

Public Health Workforce Self-Identified Training Needs by Jurisdiction and Job Type

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ABSTRACT

Context: Ensuring adequate and appropriate training of the workforce is a crucial priority for governmental public health. This is particularly important, given the diverse backgrounds of the public health workforce; the vast majority (approximately 83%) do not have formal training in public health, and those that do have formal training in public health have limited training in management and other essential organizational skills.

Objective: The purpose of this article is to identify training needs among public health workers in specific job types and settings.

Design and Participants: This cross section study used 2014 data from the Public Health Workforce Interests and Needs Survey. Qualitative analyses were used to code open-ended responses to questions about training needs. Needs are stratified across job types and jurisdiction.

Results: Eight main themes or skill areas were identified with the largest proportion indicating a need for management/leadership skills (28.2%). The second most frequent need was communication skills (21.3%). Across the 9 job types examined, general management skills were either the first or second training need for 7 job types. Among individuals who already have leadership/management positions, budgeting was the most common training need.

Conclusions: Findings from this study can inform targeted strategies to address training needs for specific types of employees. Such strategies can influence the efficiency and effectiveness of public health efforts and employee satisfaction. As new public health frameworks—like Public Health 3.0 and the Chief Health Strategist—are advanced nationally, it is necessary to ensure that the workforce has the skills and abilities to implement these frameworks.

KEY WORDS: PH WINS, public health, training, workforce

Many of the improvements in life expectancy over the last century can be linked to public health initiatives.¹⁻³ In late 2016, the Centers for Disease Control and Prevention released new data indicating that for the first time in over 2 decades, life expectancy in the United States has decreased.⁴ These new data remind us just

how important public health is for the health of the population, both in terms of the resources dedicated to public health and the workforce that is not only supported by these resources but also essential to providing public health services. Ensuring adequate and appropriate training of the public health workforce has recently been highlighted by the Department of Health & Human Services as a crucial priority.⁵ These needs are important both for individuals being trained to eventually work in public health and for those already employed in public health settings.

To provide consistent training for future public health employees and the current workforce, core competencies were identified by the Council on Linkages between Academia and Practice.⁶ This is particularly important, given the diverse backgrounds of the public health workforce; the vast majority (approximately 83%) do not have formal training in public health, and those that do have formal training in public health have limited training in management and other essential organizational skills.^{7,8} The core competencies consist of 8 domains and 3 tiers (ie, frontline staff/entry level, program management/supervisory

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level, and senior management/executive level). Ensuring an appropriately trained public health workforce is not only important for the effectiveness of the public health mission, it is also a crucial component of maintaining a satisfied workforce and ultimately retaining those workers in the field.⁹ In fact, previous studies have shown that job satisfaction is correlated to supportive training environments.^{9–11}

Although what is known about the training needs of the public health workforce has been growing in recent years, it remains relatively limited. Studies of training needs are often restricted to findings from small samples and convenience samples,^{12,13} focused in a particular area of public health or type of skill (eg, training needs in evidence-based decision making or policy development),^{10,14–17} or are limited to a specific type of employee (eg, health educators, individuals in leadership/management).^{12–14,18} More generalizable findings have been recently conducted using the 2014 Public Health Workforce Interests and Needs Survey (PH WINS) data. For example, a study by Kornfeld and colleagues assessed employee perceptions of their business skills and found that approximately half of state respondents perceived themselves to be proficient in budgeting and approximately a third perceived themselves to be proficient in performing quality improvement and strategic management.¹⁰ These findings are crucial in understanding gaps in state-level employee business skills; however, a more comprehensive understanding of all of the skills that are perceived to be priorities among employees is still needed. Such information will be valuable to developing strategies to train in concordance with perceived needs. Furthermore, given the relationship between perceptions of a supportive training environment and job satisfaction, strategies that meet employees' perceived training needs have the potential to positively impact job satisfaction.^{9–11} Given that ongoing resource constraints within public health agencies will continue to limit how much training and continuing education support can be provided, strategic decisions about training priorities are going to be even more necessary.^{19,20}

This study examines training needs identified by public health employees in state and local public health agencies and stratifies findings across job types. Data from the 2014 PH WINS were used for this study. Findings are presented on the basis of the agency's jurisdiction as it may be valuable to understand the training needs at both the local and state levels for strategic decision making in these organizations. Public health leaders and managers can incorporate findings from this study to develop targeted strategies to address training needs in specific settings as well as to specific types of employees. Such

information and strategies have the potential to influence not only the efficiency and effectiveness of public health efforts but also public health employee satisfaction.

