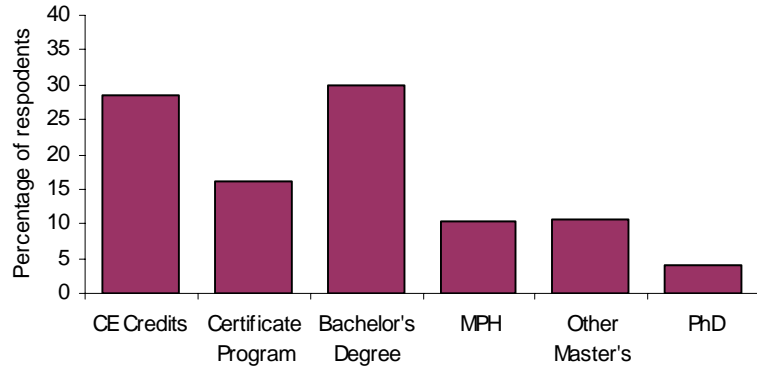
Among Those Whose Highest Degree is a Bachelor's Degree (n=1215)
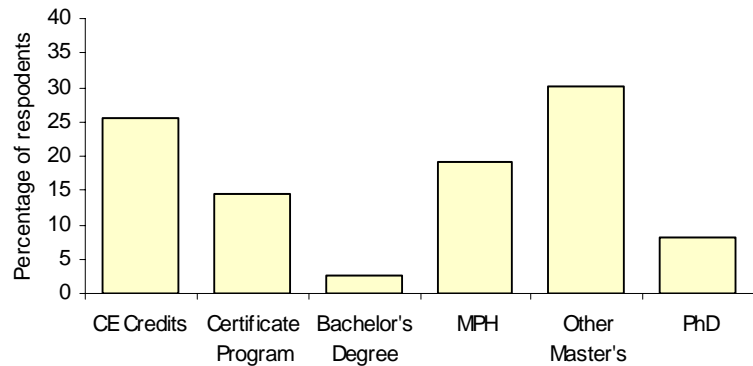
Among Those Whose Highest Degree is a Master's Degree (n=394)
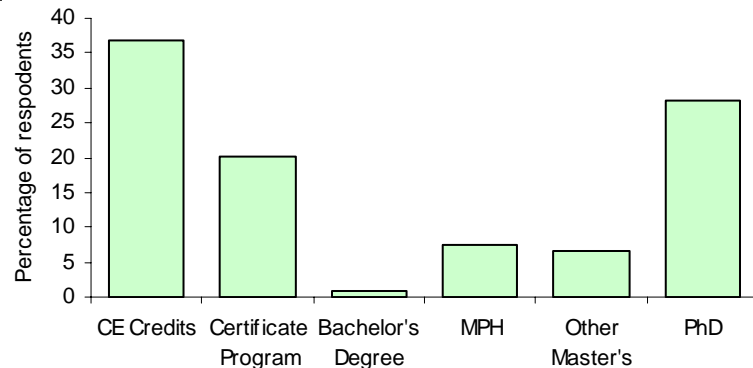
About a third of the workforce indicated the need for continuing education credits. Certificate programs were also indicated as desirable by 15-20% of the workforce, depending on current occupational attainment (Figure 17).

Figure 18. Percent of Public Health Employees in North Carolina Who Have Internet Access at Home and At Work (n=4982, 4943)
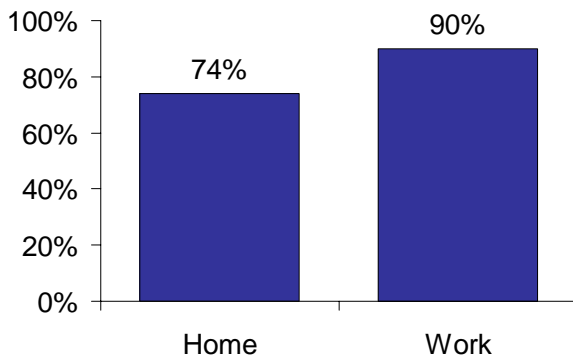
Almost 3 out of 4 public health workers who participated in this assessment have Internet access at home, and 90% report Internet access at work (Figure 18).

Given that this assessment was implemented as an online instrument, these data may not be entirely representative of the North Carolina workforce (see Limitations on pages 42-43).

Who We Are

Figure 19. Course Taken Via the Internet by Public Health Employees in North Carolina (n=4973)

The vast majority of the workforce has never taken a web-based training course (Figure 19).

Yes 18%

No 82%
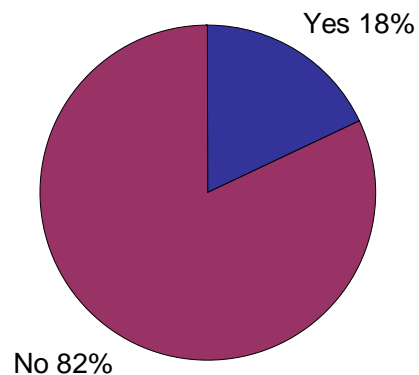
Training Needs

Interpreting Top Priority Training Needs

A color code was used to identify the percent of the workforce who indicated each competency as a training need.

Purple = identified as training need by more than 66% of workforce
Red = identified as training need by 50% to 66% of the workforce
Orange = identified as training need by 33% to 49% of the workforce
Gray = identified as training need by less than 33% of the workforce

For emergency preparedness and response competencies, individuals were asked to respond to the following questions using the scale shown.

