Assessing the Knowledge, Skills, and Abilities of Public Health Professionals in Big City Governmental Health Departments

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ABSTRACT

Objective: To identify essential knowledge, skills, and abilities (KSAs) for and characterize gaps in KSAs of professionals working in large, urban health departments.

Design: A survey was disseminated to potentially eligible supervisors within 26 of 28 health departments in the largest, most urban jurisdictions in the country. A supervisor was eligible to participate if he or she supervised at least 1 staff member whose highest level of education was a master's degree.

Setting and Participants: A total of 645 eligible supervisors participated in the workforce survey for a response rate of 27.1% and cooperation rate of 55.2%.

Main Outcome Measure(s): Supervisors were asked to rate the importance of KSAs to their masters-level staffs' work and indicate their staffs' proficiency.

Results: Fifty-eight percent of supervisors reported supervising staff with a master of public health/master of science in public health degree. More than 30% of supervisors indicated that all of the 30 KSAs were essential. Four of the top 10 KSAs rated as essential by supervisors pertained to the ability to communicate. The top skills gaps perceived by supervisors were professional staffs' ability to apply quality improvement concepts to their work (38.0%), understanding of the political system (37.7%), and ability to anticipate changes (33.8%).

Conclusions: Public health practitioners receive training in methods, theories, and evidence-based approaches, yet further investment in the workforce is necessary to advance population health. A focus should be placed developing strategic skills rather than advancing narrow specialties. Findings from this research can guide the creation and implementation of training curricula and professional development programs offered within local health departments or targeted to their staff, as well as satisfaction of accreditation requirements. By focusing on building strategic skills, we can ensure a public health workforce that is equipped with the KSAs necessary to practice Public Health 3.0 and leaders who are able to serve as their communities' chief health strategists.

KEY WORDS: competencies, local health departments, public health workforce, workforce development

There are limited data on the public health workforce comparable across states, agencies, and job classifications. In 2014, the Public Health Workforce Interests and Needs Survey (PH WINS), the first national survey of the public health workforce, sought to fill this data gap and provide information to workforce planners and training

professionals. Included in PH WINS was an assessment of training needs, which found the areas of greatest need to be "policy analysis and development, business and financial management, systems thinking and social determinants of health, evidence-based public health practice, and collaborating with and engaging diverse communities."¹ These data contribute much

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needed information, but PH WINS was designed only to provide the perspective of the employees about their own training needs. It may be equally important to solicit similar information from managers.

A study conducted by one local health department, the New York City Department of Health and Mental Hygiene (NYC DOHMH), sought similar information but from an alternate perspective. In its study, the NYC DOHMH surveyed both hiring managers and staff to understand their assessment of how well prepared master of public health graduates were for their first positions at the health department. Their results illustrated that many master of public health graduates enter their first positions “incompletely prepared” in regard to communications, policy development, leadership, and financial management, as well as with gaps in knowledge and skills related to quantitative data analyses, scientific writing, and management.²

The data provided by the NYC DOHMH study elucidate workforce development challenges from the perspective of 1 local health department. However, the generalizability of these findings is limited. Therefore, the present study contributes to the existing workforce literature by adding information from a survey of 26 public health departments in large, urban areas in the United States. Specifically, the study aims are to (1) identify the essential knowledge, skills, and abilities (KSAs) that professional staff working in large, urban health departments lack as perceived by their supervisors; and (2) characterize gaps in the KSAs of these professionals to perform programmatic work (ie, to “practice” local public health) in large, urban jurisdictions.

Methods

Survey development

Project staff convened an advisory committee of subject matter experts in public health practice and workforce research and training under whose guidance a survey instrument to assess the preparation of professional staff for local governmental public health practice was developed. The survey instrument built upon a prior survey of hiring managers conducted by the NYC DOHMH in 2011.² A list of KSAs was adapted from the PH WINS survey.¹ The survey required respondents to rate the importance of 30 KSAs to their masters-level staffs’ day-to-day work and to indicate their staffs’ current proficiency level for each KSA. Managers were asked whether each KSA was “essential,” “somewhat important,” “not at all important,” or “not applicable.” For skills that they deemed either “somewhat important” or “essential,”

managers were asked about their staffs’ current ability to perform the skill (eg, “unable to perform,” “beginner/novice,” “proficient,” or “expert”). Respondents were also asked to report—if they knew—the degrees (eg, MPH, Master of science in nursing, master of business administration) possessed by their masters-level staff. In addition, the survey instrument included questions about supervisor (ie, the respondents) demographics, education, and training (see Supplemental Digital Content Material—Survey Instrument, available at <http://links.lww.com/JPHMP/A422>).