Methods

Data and population studied

Data from the PH WINS data set were used for this study. Details of the methods behind the development of the survey instrument and the sampling methods used in PH WINS are available elsewhere.^{21,22} In brief, PH WINS utilized a complex survey design consisting of 3 unique sampling frames. The first frame was a nationally represented state frame with a 47% response rate and a total of 10 246 state employee responses from 37 of the 50 state health agencies. The 2 remaining sampling frames were convenient samples of local health departments (LHDs), with 1 frame including 14 of the 20 LHD members in the Big Cities Coalition, while the third frame consisted of 50 LHDs in 7 pilot states (Arkansas, Georgia, Mississippi, South Carolina, Vermont, Washington, and Wisconsin). In total, 10 979 LHD employees contributed survey responses.

Question examined

The question analyzed for this study asked was “What (if any) additional skills would you like to gain or strengthen to achieve your career goals?” A total of 1980 individuals provided at least 1 additional skill in response to the question: 1664 state public health employees and 316 local public health employees. Tables present overall findings and are stratified at the state and local levels.

Analysis

A team of 3 coders used a grounded theory approach to code a set of 50 responses, identifying the most prominent needs raised in each response. Each response was assigned up to 2 primary codes. The team discussed the analysis, agreed upon a standard set of codes, individually recoded the 50 responses, and discussed to ensure concordance. The 3 coders then each coded a separate set of 200 responses; a fourth coder coded a subset of each to assess interrater reliability (ranging from 80% to 95%). The 3 coders completed the remainder of the responses. The responses corresponding to the 5 most commonly occurring primary codes were selected for further analysis. Secondary themes were identified for each of these responses to gain more depth. Primary and secondary themes were tabulated and stratified by job classification for state

employees. A total of 9 job categories were used on the basis of job types that could be logically grouped together in targeted strategies to address training needs (eg, business support staff, community-based health worker, environmentalist, epidemiologist, information technology staff, laboratory staff, leadership/management, nurse, other clinical staff). Local responses were not stratified by job category because of the smaller sample size of local respondents. Comments that reported a perceived problem or issue with training at their organization were summarized

separately. All coding was conducted using Atlas.ti (Atlas.ti 7, Scientific Software Development GmbH, 2013, Berlin). This study was deemed exempt from human subjects' considerations by the institutional review board at the institution of the first author.

Results

The majority of respondents were women (1845/2308 or 79.9%) (Table 1). In terms of age of respondents, the largest group of respondents was between 51 and

TABLE 1
Sample Demographics

	Overall (n = 2308)		State (n = 1959)		Local (n = 349)	
	n	%	n	%	n	%
Sex						
Female	1845	79.9	1556	79.4	289	82.8
Male	434	18.8	380	19.4	54	15.5
Age, y						
≤20	3	0.1	1	0.1	2	0.6
21-30	157	6.8	127	6.5	30	8.6
31-40	431	18.6	359	18.3	72	20.6
41-50	570	24.7	377	24.4	93	26.7
51-60	780	33.8	679	34.7	101	29.0
61-65	238	10.3	204	10.4	34	9.7
≥66	90	3.9	77	3.9	13	3.7
Education level						
No bachelor's degree	549	23.8	488	24.9	61	17.5
Bachelor's degree	805	34.9	681	34.8	124	35.5
Master's degree	796	34.5	660	33.7	136	39.0
Doctorate degree	158	6.8	130	6.6	28	8.0
Tenure at agency						
0-5 y	791	34.3	675	34.5	116	33.2
6-10 y	533	23.1	462	23.6	71	20.3
11-15 y	359	15.6	300	15.3	59	16.9
16-20 y	243	10.5	205	10.5	38	10.9
≥21	349	15.1	289	14.8	60	17.2
Role						
Business support staff	414	17.9	359	18.3	55	15.8
Management	369	16.0	306	15.6	63	18.1
Nurse	322	14.0	257	13.1	65	18.6
Community-based health worker	172	7.5	135	6.9	37	10.6
Epidemiologist	145	6.3	120	6.1	25	7.2
Laboratory staff	111	4.8	105	5.4	6	1.7
Environmentalist	105	4.5	84	4.3	21	6.0
Information technologist staff	100	4.3	95	4.8	5	1.4
Other clinical staff	158	6.8	137	7.0	21	4.0
Unspecified	399	17.3	350	17.9	49	14.0