My personal confidence to do this activity: 1=Low, 2, 3, 4=High
My level of need for training: 1=Low, 2, 3, 4=High

The level of need for training in emergency preparedness and response competencies was identified by ranking the percent of participants who indicated a low confidence to perform the activity (1 or 2) and a high need for training (3 or 4).

Emergency preparedness competencies were ranked according to the number of employees who indicated each competency as a training need. The 5 competencies with the highest percentages were identified as top emergency preparedness training needs.

For public health core competencies, individuals were asked to respond to the following questions using the scale shown.

This skill is important to my job: 1=Low, 2, 3, 4=High
My level of need for training: 1=Low, 2, 3, 4=High

The level of need for training in core public health competencies was identified by ranking the percent of participants who indicated high importance to their job (3 or 4) and a high need for training (3 or 4).

Public health core competencies were also ranked according to percent, and the 8 competencies with the highest percentages were identified as top core competency training needs.

Statewide Training Needs Data

Number of Responses

Of the 8306 public health employees in North Carolina, 7087 (85%) submitted assessment data by October 1, 2004.

Emergency Preparedness and Response Competencies

Percent of public health employees in North Carolina who indicated low personal confidence to do this activity (1 or 2) and high need for training (3 or 4):

57%   Describe the signs and symptoms of exposure to chemical agents

49%   Describe the signs and symptoms of exposure to biological agents

45%   Describe the incident command system in your community

39%   Use emergency communication equipment

34%   Describe your health department's emergency response plan

Public Health Core Competencies

Percent of public health employees in North Carolina who indicated high importance to job (3 or 4) and high need for training (3 or 4):

42%   Stay informed of public health laws and regulations

35%   Interact effectively with people from diverse cultural, socioeconomic, educational backgrounds

32%   Be aware of amount of each important health problem in your community

32%   Work with interpreters to provide public health services to non-English speaking members

32%   Communicate effectively both in writing and speaking

30%   Maintain the security and confidentiality of personal and public health information

29%   Recognize a disease outbreak in your community or nearby communities

28%   Advocate for public health programs and resources

Occupational Training Needs Data:
Environmental Health and Occupational Safety Employees

Training Needs

Number of Responses

Of the 7087 public health employees in North Carolina who submitted assessment data by October 1, 2004, 598 participants (8%) identified themselves as environmental health and occupational safety employees.

Emergency Preparedness and Response Competencies

Percent of environmental health and occupational safety employees in North Carolina who indicated low personal confidence to do this activity (1 or 2) and high need for training (3 or 4):

60%	Describe the signs and symptoms of exposure to chemical agents
53%	Describe the signs and symptoms of exposure to biological agents
45%	Describe the incident command system in your community
39%	Describe your health department's emergency response plan
28%	Find resources that will help you carry out your responsibilities during an emergency

Public Health Core Competencies

Percent of environmental health and occupational safety employees in North Carolina who indicated high importance to job (3 or 4) and high need for training (3 or 4):

55%	Stay informed of public health laws and regulations
51%	Monitor enforcement of public health laws and regulations
51%	Use regulations to promote health in your community
49%	Explain public health regulations to community
46%	Perform environmental health risk assessments
46%	Recognize a disease outbreak in your community or nearby communities
45%	Collect biological or environmental samples to better understand a health problem
43%	Interact effectively with people from diverse cultural, socioeconomic, educational backgrounds

Occupational Training Needs Data:
Health Educators

Number of Responses

Of the 7087 public health employees in North Carolina who submitted assessment data by October 1, 2004, 296 participants (4%) identified themselves as health educators (either CHES or non-CHES).

Emergency Preparedness and Response Competencies

Percent of health educators in North Carolina who indicated low personal confidence to do this activity (1 or 2) and high need for training (3 or 4):

67%	Describe the signs and symptoms of exposure to chemical agents
59%	Describe the signs and symptoms of exposure to biological agents
56%	Describe the incident command system in your community
52%	Use emergency communication equipment
47%	Describe your health department's emergency response plan

Public Health Core Competencies

Percent of health educators in North Carolina who indicated high importance to job (3 or 4) and high need for training (3 or 4):

46%	Develop long-range plans for health programs
44%	Write proposals to obtain funding
44%	Evaluate programs to ensure that objectives and performance goals are met
42%	Apply principles of group dynamics to develop effective partnerships
39%	Develop a budget
38%	Advocate for public health programs and resources
38%	Use health promotion models to design or evaluate a health intervention program
38%	Establish and maintain community partnerships to maximize use of community assets

Occupational Training Needs Data:
Managers and Policy Analysts

Number of Responses

Of the 7087 public health employees in North Carolina who submitted assessment data by October 1, 2004, 196 participants (3%) identified themselves as managers, directors, and policy analysts.

Emergency Preparedness and Response Competencies

Percent of managers and policy analysts in North Carolina who indicated low personal confidence to do this activity (1 or 2) and high need for training (3 or 4):

60%	Describe the signs and symptoms of exposure to chemical agents
46%	Use emergency communication equipment
46%	Describe the signs and symptoms of exposure to biological agents
35%	Describe the incident command system in your community
28%	Describe your health department's emergency response plan

Public Health Core Competencies

Percent of managers and policy analysts in North Carolina who indicated high importance to job (3 or 4) and high need for training (3 or 4):

48%	Plan and implement effective emergency response services
44%	Stay informed of public health laws and regulations
44%	Use current techniques in decision analysis and health planning
42%	Develop long-range plans for health programs
42%	Formulate policy options
41%	Understand the feasibility and expected outcome of each policy option
39%	Evaluate programs to ensure that objectives and performance goals are met
37%	Create appropriate staff development and training plans for employees

Training Needs

Occupational Training Needs Data: Public Health Nurses

Number of Responses

Of the 7087 public health employees in North Carolina who submitted assessment data by October 1, 2004, 1935 participants (27%) identified themselves as public health nurses.