The survey instrument was piloted via phone with several supervisors from the Big Cities Health Coalition (BCHC) member health departments. The BCHC is a forum for the leaders of America’s largest metropolitan health departments to exchange strategies and jointly address issues to promote and protect the health and safety of the 55 million people they serve; at the time of this assessment, 28 large, urban US health departments were members of the BCHC.³ Cognitive interviews, a verbal technique of asking scripted and spontaneous probing questions after respondents have completed the survey, were conducted to assess whether questions were interpreted as intended and consistently across health departments. Cognitive interviewees were purposefully and conveniently sampled to ensure size and geographic diversity of health departments. Based on feedback from the cognitive interviews, the survey instrument was revised prior to full administration.

Participants

The lead health official (eg, health officer, commissioner, or director) for each BCHC member health department consented to agency participation and designated a project liaison within the organization to assist with survey recruitment. Two BCHC member health departments declined to participate at the agency level resulting in a total of 26 BCHC member health departments from which eligible survey respondents were recruited.

Using agency databases, each departmental liaison identified and provided a list of employees who supervised at least 1 staff member whose highest level of education was a master’s degree. These supervisors received automated e-mail invitations via Qualtrics to participate in the anonymous Web-based survey. The survey instrument included screening questions to eliminate any supervisors who did not meet the inclusion criterion. Departmental liaisons notified supervisors that their health department would be participating on an agency level in the survey; participation on the part of individual supervisory staff

was voluntary. Liaisons served as an internal point of contact for any questions, sent e-mail reminders, and at their own discretion, promoted participation in agency meetings or via individual calls.

Initial survey invitations were sent via Qualtrics and the first reminder was sent 1 week after survey dissemination. Three additional reminders were sent within the 6 weeks the survey was open. Interim response rates were shared with departmental liaisons and leadership, and in turn, with supervisors, to promote increased participation. Because of technical difficulties, delivery of the survey invitation was delayed in 2 health departments. In addition, 1 health department was actively engaged in an agency-wide response to the 2016 Zika outbreak, which impacted its ability to promote the survey internally. To ensure all respondents had adequate time to complete the survey, we extended the due date for all participants.

Of 2789 surveys distributed, 1192 (43%) individuals opened the survey link and 1169 (42%) consented to participate. While a large portion of survey recipients were willing to participate, many were screened out because they either did not supervise staff (n = 119) or did not supervise masters-level staff (n = 289) thereby impacting the response rate. Respondents were also excluded from the study (n = 116) if they did not answer all of the questions about KSAs and their staffs' proficiency levels (ie, they did not meet minimum partial completion requirement). The final study sample was n = 645 for a response rate of 27.1%.* We had a cooperation rate† of 55.2%, where the cooperation rate represents the percentage of survey recipients who were willing to participate in the survey (ie, those who cooperated by opening the link and consenting to participate) among the total number of eligible or potentially eligible respondents to whom the survey was sent.

Institutional review board

The NYC DOHMH's Institutional Review Board (IRB) reviewed this study's protocol and determined that this study was exempt from the federal regulations under 45 CFR §46.101 (b)(2).

*The response rate represents the proportion of supervisors who fully or partially completed the survey out of the number of eligible supervisors to whom the survey was distributed. Respondents had to complete at minimum all of the skill/knowledge questions to be included as a "partial completion."

†The survey cooperation rate is higher than the response rate because some individuals were willing and consented to participate in the survey but did not meet inclusion criteria and therefore did not complete the survey.