60 years of age (780/2308 or 33.8%), with those aged 31 to 40 years and 41 to 50 years making up the next largest age groups. Approximately, a third of respondents joined their agency within the last 5 years (791/2308 or 34.3%). Demographics did not differ notably between state and local respondents.

Eight main themes or skill areas were identified, with the largest number of respondents indicating a need for management/leadership skills (665 of 2308 respondents or 28.8%) (Table 2). The second most frequent area of need was computer skills (449 of 2308 respondents or 19.5%). Within each main theme numerous specific skills were identified. More specifically, within the *management/leadership* theme, the most common specific skills needed were general management skills ($n = 274/2308$ or 11.6%) and general leadership skills ($134/2308$ or 5.8%), followed by quality assurance/process improvement ($80/2308$ or 3.5%) and strategic management ($68/2308$ or 2.9%). Within the *computer skills* theme, respondents asked for general administrative computer skills ($208/2308$ or 8.8%), general technology skills ($145/2308$ or 6.3%), and database management skills ($66/2308$ or 2.9%). Communication skills were also requested frequently among all respondents. Interpersonal skills ($148/2308$ or 6.4%) was the most common specific skill requested in the *communication skills* theme. A higher percentage of local respondents indicated needing grant writing skills ($15/349$, 4.3%) than those at the state level ($44/1959$ or 2.2%). In particular, the need for grant writing skills was more prominent among local respondents than public risk communication ($10/349$ or 2.9%), which was the second most frequent communication subtheme among state respondents ($72/1,959$ or 3.7%). Approximately 11% of overall respondents requested program-related skills without specifying the type of skills needed ($218/2308$ or 11.1%). Similarly, in the *data analysis* theme, approximately 8% of respondents requested general data analysis and management skills ($191/2308$ or 8.3%). Among respondents who were specific about data analysis skills needed, skills in geographic information systems ($24/2,308$ or 1.0%) and data analysis software ($19/2308$ or 0.8%) were specified. The *finance theme* primarily focused on budgeting skills ($183/2308$ or 7.9%) but more so among local respondents ($34/349$ or 9.7%) than among state respondents ($149/1959$ or 7.6%).

Across the 9 job types examined in state agencies, general management skills were either the first or second training need for 7 of the job types (Table 3). Among state employees who serve in leadership/management positions ($n = 306$), budgeting ($n = 49/306$ or 16%) was the most common training need identified, followed closely by a need for general

management skills ($n = 46/306$ or 15.0%). Unspecified program-specific skills were the most common or second most common skills needed among 4 state-level professions: nurses ($24/257$ or 9.3%); other clinical staff ($16/137$ or 11.7%); community-based health workers ($15/135$ or 11.1%); and environmentalists ($10/84$ or 11.9%). General computer skills were the most common or second most common needs among laboratory staff ($12/105$ or 11.4%), other clinical staff ($14/137$ or 10.2%), and business support staff ($42/359$ or 11.7%). General data analysis and management skills were the most commonly cited needs among epidemiologists ($n = 29/120$ or 24.2%) and information technology staff ($n = 16/95$ or 16.8%) at the state level.