Emergency Preparedness and Response Competencies

Percent of public health nurses in North Carolina who indicated low personal confidence to do this activity (1 or 2) and high need for training (3 or 4):

67%   Describe the signs and symptoms of exposure to chemical agents

54%   Describe the signs and symptoms of exposure to biological agents

52%   Describe the incident command system in your community

48%   Use emergency communication equipment

37%   Describe your health department's emergency response plan

Public Health Core Competencies

Percent of public health nurses in North Carolina who indicated high importance to job (3 or 4) and high need for training (3 or 4):

53%   Stay informed of public health laws and regulations

42%   Be aware of amount of each important health problem in your community

41%   Recognize a disease outbreak in your community or nearby communities

38%   Work with interpreters to provide public health services to non-English speaking members

37%   Advocate for public health programs and resources

37%   Interact effectively with people from diverse cultural, socioeconomic, educational backgrounds

36%   Identify healthcare service needs in your community

36%   Identify cultural, social, and behavioral factors that affect health problems in your community

Training Needs

Occupational Training Needs Data:
Clinicians and Epidemiologists

Number of Responses

Of the 7087 public health employees in North Carolina who submitted assessment data by October 1, 2004, 197 participants (3%) identified themselves as clinicians and epidemiologists.

Emergency Preparedness and Response Competencies

Percent of clinicians and epidemiologists in North Carolina who indicated low personal confidence to do this activity (1 or 2) and high need for training (3 or 4):

55%	Describe the signs and symptoms of exposure to chemical agents
48%	Describe the incident command system in your community
48%	Use emergency communication equipment
44%	Describe the signs and symptoms of exposure to biological agents
35%	Describe your health department's emergency response plan

Public Health Core Competencies

Percent of clinicians and epidemiologists in North Carolina who indicated high importance to job (3 or 4) and high need for training (3 or 4):

48%	Stay informed of public health laws and regulations
38%	Work with interpreters to provide public health services to non-English speaking members
34%	Be aware of amount of each important health problem in your community
34%	Interact effectively with people from diverse cultural, socioeconomic, educational backgrounds
34%	Identify cultural, social, and behavioral factors that affect health problems in your community
33%	Recognize a disease outbreak in your community or nearby communities
32%	Maintain the security and confidentiality of personal and public health information
31%	Plan and implement effective emergency response services
31%	Advocate for public health programs and resources

Training Needs

EveryWhere. EveryDay. EveryBody.

Occupational Training Needs Data: Nutritionists

Number of Responses
Of the 7087 public health employees in North Carolina who submitted assessment data by October 1, 2004, 268 participants (4%) identified themselves as nutritionists.

Emergency Preparedness and Response Competencies
Percent of nutritionists in North Carolina who indicated low personal confidence to do this activity (1 or 2) and high need for training (3 or 4):

66%   Describe the signs and symptoms of exposure to chemical agents

63%   Describe the signs and symptoms of exposure to biological agents

56%   Describe the incident command system in your community

49%   Use emergency communication equipment

47%   Describe your health department's emergency response plan

Public Health Core Competencies
Percent of nutritionists in North Carolina who indicated high importance to job (3 or 4) and high need for training (3 or 4):

46%   Work with interpreters to provide public health services to non-English speaking members

42%   Identify cultural, social, and behavioral factors that affect health problems in your community

42%   Interact effectively with people from diverse cultural, socioeconomic, educational backgrounds

38%   Stay informed of public health laws and regulations

37%   Adapt healthcare service programs to take into account cultural differences in the population

36%   Advocate for public health programs and resources

36%   Refer clients to other agencies where appropriate to receive personal health services

35%   Provide health promotion and disease prevention information to groups or individuals

Training Needs

Occupational Training Needs Data: Laboratorians

Number of Responses

Of the 7087 public health employees in North Carolina who submitted assessment data by October 1, 2004, 195 participants (3%) identified themselves as laboratorians.

Emergency Preparedness and Response Competencies

Percent of laboratorians in North Carolina who indicated low personal confidence to do this activity (1 or 2) and high need for training (3 or 4):

59%	Describe the signs and symptoms of exposure to chemical agents
50%	Describe the signs and symptoms of exposure to biological agents
46%	Describe the incident command system in your community
39%	Use emergency communication equipment
33%	Perform your communication role in an emergency

Public Health Core Competencies

Percent of laboratorians in North Carolina who indicated high importance to job (3 or 4) and high need for training (3 or 4):

45%	Stay informed of public health laws and regulations
39%	Interact effectively with people from diverse cultural, socioeconomic, educational backgrounds
38%	Work with interpreters to provide public health services to non-English speaking members
35%	Communicate effectively both in writing and speaking
34%	Read scientific literature to keep up-to-date with knowledge of new diseases and risk factors
33%	Recognize a disease outbreak in your community or nearby communities
32%	Be aware of amount of each important health problem in your community
31%	Explain your technical/computer needs to the appropriate people

Training Needs

Occupational Training Needs Data:
Social Work and Mental Health Employees

Number of Responses
Of the 7087 public health employees in North Carolina who submitted assessment data by October 1, 2004, 413 participants (6%) identified themselves as social work and mental health employees.