TABLE 1
Training and Education of Survey Respondents

	% (N)
Education	
High school or less	0.7 (4)
Associate's degree	1.3 (8)
Bachelor's degree	18.7 (113)
Master's degree	59.0 (357)
Doctoral degree	17.4 (105)
Other	3.0 (18)
Public health training	
Training in public health (% yes)	47.1 (288)
Training in public health from a CEPH-accredited Program or School of Public Health (% yes)	80.6 (229)
Degree/certificate/training earned from a CEPH-accredited program or school of public health^a	
Bachelor's degree	4.6 (13)
Master's degree	61.3 (174)
Doctoral degree	9.5 (27)
Dual degree	4.6 (13)
Preventative medicine residency	2.1 (6)
Certificate program	10.9 (31)
Other public health training	7.0 (20)
Area of study	
Other	19.4 (55)
Epidemiology	18.7 (53)
Health behavior, education, and promotion	17.6 (5)
General public health	14.8 (42)
Health policy and management	7.4 (21)
Environmental health sciences	6.7 (19)
Maternal and child health	4.6 (13)
Health services administration	4.6 (13)
Global health	3.2 (9)
Emergency preparedness	3.2 (9)
Informatics	0.7 (2)
Mental health	0.4 (1)
Biostatistics	0.4 (1)

Abbreviation: CEPH, Council on Education for Public Health.
^aTotal number of degrees obtained by respondents and not total number of participants.

Data analysis

Descriptive statistics were calculated for all variables using STATA version 14. Means and standard deviations were used for continuous variables with a normal distribution. Nonparametric descriptive statistics were depicted using medians and interquartile ranges (IQRs). Proportions and sample size were indicated for all categorical variables. We had no a priori hypothesis.

Results

This survey was part of a multiphase study that also included key informant interviews and an expert convening; the results of the survey component are presented herein.

Supervisor characteristics

Participants were primarily female (71.6%, $n = 421$), white (48.9%, $n = 280$), and were a median age of 49 years (IQR = 41-56 years) (all self-reported). Participants directly supervised a median of 6 employees overall (IQR = 4-11 employees) and a median of 2 masters-level staff (IQR = 1-4 employees). Overall, participants had a median of 16 years of experience in public health (IQR = 10-22 years) and a median of 11 years of experience as a supervisor (IQR = 6-20 years). More than half of the responding managers supervised more than 1 program area (51.9%, $n = 317$). Fifty-nine percent ($n = 358$) of supervisors possessed a master's degree and almost half (47.1%, $n = 288$) reported having received training in public health (Table 1).

Staff education

Fifty-eight percent of respondents ($n = 376$) indicated that they supervised staff with a master of public health/master of science in public health degree. Twenty-one percent ($n = 138$) and 18% ($n = 118$) of respondents supervised staff with master of arts/master of science and master of social work degrees, respectively (Table 2).

Supervisor's perceptions of masters-level staff

Table 3 presents the KSAs in descending order of the percentage of supervisors who reported that they were essential to their staffs' work. More than 30% of supervisors indicated that all of the 30 workforce KSAs they reviewed were "essential" to their staffs' day-to-day work. Almost all managers (91.2%) perceived "orally communicating ideas and information in a way that different audiences can understand" as an essential workforce skill. In addition, of the "top 10 KSAs" (ie, the 10 KSAs rated as essential by the highest percentage of supervisors) 4 pertained to the ability to effectively and persuasively communicate whether orally or in writing. Skills related to cultural sensitivity and racial humility were among the top 10 essential skills. Only 32% of managers indicated preparation of a program budget as an essential workforce skill.

A skill "gap" was defined as when a supervisor perceived a KSA as "essential" or "somewhat important" to his or her staff's day-to-day work and reported that the staff's proficiency level was either "unable to perform" or "beginner/novice." Almost 40% ($n = 246$) of supervisors perceived "applying quality improvement concepts in their work" as a skill gap among their masters-level staff. In addition, the largest percentages of supervisors reported gaps in KSAs related to political systems, politics, and policy. For example, 38% ($n = 243$) of supervisors perceived a gap in staffs' understanding of the political system within which health departments operate. Thirty-four percent ($n = 218$) reported gaps in staffs' ability to anticipate changes in the environment—such as

TABLE 2
Percentage of Respondents Indicating That They Supervise Staff With Various Types of Masters Degrees

Type of Masters Degrees	Respondents Who Reported Supervising Staff With Each Degree ^a	
	% of Supervisors	Number of Supervisors (n)
Master of public health/Master of science in public health	58.3	376
Other master's degree	26.4	170
Master of arts/Master of science	21.4	138
Master of social work	18.3	118
Master of public policy/Master of public administration	15.8	102
Master of business administration	15.7	101
Master of science in nursing	12.9	83
Master of health services administration/Master of health administration	7.9	51
Master of health science	4.5	29
Master of health informatics	0.9	6

^a Supervisors indicated degrees possessed by staff they manage. Responses were not mutually exclusive; percentages in the columns are not cumulative and do not total to 100%.