Nearly one-third of all respondents ($743/2308$ or 32.2%) reported a perceived problem or issue with training at their organization (Table 4). The majority of these responses indicated that there are barriers to growth or training within the organization without providing details about the barriers ($n = 218/743$ or 29.3%). The next most frequently cited barriers were lack of support for continuing education ($n = 139/743$ or 18.7%) and lack of support for advanced degrees ($n = 117/743$ or 15.7%). Issues with career development were also reported ($n = 98/743$ or 13.2%). The 2 most commonly discussed issues were the same for both state and local respondents (unspecified barriers to growth training and lack of support for continuing education); however, the third most commonly discussed barrier among state respondents was lack of support for advanced degrees ($n = 104/632$ or 16.5%) whereas among locals, it was language/cultural competency ($17/111$ or 15.3%).

Discussion

Throughout the 20th century, chronic disease was increasingly the major cause of morbidity and mortality within the United States. The ascendance of chronic disease was not the result of a new virus or bacteria but a confluence of social and community factors that include the distribution of social and economic opportunities; the availability of resources and support within our homes, neighborhoods, and communities; the quality of our schooling; the safety of our workplaces; and the cleanliness of our water, food, and air. The shift in the causes of disease in the United States from microbial, physiological, and biological to social and environmental requires an equal shift in the skills and abilities of the public health workforce.²³ For continued improvement in the nation's health, the governmental public health workforce must have the skills to not only do what it currently does well but also influence

TABLE 2
Frequency of Themes and Subthemes by Respondents at the State and Local Levels^a

Themes	Subthemes	Overall (n = 2308)		State (n = 1959)		Local (n = 349)	
		n	%	n	%	n	%
1. Leadership/Management skills	Totals for theme	665	28.8	532	27.2	133	38.1
	General management	274	11.9	223	11.4	51	14.6
	General leadership	134	5.8	106	5.4	28	8.0
	Quality assurance/Process improvement	80	3.5	63	3.2	17	4.9
	Strategic management	68	2.9	54	2.8	14	4.0
	Evidence-based decision making	26	1.1	21	1.1	5	1.4
	Human resources	16	0.7	13	0.7	3	0.9
	Organizational techniques	15	0.6	13	0.7	2	0.6
	Contracts	13	0.6	12	0.6	1	0.3
	Organizational behavior	11	0.5	7	0.4	4	1.1
	Team building	9	0.4	7	0.4	2	0.6
	Negotiation	7	0.3	6	0.3	1	0.3
	Funding	5	0.2	2	0.1	3	0.9
	Health care administration	5	0.2	3	0.2	2	0.6
	Business analysis	1	0.0	1	0.1	0	0.0
Facility management	1	0.0	1	0.1	0	0.0	
2. Computer skills	Totals for theme	449	19.5	372	19.0	77	22.1
	General administrative computer	203	8.8	162	8.3	41	11.7
	General technology	145	6.3	125	6.4	20	5.7
	Database management	66	2.9	55	2.8	11	3.2
	Software (unspecified)	10	0.4	10	0.5	0	0.0
	Informatics	9	0.4	6	0.3	3	0.9
	Microsoft Office (Word and PowerPoint)	9	0.4	7	0.4	2	0.6
	Routine health information systems	3	0.1	3	0.2	0	0.0
	Coding	2	0.1	2	0.1	0	0.0
	Graphic design	2	0.1	2	0.1	0	0.0
3. Communication skills	Totals for theme	424	18.4	351	17.9	73	20.9
	Interpersonal skills	148	6.4	123	6.3	25	7.2
	Public risk communication	82	3.6	72	3.7	10	2.9
	Public speaking	61	2.6	54	2.8	7	2.0
	Grant writing	59	2.6	44	2.2	15	4.3
	General writing	34	1.5	27	1.4	7	2.0
	Social media	21	0.9	18	0.9	3	0.9
	Community outreach	11	0.5	5	0.3	6	1.7
	Marketing	5	0.2	5	0.3	0	0.0
	Writing for publication	3	0.1	3	0.2	0	0.0
	4. Program-related skills	Totals for theme	283	12.3	235	12.0	48
General program-specific (unspecified)		191	8.3	160	8.2	31	8.9
Epidemiology		21	0.9	18	0.9	3	0.9
Core public health		9	0.4	8	0.4	1	0.3
Workplace and laboratory safety		8	0.3	7	0.4	1	0.3
Biostatistics		7	0.3	2	0.1	5	1.4