Emergency Preparedness and Response Competencies
Percent of social work and mental health employees in North Carolina who indicated low personal confidence to do this activity (1 or 2) and high need for training (3 or 4):

62%   Describe the signs and symptoms of exposure to chemical agents

57%   Describe the signs and symptoms of exposure to biological agents

48%   Describe the incident command system in your community

45%   Use emergency communication equipment

35%   Describe your health department's emergency response plan

Public Health Core Competencies
Percent of social work and mental health employees in North Carolina who indicated high importance to job (3 or 4) and high need for training (3 or 4):

37%   Stay informed of public health laws and regulations

35%   Be aware of amount of each important health problem in your community

35%   Interact effectively with people from diverse cultural, socioeconomic, educational backgrounds

34%   Identify cultural, social, and behavioral factors that affect health problems in your community

34%   Identify healthcare service needs in your community

33%   Establish and maintain community partnerships to maximize use of community assets

32%   Coordinate with other groups/agencies to ensure appropriate health care services are provided

32%   Refer clients to other agencies where appropriate to receive personal health services

32%   Work with interpreters to provide public health services to non-English speaking members

32%   Advocate for public health programs and resources

32%   Follow-up with clients to ensure that they have received health or social services

Occupational Training Needs Data:
Clerical and Administrative Employees

Number of Responses

Of the 7087 public health employees in North Carolina who submitted assessment data by October 1, 2004, 1857 participants (26%) identified themselves as clerical and administrative employees.

Emergency Preparedness and Response Competencies

Percent of clerical and administrative employees in North Carolina who indicated low personal confidence to do this activity (1 or 2) and high need for training (3 or 4):

45%   Describe the signs and symptoms of exposure to chemical agents

42%   Describe the signs and symptoms of exposure to biological agents

35%   Describe the incident command system in your community

30%   Use emergency communication equipment

27%   Describe your health department's emergency response plan

Public Health Core Competencies

Percent of clerical and administrative employees in North Carolina who indicated high importance to job (3 or 4) and high need for training (3 or 4):

35%   Maintain the security and confidentiality of personal and public health information

31%   Stay informed of public health laws and regulations

31%   Interact effectively with people from diverse cultural, socioeconomic, educational backgrounds

30%   Communicate effectively both in writing and speaking

25%   Work with interpreters to provide public health services to non-English speaking members

22%   Explain your technical/computer needs to the appropriate people

22%   Refer clients to other agencies where appropriate to receive personal health services

21%   Be aware of amount of each important health problem in your community

Training Needs

Occupational Training Needs Data:
Non-Health Professionals

Number of Responses

Of the 7087 public health employees in North Carolina who submitted assessment data by October 1, 2004, 133 participants (2%) identified themselves as non-health professionals.

Emergency Preparedness and Response Competencies

Percent of non-health professionals in North Carolina who indicated low personal confidence to do this activity (1 or 2) and high need for training (3 or 4):

50%   Describe the signs and symptoms of exposure to chemical agents

49%   Describe the signs and symptoms of exposure to biological agents

39%   Describe the incident command system in your community

32%   Describe your health department's emergency response plan

26%   Use emergency communication equipment

Public Health Core Competencies

Percent of non-health professionals in North Carolina who indicated high importance to job (3 or 4) and high need for training (3 or 4):

39%   Communicate effectively both in writing and speaking

39%   Interact effectively with people from diverse cultural, socioeconomic, educational backgrounds

38%   Stay informed of public health laws and regulations

37%   Be aware of amount of each important health problem in your community

37%   Maintain the security and confidentiality of personal and public health information

36%   Explain public health regulations to community

35%   Collect, summarize, and interpret information relevant to a health issue

33%   Work with interpreters to provide public health services to non-English speaking members

Training Needs

Occupational Training Needs Data:
Other Allied Health Employees

Training Needs

Number of Responses
Of the 7087 public health employees in North Carolina who submitted assessment data by October 1, 2004, 321 participants (5%) identified themselves as employees in other allied health fields.

Emergency Preparedness and Response Competencies
Percent of other allied health employees in North Carolina who indicated low personal confidence to do this activity (1 or 2) and high need for training (3 or 4):

52%   Describe the signs and symptoms of exposure to chemical agents

47%   Describe the incident command system in your community

43%   Describe the signs and symptoms of exposure to biological agents

35%   Use emergency communication equipment

33%   Describe your health department's emergency response plan

Public Health Core Competencies
Percent of other allied health employees in North Carolina who indicated high importance to job (3 or 4) and high need for training (3 or 4):

44%   Stay informed of public health laws and regulations

36%   Interact effectively with people from diverse cultural, socioeconomic, educational backgrounds

35%   Be aware of amount of each important health problem in your community

34%   Maintain the security and confidentiality of personal and public health information

34%   Communicate effectively both in writing and speaking

32%   Recognize a disease outbreak in your community or nearby communities

31%   Identify healthcare service needs in your community

31%   Provide health promotion and disease prevention information to groups or individuals

31%   Work with interpreters to provide public health services to non-English speaking members

Occupational Training Needs Data: Other Employees

Number of Responses
Of the 7087 public health employees in North Carolina who submitted assessment data by October 1, 2004, 678 participants (10%) identified themselves as employees in other occupations.