TABLE 3**Percentage of Supervisors Who Perceived KSA as Essential to Their Masters-Level Staff's Day-to-Day Work (N = 645)**

KSA ^a	% (n)
Orally communicating ideas and information in a way that different audiences can understand.	91.2 (588)
Gathering reliable information to answer questions.	89.3 (576)
Communicating ideas and information in writing in a way that different audiences can understand.	82.8 (534)
Addressing the needs of diverse populations in a culturally sensitive way.	75.0 (484)
Adapting in response to dynamic, evolving circumstances.	73.0 (471)
Demonstrate racial humility.	72.3 (466)
Orally communicating in a way that persuades others to act.	71.3 (460)
Collaborating with diverse communities to identify and solve health problems.	68.1 (439)
Communicating in writing in a way that persuades others to act.	63.4 (409)
Applying quality improvement concepts in their work.	58.8 (379)
Applying evidence-based approaches to solve public health issues.	57.5 (371)
Implementing policies, services, and programs.	55.7 (359)
Engaging staff throughout the health department to collaborate on projects.	55.2 (356)
Assessing the broad array of factors that influence specific public health problems.	55.0 (355)
Interpreting public health data to answer questions.	54.6 (352)
Engaging health and medical partners outside the health department to collaborate on projects.	53.8 (347)
Assessing and evaluating the effectiveness of policies, services, or programs.	51.2 (330)
Finding evidence on public health efforts that work.	49.2 (317)
Understanding the relationship between a policy and a public health problem.	45.6 (294)
Understanding the non-health consequences of public health policies or programs.	45.4 (293)
Anticipating changes in the environment (physical, political, environmental) that may influence their work.	45.1 (291)
Engaging multisector partners (eg, business, transportation, housing, education) to collaborate and solve problems.	45.0 (290)
Assessing and building the capacity of community partners.	44.3 (286)
Determining the feasibility of policies, services, and programs.	43.1 (278)
Understanding the political system within which health departments operate.	42.5 (274)
Ensuring that programs are managed within the current and forecasted budget constraints.	40.3 (260)
Developing policies and program options.	40.0 (258)
Selecting policies, services, and programs for implementation.	39.4 (524)
Developing and managing contractual agreements with external parties (eg, grants and contracts).	34.1 (226)
Preparing a program budget with justification.	31.8 (205)

Abbreviation: KSA, knowledge, skills, and ability.

^a Knowledge, skills, and abilities were presented to respondents exactly as they appear in this table (see Supplemental Digital Content Material—Survey Instrument, available at <http://links.lww.com/JPHMP/A422>). Knowledge, skills, and abilities are listed in descending order by the percentage of respondents who reported the KSA as essential.

changes in the political landscape—that may influence their work. And approximately 30% reported gaps in each of 3 policy-related KSAs—understanding the relationship between a policy and a public health problem; determining the feasibility of policies, services, and programs; and understanding the non-health consequences of public health policies or programs (Table 4).

While communication KSAs were rated as essential by the highest percentage of respondents, less than 20% of supervisors reported gaps for most communication KSAs, as well as those pertaining to cultural sensitivity and racial humility. One exception was

communicating in writing in a way that persuades others to act for which 25% (n = 161) of supervisors perceived a gap to exist. Another large gap was perceived in competencies pertaining to partnerships, including engaging multisectoral partners (28%, n = 181) and building capacity among partners (28%, n = 179).