(continues)

TABLE 2
Frequency of Themes and Subthemes by Respondents at the State and Local Levels^a (Continued)

Themes	Subthemes	Overall (n = 2308)		State (n = 1959)		Local (n = 349)	
		n	%	n	%	n	%
	Environmental health	7	0.3	5	0.3	2	0.6
	Maternal, child, and reproductive health	9	0.4	7	0.4	2	0.6
	Nutrition/WIC	5	0.2	4	0.2	1	0.3
	Health care reform	4	0.2	3	0.2	1	0.3
	Medical coding and billing	4	0.2	4	0.2	0	0.0
	Disease surveillance	3	0.1	3	0.2	0	0.0
	Emergency preparedness	3	0.1	3	0.2	0	0.0
	Health systems	3	0.1	3	0.2	0	0.0
	Biology	2	0.1	2	0.1	0	0.0
	Case management	2	0.1	2	0.1	0	0.0
	Chronic disease	2	0.1	2	0.1	0	0.0
	Social determinants of health	2	0.1	2	0.1	0	0.0
	Capacity building	1	0.0	0	0.0	1	0.3
5. Data analysis skills	Totals for theme	234	10.1	200	10.2	34	9.7
	General data analysis and management	191	8.3	162	8.3	29	8.3
	Geographic information systems	24	1.0	22	1.1	2	0.6
	Data analysis software	19	0.8	16	0.8	3	0.9
6. Finance skills	Totals for theme	214	9.3	176	9.0	38	10.9
	Budgeting	183	7.9	149	7.6	34	9.7
	General finance	16	0.7	14	0.7	2	0.6
	Grant management	14	0.6	12	0.6	2	0.6
	Auditing	1	0.0	1	0.1	0	0.0
7. Policy skills	Totals for theme	180	7.8	145	7.4	35	10.0
	Policy development and advocacy	123	5.3	97	5.0	26	7.4
	General policy	47	2.0	38	1.9	9	2.6
	Legislation	7	0.3	7	0.4	0	0.0
	Health equity	3	0.1	3	0.2	0	0.0
8. Research skills	Totals for theme	98	4.2	82	4.2	16	4.6
	Program evaluation	52	2.3	42	2.1	10	2.9
	General research	29	1.3	25	1.3	4	1.1
	Needs assessment	5	0.2	4	0.2	1	0.3
	Health impact assessment	3	0.1	3	0.2	0	0.0
	Investigation	3	0.1	3	0.2	0	0.0
	Program monitoring	3	0.1	3	0.2	0	0.0
	Program design	2	0.1	1	0.1	1	0.3
	Academic research partnerships	1	0.0	1	0.1	0	0.0

Abbreviation: WIC, Special Supplemental Nutritional Program for Women, Infants, and Children.

^aMain themes are listed in the order of frequency. n = the number of respondents who listed at least 1 skill. % refers to percentage out of total 1980 responses. Comments could be assigned to more than 1 subtheme.

TABLE 3

Ten Most Frequent Training Needs Subthemes Mentioned by Selected Respondent Job Category, State Level