Emergency Preparedness and Response Competencies
Percent of other employees in North Carolina who indicated low personal confidence to do this activity (1 or 2) and high need for training (3 or 4):

47%   Describe the signs and symptoms of exposure to chemical agents
37%   Describe the incident command system in your community
41%   Describe the signs and symptoms of exposure to biological agents
34%   Use emergency communication equipment
33%   Describe your health department's emergency response plan

Public Health Core Competencies
Percent of other employees in North Carolina who indicated high importance to job (3 or 4) and high need for training (3 or 4):

37%   Interact effectively with people from diverse cultural, socioeconomic, educational backgrounds
37%   Stay informed of public health laws and regulations
36%   Communicate effectively both in writing and speaking
34%   Be aware of amount of each important health problem in your community
33%   Maintain the security and confidentiality of personal and public health information
32%   Work with interpreters to provide public health services to non-English speaking members
29%   Identify cultural, social, and behavioral factors that affect health problems in your community
28%   Recognize a disease outbreak in your community or nearby communities

Training Needs

Methodology

This report summarizes data collected from public health workers across North Carolina. Implementation of the survey focused on employees in the 85 local public health departments.

Health directors and bioterrorism coordinators served as initial points of contact for permission to conduct the assessment at local health departments.   Each health director was asked to provide the current number of employees in his or her department (those in filled positions including every occupational classification of public health worker).   Based on information provided by local health directors, there are 8306 public health workers in local health departments throughout North Carolina. This number varies depending on turnover, attrition, and local funding sources. Although efforts were made to update the number of workers throughout the process of data collection, 8306 represents the size of the workforce at only one point in time. Local health directors were the only source used to determine the total number of employees.

The North Carolina workforce development training needs assessment was developed as part of the CDC's charge to Centers for Public Health Preparedness, to improve the capacity of the public health workforce to prepare for and respond to bioterrorism and other emerging public health threats. The assessment was pilot tested, refined, and implemented across North Carolina in 4 phases (see Figure 20).

Figure 20. Implementation Phases for the Public Health Workforce Needs Assessment

Pilot: May 2001-May 2002
Pilot test in 3 counties *(paper and pencil)*

Phase 1: August 2002-October 2002
PHRST members *(online)*

Phase 2: October 2002-December 2002
Epidemiology Teams *(online)*

Phase 3: November 2002-May 2003
Public health workers in 23 local health departments *(online)*

Phase 4: June 2003-October 2004
Public health workers in all local health departments
(integrated into online learning management system)

Response Rates

The response rate from 3 counties participating in the pilot study phase through September 2001 was 67% (range: 57-78%) of more than 800 public health workers. To achieve this response rate, NCCPHP staff sent multiple reminders via e-mail, mail, and telephone to health department staff to encourage survey completion.

PHRST members and Epidemiology Team members (identified by local health directors) participated in Phases 1 and 2 of the online survey between August and December 2002. Response rates were 95% for PHRST members (36 of 38) and 67% for Epidemiology Team members (507 of 752). Employees at 23 local health departments participated in Phase 3 between November 2002 and May 2003. Response rate for Phase 3 was 41% (646 of 1560).

Phase 4 included the introduction of the online learning management system, the Public Health Workforce Development System (PHWDS) in June 2003. The system is able to to offer direct feedback to the participant once the assessment was submitted, which is an innovative feature. The PHWDS goes beyond merely measuring the workforce's knowledge gaps in emergency preparedness and core public health competencies; it immediately creates an individualized training plan by prioritizing the competencies based on an individual's answers to the survey and then links individuals to competency-matched trainings.

More than 7500 of 8306 (90%) public health workers across North Carolina logged in via the online system and participated in the assessment effort. A total of 6482 individuals (78%) *completed* the online assessment. Those who did not complete the entire assessment were also included in the data analysis.

Response rates for individual local health departments are presented in Figure 21.

> **A full 90% of the public health workforce in North Carolina has logged in to the Public Health Workforce Development System since June 2003.**
>
> **Nearly 80% completed the online training needs self-assessment.**

