

Public Health Workforce Training Gaps

by

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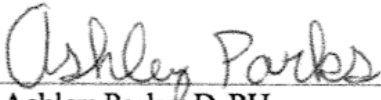
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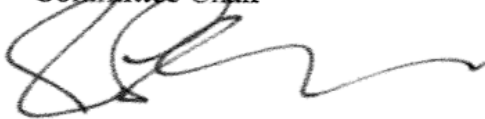
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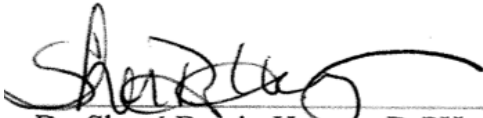
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Abstract

In 2010, the public health workforce was identified as one of the six public health areas that urgently need quality improvement by the Department of Health and Human Services Office of the Assistant Secretary of Health. In 2014, the Public Health Workforce Interests and Needs Survey (PH WINS) surveyed over 10,000 public health workers on perceived confidence in performing 18 skills based on the core competencies of public health professionals. The purpose of this study was to identify perceived skill gaps between those with a public health degree and non-public health degree and years in the workforce based on a sampling of responses from the PH WINS. Of all participants (n = 1,374), very few (n = 155) had either a Master of Public Health (MPH) or Doctorate of Public Health (DrPH). The majority of the sample were females (72.5%) between the ages of 41 and 60 (60%) and non-Hispanic White (70.2%). Of the 18 public health skills listed in the questionnaire, those with a public health degree were significantly more confident in performing 17 of the skills than those with a non-public health degree. This study helps to identify areas in need of strengthening in the workforce. A competent workforce is important to ensuring success in public health initiatives and programming.

Key Words: public health workforce, training, perceived confidence, skill gaps

Table of Contents

Abstract.....	iv
Public Health Workforce Training Gaps.....	7
Qualified Infrastructure.....	8
Improve Infrastructure Strategies.....	10
Additional gaps.....	12
Purpose of the Study.....	12
Research Questions.....	13
Research Hypotheses.....	13
Method.....	14
Design.....	14
Procedures.....	15
Data Analysis.....	16
Independent Variable and Dependent Variable.....	16
Results.....	18
Participants.....	18
Major Findings.....	18
Discussion.....	25
Summary of Major Findings.....	25
Public Health Implications.....	26
Limitations:.....	27
References.....	28
Appendix.....	32

List of Tables

Table 1. Gender, Age, and Ethnicity of Sample.....	32
Table 2. Degree and Employment Status.....	32
Table 3. Means of Perceived Confidence in Performing 18 Different Skills Between Respondents with a Public Health Degree and a Non-Public Health Degree.....	33
Table 4. Perceived Confidence in Performing 18 Different Skills Between Respondents with a Public Health Degree and Non-Public Health Degree.....	34
Table 5. Mean of Perceived Confidence in Applying Evidence-Based Approaches to Solve Public Health Issues Based on Years in the Workforce.....	36
Table 6. The 18 Public Health Skills Adapted from the Core Competencies of Public Health Professionals.....	37

Public Health Workforce Training Gaps

The public health workforce has been instrumental in improving the health of many communities and future generations. According to the Centers of Disease Control and Prevention ([CDC] 2011), the efforts of the United States public health workforce have added 25 years to the public's life expectancy by preventing and/or eradicating diseases, increasing health promoting behaviors, and helping with family planning. Despite the successes of the public health workforce, the public health infrastructure needs improvement. In 2010, the Department of Health and Human Services Office of the Assistant Secretary of Health released a report that identified the public health workforce as one of the six public health areas that urgently need quality improvement (Honoré & Scott, 2010). Additionally, the need to strengthen the public health workforce has been recognized internationally by the United Kingdom, Australia, and Canada (Shickle et al., 2014). The public health infrastructure, referred to as “the nerve center” of the public health system (HealthyPeople.gov., 2018), is important in the continuation of effective disease prevention and decline in threats to the public’s health. Every public health program and/or initiative requires a competent public health workforce.