Main Themes	Most Common Subthemes Within Each Job Category				
	Business Support Staff (n = 359)	Community-Based Health Worker (n = 135)	Environmentalist (n = 84)	Epidemiologist (n = 120)	Information Technology Staff (n = 95)
Management/Leadership skills	2. General management (n = 40; 11.1%) 7. General leadership (n = 17; 4.7%)	2. General management (n = 12; 8.9%) 3. General leadership (n = 10; 7.4%) 4. Strategic management (n = 9; 6.7%)	2. General management (n = 8; 9.5%) 5. General leadership (n = 5; 6.0%)	2. General management (n = 19; 15.8%) 7. General leadership (n = 8; 6.7%)	3. General management (n = 11; 11.6%) 6. General leadership (n = 4; 4.2%) 7. Strategic management (n = 3; 3.2%)
Communication skills	3. Interpersonal skills (n = 29; 8.1%) 10. Public speaking (n = 13; 3.6%)	4. Public speaking (n = 9; 6.7%) 8. Social media (n = 6; 4.4%)	6. General writing (n = 4; 4.8%)	8. Public risk communication (n = 6; 5.0%)	4. Interpersonal skills (n = 9; 9.5%)
Computer skills	1. General computer (n = 42; 11.7%) 9. Database management (n = 14; 3.9%) 6. General technology (n = 18; 5.0%)	7. General computer (n = 8; 5.9%) 7. General technology (n = 8; 5.9%)	4. General technology (n = 6; 7.1%) 5. General computer (n = 5; 6.0%)	3. General technology (n = 12; 10.0%)	1. General technology (n = 18; 18.9%) 5. General computer (n = 7; 7.4%) 6. Database management (n = 4; 4.2%)
Program-related skills	5. General program-specific (n = 21; 5.8%)	1. General program-specific (n = 15; 11.1%)	1. General program-specific (n = 10; 11.9%) 5. Language/Cultural competency (n = 5; 6.0%)	6. General program-specific (n = 9; 7.5%) 8. Epidemiology (n = 6; 5.0%)	5. General program-specific (n = 7; 7.4%)
Data analysis skills	8. General data analysis and management (n = 16; 4.5%)	8. Budgeting (n = 6; 4.4%) 4. Policy development and advocacy (n = 9; 6.7%)	3. General data analysis and management (n = 7; 8.3%)	1. General data analysis and management (n = 29; 24.2%) 4. Geographic information systems (n = 11; 9.2%) 8. Data analysis software (n = 6; 5.0%)	2. General data analysis and management (n = 16; 16.8%)
Finance skills	4. Budgeting (n = 24; 6.7%)	8. Budgeting (n = 6; 4.4%)	4. Budgeting (n = 6; 7.1%)		7. Budgeting (n = 3; 3.2%)
Policy skills		4. Policy development and advocacy (n = 9; 6.7%)	5. Policy development and advocacy (n = 5; 6.0%)	8. General policy (n = 6; 5.0%)	
Research skills				5. Program evaluation (n = 10; 8.3%)	

(continues)

TABLE 3**Ten Most Frequent Training Needs Subthemes Mentioned by Selected Respondent Job Category, State Level (Continued)****Most Common Subthemes Within Each Job Category**

Main Themes	Leadership/Management (n = 306)			Nurse (n = 257)	Other Clinical Staff (n = 137)
	Laboratory Staff (n = 105)				
Management/Leadership skills	1. General management (n = 13; 12.4%) 5. General leadership (n = 4; 3.8%)	2. General management (n = 46; 15.0%) 5. General leadership (n = 20; 6.5%) 5. Quality assurance/ Process improvement (n = 20; 6.5%) 7. Strategic management (n = 17; 5.6%)	1. General management (n = 28; 10.9%) 6. Quality assurance/ improvement (n = 13; 5.1%) 8. General leadership (n = 11; 4.3%)	4. General management (n = 12; 8.8%) 6. General leadership (n = 8; 5.8%)	
Communication skills	4. Interpersonal skills (n = 6; 5.7%)	6. Interpersonal skills (n = 18; 5.9%)	3. Public risk communication (n = 18; 7.0%) 4. Interpersonal skills (n = 17; 6.6%)	2. Interpersonal skills (n = 14; 10.2%) 5. Public speaking (n = 9; 6.6%) 6. Public risk communication (n = 8; 5.8%)	
Computer skills	2. General computer (n = 12; 11.4%) 3. General technology (n = 9; 8.6%)	5. General computer (n = 20; 6.5%) 7. General technology (n = 17; 5.6%)	6. General computer (n = 13; 5.1%)	2. General computer (n = 14; 10.2%) 3. General technology (n = 13; 9.5%)	
Program-related skills	3. General program- specific (n = 9; 8.6%) 5. Clinical skills (n = 4; 3.8%)	4. General program- specific (n = 23; 7.5%)	2. General program- specific (n = 24; 9.3%)	1. General program- specific (n = 16; 11.7%)	
Data analysis skills	5. General data analysis and management (n = 4; 3.8%)	5. General data analysis and management (n = 20; 6.5%)	6. General data analysis and management (n = 13; 5.1%)	4. General data analysis and management (n = 12; 8.8%)	
Finance skills	5. Budgeting (n = 4; 3.8%)	1. Budgeting (49; 16.0%)	5. Budgeting (15; 5.8%)	6. Budgeting (n = 8; 5.8%)	
Policy skills		3. Policy development and advocacy (n = 31; 10.1%)	7. Policy development and advocacy (n = 12; 4.7%)		
Research skills					