Figure 21. Responses By Local Health Departments, October 1, 2004

County	Number of Employees	Number of Responses	Response Rate	County	Number of Employees	Number of Responses	Response Rate
Alamance	56	46	82%	Jackson	62	48	77%
Albemarle	146	146	100%	Johnston	93	89	96%
Alexander	34	27	79%	Jones	15	13	87%
Anson	30	23	77%	Lee	46	40	87%
Appalachian	91	70	77%	Lenoir	63	49	77%
Beaufort	43	41	95%	Lincoln	76	67	88%
Bladen	71	56	79%	Macon	47	44	94%
Brunswick	83	74	89%	Madison	20	20	100%
Buncombe	242	191	79%	M-T-W	155	122	79%
Burke	69	56	81%	Mecklenburg	442	368	83%
Cabarrus	95	79	83%	Montgomery	38	35	92%
Caldwell	120	103	86%	Moore	60	55	92%
Carteret	54	44	81%	Nash	135	116	86%
Caswell	47	40	85%	New Hanover	174	99	57%
Catawba	142	108	76%	Northampton	60	60	100%
Chatham	70	70	100%	Onslow	150	134	89%
Cherokee	31	30	97%	Orange	91	79	87%
Clay	21	21	100%	Pamlico	18	16	89%
Cleveland	176	172	98%	Pender	42	32	76%
Columbus	76	65	86%	Person	55	43	78%
Craven	141	107	76%	Pitt	118	95	81%
Cumberland	208	165	79%	R-P-M	116	93	80%
Dare	72	71	99%	Randolph	89	73	82%
Davidson	89	68	76%	Richmond	60	45	75%
Davie	56	42	75%	Robeson	188	188	100%
Duplin	51	42	82%	Rockingham	83	82	99%
Durham	232	185	80%	Rowan	78	53	68%
Edgecombe	117	117	100%	Sampson	43	33	77%
Forsyth	214	8	4%	Scotland	61	49	80%
Franklin	74	73	99%	Stanly	54	43	80%
Gaston	166	148	89%	Stokes	46	36	78%
Graham	12	9	75%	Surry	162	127	78%
Granville-Vance	82	65	79%	Swain	22	22	100%
Greene	28	26	92%	Toe River	137	112	82%
Guilford	462	389	84%	Transylvania	29	22	76%
Halifax	107	107	100%	Union	92	84	91%
Harnett	79	67	85%	Wake	458	29	6%
Haywood	64	50	78%	Warren	48	42	88%
Henderson	69	55	80%	Wayne	135	135	100%
Hertford	62	50	81%	Wilkes	58	45	78%
Hoke	32	27	84%	Wilson	132	99	75%
Hyde	15	12	80%	Yadkin	29	25	86%
Iredell	97	76	78%	**Total**	**8306**	**6482**	**78.0%**

Response Rates

Figure 22. Public Health Workforce Development System Participation by Public Health Workers in North Carolina, June 2003-September 2004
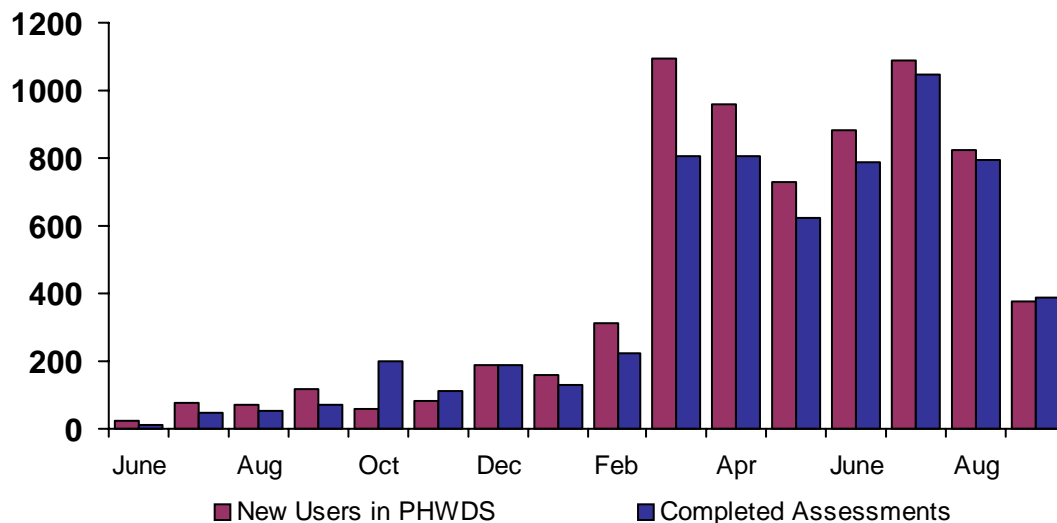
Participation in the learning management system between June 2003 and September 2004 is represented in Figure 22. The increase in participation in the summer and fall of 2004 was likely due to marketing and support efforts, as well as a 75% participation requirement, both described below.

Beginning in fall 2003, the Office of Public Health Preparedness and Response in the North Carolina Division of Public Health required participation by 75% of individuals working in each local health department as part of an agreement addendum between the state and counties regarding bioterrorism funding. This requirement provided incentive for local health department management to support staff to complete the online assessment.

In addition, 2 full-time staff at NCCPHP were available for technical assistance, including computer use troubleshooting and demonstrations in logging on to the system. These staff members were available to present information about the online learning management system, assessment, and the importance of competency-based training programs. Flyers, posters, letters, e-mails, and presentations to local health department staff and administration emphasized the immediate and long-term benefits for participating individuals and agencies.

Response Rates

Limitations

This report focuses on training needs results from the Public Health Workforce Development System assessment, and presents the self-identified top training needs of public health workers employed at local public health departments.

When compared to a report of Local Health Department Staffing and Services Summary for Fiscal Year 2003 from the North Carolina Department of Health and Human Services' State Center for Health Statistics, a total of 8306 public health workers is significantly smaller than the 9480 full-time equivalent employees (not including contract workers) reported for all health departments. However, this number closely matches the 8518 workers reported across occupational groups in total funded full-time positions.[7]

For the purposes of this training needs assessment, each local health director was asked to determine his or her total number of employees at the time of the assessment. Health directors were encouraged to include all staff members (even those not conventionally trained in public health, such as home health and animal control staff), but many did not include various occupational groups in their reported number.

Another limitation is that all data collected are based on self-reports. Moreover, the assessment data gives a snapshot of a single point in time, so conclusions about trend data are not possible. All training needs assessment data are descriptive and do not directly reflect the performance of individuals or the public health workforce as a whole.