Discussion

Several frameworks, for example, Public Health 3.0⁴ and the Chief Health Strategist,⁵ have been advanced that help identify the future needs of the public health

TABLE 4
Percentage of Supervisors Who Perceived KSA Gaps Among Their Masters-Level Staff's Day-to-Day Work (N = 645)

KSA Gap ^a	% (n)
Applying quality improvement concepts in their work.	38.0 (245)
Understanding the political system within which health departments operate.	37.7 (243)
Anticipating changes in the environment (physical, political, environmental) that may influence their work.	33.8 (218)
Assessing and evaluating the effectiveness of policies, services, or programs.	33.2 (214)
Understanding the relationship between a policy and a public health problem.	30.9 (199)
Determining the feasibility of policies, services, and programs.	30.5 (197)
Understanding the non–health consequences of public health policies or programs.	29.8 (192)
Adapting in response to dynamic, evolving circumstances.	29.3 (189)
Engaging multisector partners (eg, business, transportation, housing, education) to collaborate and solve problems.	28.1 (181)
Assessing and building the capacity of community partners.	27.8 (179)
Developing policies and program options.	27.0 (174)
Selecting policies, services, and programs for implementation.	25.1 (162)
Communicating in writing in a way that persuades others to act.	25.0 (161)
Interpreting public health data to answer questions.	24.7 (159)
Engaging staff throughout the health department to collaborate on projects.	24.0 (155)
Finding evidence on public health efforts that work.	23.7 (153)
Ensuring that programs are managed within the current and forecasted budget constraints.	23.7 (153)
Engaging health and medical partners outside the health department to collaborate on projects.	23.6 (152)
Developing and managing contractual agreements with external parties (eg, grants and contracts).	23.1 (149)
Applying evidence-based approaches to solve public health issues.	22.8 (147)
Assessing the broad array of factors that influence specific public health problems.	22.5 (145)
Implementing policies, services, and programs.	21.6 (139)
Preparing a program budget with justification.	21.6 (139)
Addressing the needs of diverse populations in a culturally sensitive way.	19.5 (126)
Orally communicating in a way that persuades others to act.	19.4 (125)
Collaborating with diverse communities to identify and solve health problems.	17.5 (113)
Communicating ideas and information in writing in a way that different audiences can understand.	15.2 (98)
Demonstrate racial humility.	14.4 (93)
Orally communicating ideas and information in a way that different audiences can understand.	9.2 (59)
Gathering reliable information to answer questions.	9.2 (59)

Abbreviation: KSA, knowledge, skills, and ability.

^aKnowledge, skills, and abilities were presented to respondents exactly as they appear in this table (see Supplemental Digital Content Material—Survey Instrument, , available at <http://links.lww.com/JPHMP/A422>). Knowledge, skills, and ability gaps are listed in descending order by the percentage of respondents who reported a gap as existing. A “gap” is defined as when a manager reported that a KSA was “essential” or “somewhat important” to their staff's day-to-day work and their staff was either “unable to perform” this skill or entirely lacked this knowledge/ability or their proficiency level was “beginner/novice.”

workforce. In each of these frameworks, the ability of the public health workforce to engage community stakeholders, forge strategic cross-sector partnerships, and communicate to persuade action is identified as critical to achieving optimal population health. While these may be the articulated needs, there is limited research on the extent to which they are present in the workforce. The present study assesses the existing skill gaps in the masters-level staff in some of the nation's leading local health departments. We found that the workforce training needs identified by supervisors are precisely those identified in these 2 frameworks.

Nearly a third of supervisors reported gaps in both their staffs' ability to engage in multisector partners to solve problems and their ability to assess and build capacity of community partners. If the vision of these 2 frameworks is to be achieved, workforce development initiatives will need to address this gap. Notably, however, only 45% of responding supervisors perceived engaging multisector partners as essential to their staffs' day-to-day work. In addition, less than half reported that building the capacity of community partners was an essential skill. It may be that skills related to building cross-sector partnerships and building

community capacity are not universally required among professional public health workers. Future research should examine which workers would benefit most by developing these strategic skills; health departments should consider focusing skill building in strategic partnerships for those workers who will serve as the pipeline of future public health leaders.

Another significant finding was that public health staff in large, urban health departments lack adequate ability to apply quality improvement concepts in their work. This gap may be an impediment specifically to health departments seeking accreditation and more generally to the ability of departments to continuously improve quality and performance. Anecdotally, our experience has been that this subset of health departments is extremely engaged in continuous quality improvement.