TABLE 4
Training Issues Identified^a

Training Issues Themes	Overall (n = 743)		State (n = 632)		Local (n = 111)	
	n	%	n	%	n	%
Barriers to growth/training	218	29.3	193	30.5	25	22.5
Lack of support for continuing education	139	18.7	111	17.6	28	25.2
Lack of support for advanced degrees	117	15.7	104	16.5	13	11.7
Career development	98	13.2	83	13.1	15	13.5
Certification	63	8.5	50	7.9	13	11.7
Language/Cultural competency	60	8.1	43	6.8	17	15.3
Collaborative partnerships	55	7.4	48	7.6	7	6.3
Reimbursement	38	5.1	33	5.2	5	4.5
Clinical skills	29	3.9	26	4.1	3	2.7
Topical seminars	24	3.2	20	3.2	4	3.6
Cross-training	22	3.0	20	3.2	2	1.8
Benefits received	13	1.7	12	1.9	1	0.9
Train the trainer	7	0.9	7	1.1	0	0.0
Science, technology, engineering, and mathematics	1	0.1	1	0.2	0	0.0

^an = the number of respondents who discussed training issues/barriers. % refers to number of responses in each theme out of the total responses in that column (overall/state/local) that denoted issues/barriers. Comments could be assigned to more than 1 theme.

other sectors toward achieving mutually beneficial population health goals requiring the workforce to link perspectives and learn from other specialties to tackle today's pressing community health challenges.

While these skills may not be currently prioritized in ongoing training offerings or in most curricula in schools and programs of public health, these data demonstrate a clear demand for leadership/management skills, informatics skills (computer and data themes), and financial management skills. Furthermore, these findings align well with the quantitative findings from PH WINS²¹ and other studies that have identified similar training and skills-building needs (eg, systems thinking, communicating persuasively, change management, information and analytics, problem solving, and working with diverse populations).¹³

Strengths and limitations

This study has numerous strengths and limitations. First, the qualitative data used in this analysis are among the most recent opinions of the public health workforce and they provide valuable insight about the needs of current public health workers. However, training needs provided in open-ended responses were often general and did not always provide descriptions or specifics. Furthermore, it is not possible to differentiate the importance of the need(s) to the respondent

Implications for Policy & Practice

- As new public health frameworks—like Public Health 3.0 and the Chief Health Strategist—are advanced nationally, it is necessary to ensure that the workforce has the skills and abilities to implement these frameworks. Those skills and abilities are precisely what are identified here.
- It is the responsibility of funders (federal and philanthropic), schools and programs of public health, national training centers, and state and local health department leaders to ensure that the training needs expressed by the workforce here and in previous studies are met. Otherwise, without a workforce with the necessary preparation to meet a changing environment, the health of the nation not only risks continued improvements, it risks decline.

(all needs mentioned were treated with the same level of importance). In addition, the PH WINS was a cross-sectional survey and provides information only at 1 point in time. Finally, as described in other peer-reviewed articles, there are limitations in using the PHWINS data due to the potential of nonresponse bias.²²

References

1. Centers for Disease Control and Prevention. Ten great public health achievements United States, 1900-1999. *MMWR Morb Mortal Wkly Rep.* 1999;48(12):241-243.