A limitation to implementation of this online survey included challenges in computer access and computer literacy. Even with increased computer access across North Carolina over the past decade and recent installation of T-1 lines (high-speed Internet access) in all 85 local health departments, computer access limitations still exist. Some health departments have one computer to serve an entire department or group of employees, so only shared workstations are available. Also, the digital literacy (comfort with and knowledge about computers) of public health workers varies considerably. Workers located in clinics or who conduct home visits may not regularly use computers and may not have access to a computer at work or at home.

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[7] *Local Health Department Staffing and Services Summary Fiscal Year 2003*. North Carolina Department of Health and Human Services Division of Public Health State Center for Health Statistics. April 2004.

Figure 23. Screen Shot of the Public Health Workforce Development System Login Page
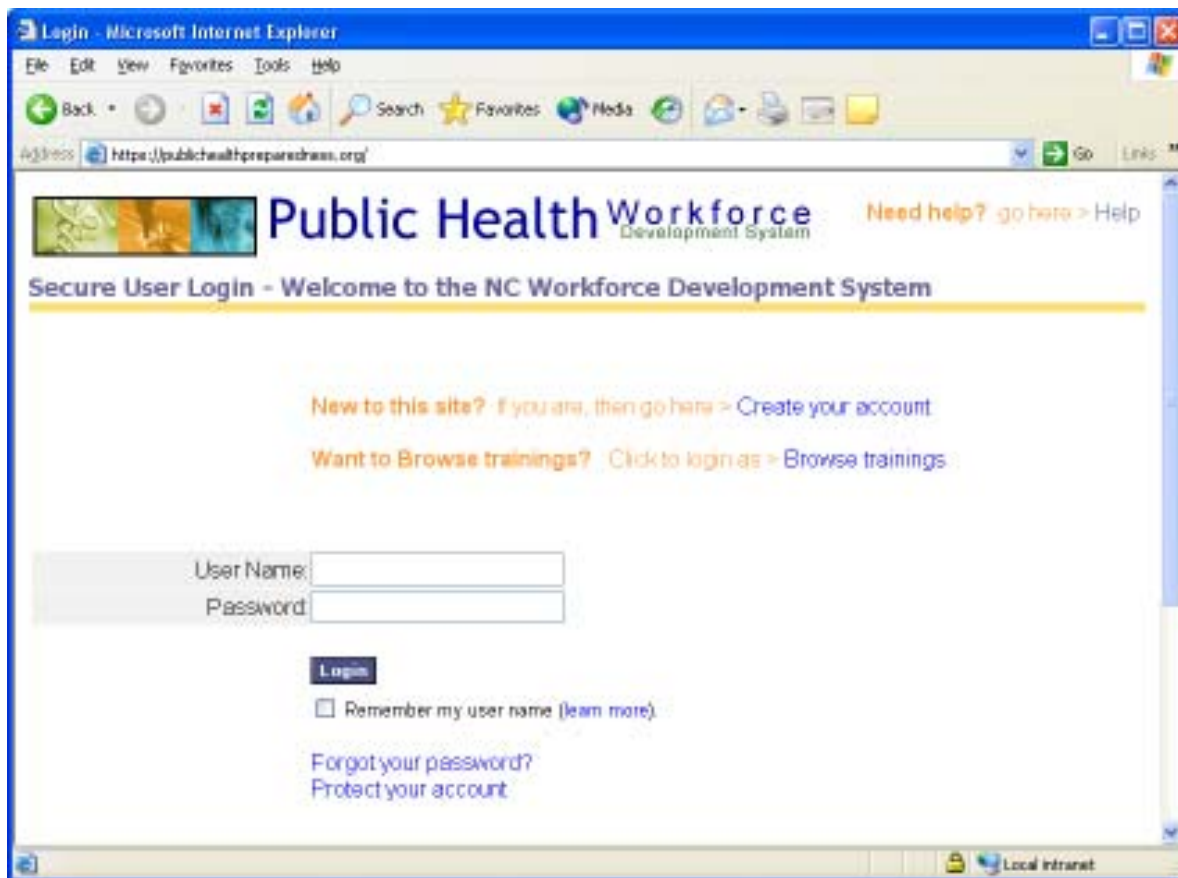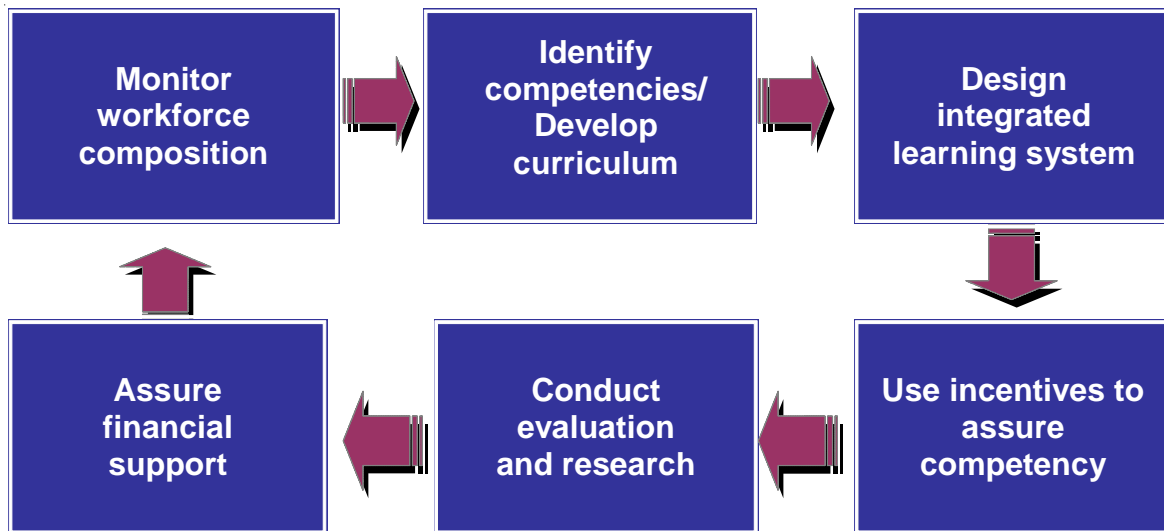

Developed by UNC SPH Instructional and Information Systems, 2002.