The most commonly cited gaps by supervisors included several aspects of policy engagement⁶ and systems thinking. As public health agencies focus upstream to address the social determinants of health, staff will need robust ability to develop and assess policy interventions, build strong relationships with policy makers, communicate to persuade action, and assess systems impact in order to reshape the social, environmental, and economic conditions that affect health and health equity.

Another concerning gap we identified was the ability of staff to adapt in response to dynamic, evolving circumstances. Health departments, public health training centers, schools and programs of public health, and national membership organizations should partner to create and deliver professional development that builds skills and resilience among public health workers. Given the tumultuous environment in which we live and work, the ways in which the field of public health is changing, as well as the ever-increasing number of disasters that public health now responds to, developing resilience among public health workers will be essential to ensuring that they are equipped to ensure the conditions in which everyone can be healthy.

Strengths and limitations

This is the first study to examine masters-level workforce skills and proficiency in 26 of the 28 health departments in the largest, most urban US cities. Collectively, these health departments address the health and well-being of 1 in 6 Americans and thus current findings have far-reaching implications. To ensure feasibility and minimize burden, supervisors were asked to report their perceptions of essential skills

Implications for Policy & Practice

- Often public health departments and public health training centers rely on the Core Competencies for Public Health Practitioners developed by the Council on Linkages Between Academia and Public Health to assess training needs, develop training plans, and to satisfy reporting requirements.⁷ While this framework provides a useful guide for assessing individual staff, practitioners and other members of our advisory group perceived the Core Competencies to be too cumbersome to assess aggregate skill gaps, particularly given the number of skills in each of the 8 domains and the 3 tiers of which masters-level staff could work at any tier.
- Instead, we adapted a list of KSAs from the 2014 PH WINS study, which had assessed employee perspectives. Supervisors were able to successfully report on the importance of these KSAs to their staffs' day-to-day work, as well as characterize gaps in their proficiency.
- This list is currently being used again in the 2017 iteration of PH WINS to assess the perspectives of a representative sample of state health agency workers, a representative sample of local health agency workers, and staff in big city health departments.
- Health Departments and public health training centers should consider using the PH WINS KSAs when attempting to identify areas for improvement and enhance workplace environment for an entire organization or region.
- The results of this research and future assessments with the PH WINS KSAs can be used by individual health departments to satisfy Public Health Accreditation Board requirements to assess staff competencies and address gaps as part of accreditation or reaccreditation processes.
- This study probed a select set of skills, and it is possible that larger gaps exist in more specialized skills. However, given the gaps identified in this study and the skills identified in Public Health 3.0 and the Chief Health Strategist, if the future public health workforce is to align with these frameworks, partnership building, policy engagement, persuasive communication, and quality improvement skills gaps must be addressed. This will require significant changes from training philosophies that focus on specialized skills to broaden more strategic practice.
- For the existing workforce, while available funding for workforce development may be declining, aligning training initiatives and the funding that does exist toward addressing these skills may have the most significant impact on improving the workforce.
- For those being trained, this information should be instructive as curricula are designed and competencies identified.

and competency levels of their staff in the aggregate (ie, essential skills for all staff and staff's abilities overall). Because respondents reported in aggregate, we cannot draw conclusions about the ability of particular training or education programs to prepare students for local public health practice; rather, we have identified major KSA gaps that exist in the collective professional workforce in large, local health departments. These findings may not be generalizable to the entire workforce; skills lacking among our studied population may exist among other members of the local governmental, public health workforce (eg, among staff with no graduate education who built these skills through on-the-job training and experience). The results from this study are consistent with prior research and expand our knowledge on the public health workforce competency gaps faced by local health departments.² In 1 health department, we were unable to disseminate the survey to a specific subset of supervisors who were unionized and reached about only one-third of managers in this health department. However, we know of no reason that unionized managers differ from nonunionized managers in this department; their background and supervisory roles are likely quite similar.

Conclusion

The scientific foundations of public health are strong. Public health practitioners receive training in methods, theories, and approaches that are evidence-based and tested. However, while necessary, these skills are insufficient to achieve the changes sought in

population health going forward. The power of the science is lost when it cannot be translated or necessary connections with other fields cannot be made. When considering investment in workforce training, additional attention could be given to unleashing the creativity and ideas of the workforce rather than advancing narrow specialties, finding the ability to link different perspectives from different fields to accomplish the goals of public health.

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