2. Brown TT. How effective are public health departments at preventing mortality? *Econ Hum Biol.* 2014;13:34-45.
3. Ensign K. The value of public health. *J Public Health Manag Pract.* 2017;23(2):195-197.
4. Xu J, Murphy SL, Kochanek KD, Arias E. Mortality in the United States, 2015. NCHS Data Brief No. 267. <https://www.cdc.gov/nchs/data/databriefs/db267.pdf>. Published 2016. Accessed March 12, 2017.
5. Honore' PA, Scott W. *Priority Areas for Improvement of Quality in Public Health.* Washington, DC: US Department of Health & Human Services Office of the Assistant Secretary for Health; 2010. <http://www.phf.org/resourcestools/Documents/ImproveQuality2010.pdf>. Accessed March 12, 2017.
6. Council on Linkages Between Academia and Practice. Core competencies for public health professionals, 2014. http://www.phf.org/resourcestools/Documents/Core_Compencies_for_Public_Health_Professionals_2014June.pdf. Published 2014. Accessed March 7, 2017.
7. Koo D, Miner K. Outcome-based workforce development and education in public health. *Annual Rev Public Health.* 2010;31:253-269.
8. Leider JP, Harper E, Bharthapudi K, Castrucci BC. Educational attainment of the public health workforce and its implications for workforce development. *J Public Health Manag Pract.* 2015;21(suppl 6):S56-S68.
9. Harper E, Castrucci BC, Bharthapudi K, Sellers K. Job satisfaction: a critical, understudied facet of workforce development in public health. *J Public Health Manag Pract.* 2015;21(suppl 6):S46-S55.
10. Kornfield J, Sznol J, Lee D. Characterizing the business skills of the public health workforce: practical implications from the Public Health Workforce Interests and Needs Survey (PH WINS). *J Public Health Manag Pract.* 2015;21(suppl 6):S159-S167.
11. Rowden RW. The relationship between workplace learning and job satisfaction in U.S. small to midsized business. *Human Resour Dev Q.* 2002;13(4):407-425.
12. Allegrante JP, Moon RW, Auld E, Gebbie KM. Continuing-education needs of the currently employed public health workforce. *Am J Public Health.* 2001;91(8):1230-1234.
13. Kaufmann NJ, Castrucci BC, Pearsol J, et al. Thinking beyond the silos: emerging priorities in workforce development for state and local government public health agencies. *J Public Health Manag Pract.* 2014;20(6):557-565.
14. Jacob RR, Baker EA, Allen P, et al. Training needs and supports for evidence-based decision making among the public health workforce in the United States. *BMC Health Serv Res.* 2014;14(564):11-12.
15. Wright K, Rowitz L, Merkle A, et al. Competency development in public health leadership. *Am J Public Health.* 2000;90(8):1202-1207.
16. Castrucci B, Leider JP, Sellers K. Perceptions regarding importance and skill at policy development among public health staff. *J Public Health Manag Pract.* 2015;21(suppl 6):S141-S150.
17. Honoré PA, Costich JF. Public health financial management competencies. *J Public Health Manag Pract.* 2009;15(4):311-318.
18. Ye J, Leep C, Robin N, Newman S. Perception of workforce skills needed among public health professionals in local health departments: staff versus top executives. *J Public Health Manag Pract.* 2015;21(suppl 6):S151-S158.
19. Willard R, Shah GH, Leep C, Ju L. Impact of the 2008-2010 economic recession on local health departments. *J Public Health Manag Pract.* 2012;18(2):106-114.
20. Association of State and Territorial Health Officials. *Budget Cuts Continue to Affect the Health of Americans.* May 2011 Update. Arlington, VA: Association of State and Territorial Health Officials; 2011.
21. Sellers K, Leider JP, Harper E, et al. The public health workforce interests and needs survey: the first national survey of state health agency employees. *J Public Health Manag Pract.* 2015;21(suppl 6):S13-S27.
22. Leider JP, Bharthapudi K, Pineau V, Liu L, Harper E. The methods behind PH WINS. *J Public Health Manag Pract.* 2015;21(suppl 6):S28-S35.
23. Freiden TR. Asleep at the switch: local public health and chronic disease. *Am J Public Health.* 2004;94(12):2059-2061.