To assist with computer use limitations, NCCPHP provided on-site assistance to health departments through presentations and demonstrations of the online survey. In more than 50 local health departments, NCCPHP staff demonstrated the survey at a staff meeting or forum chosen by the health department management, and remained after the demonstration to provide individual assistance with the login process (Figure 23). Of all the outreach and communication activities regarding survey implementation, these in person demonstrations were most effective in improving the response rate. Also helpful were clear, concise, printed instructions for people with varying levels of computer skills and creative one-page printed handouts that provided an overview of the survey, its functions, and its usefulness to individuals and organizations. To further address any issues of computer literacy and computer access, paper copies of the survey were available upon request. Information from paper surveys were then entered into the system by NCCPHP staff.

Limitations

Conclusion

The Taskforce for Public Health Workforce Development, established by CDC and ASTDR, presented six broad strategies for national public health workforce development agenda (Figure 24).[8]

Figure 24. Strategic Elements for Public Health Workforce Development

```
Monitor          →    Identify              →    Design
workforce             competencies/              integrated
composition           Develop                    learning system
  ↑                   curriculum                     ↓

Assure           ←    Conduct               ←    Use incentives to
financial             evaluation                 assure
support               and research               competency
```

Source: Centers for Disease Control and Prevention

Through active partnerships among the North Carolina Division of Public Health, academic institutions, and training resources like those at NCCPHP and the North Carolina Institute for Public Health, our state is working hard to employ effective strategies taking into consideration those recommendations from the CDC, ASTHO, the IOM reports, and the Council on Linkages Between Public Health Practice and Academia.

This report is a first step in gaining a better understanding of the local public health workforce in North Carolina. Knowing the composition of our workforce and the training needs they prioritize are important in order to help us pinpoint appropriate educational access. This information will continue to inform the planning process and other efforts to sustain and improve North Carolina's public health services.

[8] *The Trends Alert: State Employee Workforce Shortage*. National Association of State Personnel Executives. October 2002.

Training priorities will inform the development, improvement, and maintenance of training programs, and will provide data to create customized training plans for local health departments. NCCPHP will use these findings to continue to guide the development of online training modules and training programs. For example, numerous epidemiology and biological agent training modules were created for the NCCPHP website with preliminary findings from the assessment.

NCCPHP will continue to monitor the training needs and track the progress of public health workers in North Carolina. These efforts will help ensure the development and dissemination of effective training options and will work toward improving the awareness, knowledge, and skill levels of public health workers in emergency preparedness and response and core public health competencies.

This work has just begun. Data in this report provide only a snapshot of the public health workforce in North Carolina. It is imperative that the progress of our workforce is tracked over time and that the composition and needs of our public health workforce are summarized on a regular basis. We must also work together across practice and academic institutions to continue to promote and provide competency based training in core public health skills and emergency preparedness and response. These efforts will support not only the people who do the work, but also the people who depend on the public health workforce to keep their community healthy.

> "Knowing is not enough; we must apply. Willing is not enough; we must do."
> Goethe

Assessment of knowledge will continue to be important as we move ahead in public health in the 21st century. Active and valued partnerships between practice and academic units will ensure improved public health trainings, offer customized training programs for individuals, regions, and organizations, and improve knowledge-based planning to address top priorities of the public health workforce in North Carolina.

Conclusion

Acknowledgements

About This Report

This report lists those competencies identified as having the highest need for training, and can be used to help determine the focus of future training activities. Data on all competencies is available upon request.

For more information about these data, including details about the assessment instrument and analysis methods, visit the North Carolina Center for Public Health Preparedness online at www.sph.unc.edu/nccphp/ or call 919-843-5561.

An entire workforce development team at the North Carolina Center for Public Health Preparedness was responsible for survey development, implementation, technical assistance, documentation, presentation, demonstration, communication and marketing, data analysis, and report writing for this project:

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About NCCPHP

The North Carolina Center for Public Health Preparedness (NCCPHP) is located within the North Carolina Institute for Public Health at the University of North Carolina at Chapel Hill's School of Public Health. The NCCPHP primarily serves the states of North Carolina, Tennessee, Virginia, and West Virginia as part of a national network of Centers for Public Health Preparedness.
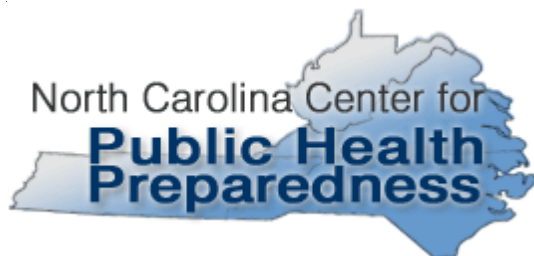
The mission of the network of Centers for Public Health Preparedness is: *To improve the capacity of the public health workforce to prepare for and respond to terrorism and other emerging public health threats.*

North Carolina Public Health
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