According to Koo and Miner (2010), much of the current public health workforce does not have formal training in public health science and practice. In 2014, the Public Health Workforce Interests and Needs Survey (PH WINS) surveyed over 10,000 public health workers and only 17% had a public health degree (ASTHO & de Beaumont Foundation, 2014). Essentially, 83% of the public health workforce is not held accountable to the public health standards that the Council on Linkages Between Academia and Public Health Practice (COL) developed. According to Shickle et al. (2014), leaders from outside public health may have no

understanding of what public health is and may not consider their work as part of a wider public health agenda.

Public Health Workforce Defined

The public health workforce can be defined broadly as any persons responsible for providing any of the 10 Essential Public Health Services who are employed in the following venues (Gebbie, Merrill, & Tilson, 2002). The 10 essential services developed by the Core Public Health Functions Steering Committee are: (1) monitor health status to identify and solve community health problems; (2) diagnose and investigate health problems and health hazards in the community; (3) inform, educate, and empower people about health issues; (4) mobilize community partnerships and action to identify and solve health problems; (5) develop policies and plans that support individual and community health efforts; (6) enforce laws and regulations that protect health and ensure safety; (7) link people to needed personal health services and assure the provision of health care when otherwise unavailable; (8) assure competent public and personal health care workforce; (9) evaluate effectiveness, accessibility, and quality of personal and population-based health services; and (10) research for new insights and innovative solutions to health problems (CDC, 2014).

The CDC (2012) defines a public health worker as a person responsible for providing any of the 10 essential public health services and who are employed at traditional nontribal state, territorial, and local governmental public health agencies/departments; federal agencies with a clear mandate to provide public health services; non-public health state, territorial, local, or federal governmental agencies providing environmental health services; or non-public health state, territorial, local, or federal governmental agencies providing public health laboratory services. The occupational classifications used in this definition are: Administrative or Clerical

Personnel, Behavioral Health Professional, Emergency Preparedness Staff, Environmental Health Worker, Epidemiologist, Health Educator, Laboratory Worker, Nutritionist, Public Health Dentist, Public Health Manager, Public Health Nurse, Public Health Physician, Public Health Informatics Specialist, Public Information Specialist, and Other Public Health Professional/Uncategorized Workers. Although, this covers a large portion of the public health workforce, this definition does not include non-profit organizations, private sectors, or school sectors.

Qualified Infrastructure

A capable and qualified public health workforce is a workforce that cannot only perform the 10 essential public health services but also the public health core competencies. The public health competencies, developed by the COL, cover eight domains and three tiers that represent foundational skills professionals at various levels need for public health education, practice, and research (COL, 2014). The foundational skill domains are: analytical and assessment skills, policy development and program planning skills, communication skills, cultural competency skills, community dimensions of practice skills, public health sciences skills, financial planning and management skills, and leadership and systems thinking skills. Each of these domains have competencies based on the professional level or tier of the position. There are three tiers; tier one is the frontline staff and entry level, tier two is program management and supervisory levels, and tier three is senior management and executive level (COL, 2014). These competencies are a valid and essential tool in assessing the competence of the public health workforce (Edgar et al., 2009).

Improve Infrastructure Strategies

Public health workforce development is also a priority for Healthy People 2020. The goal is “to ensure all levels (i.e. federal, state, local, etc.) of health agencies have the necessary infrastructure to effectively provide essential public health services” (HealthyPeople.gov., 2018). Healthy People 2020 has set out to accomplish this goal by increasing the Council on Education for Public Health’s (CEPH) accredited schools and academic programs. This goal is to be reached by meeting the following objectives: (1) increasing the number of public health or related undergraduate and graduate degrees and post-baccalaureate certificates; (2) increasing the proportion of 4-year colleges and universities that offer public health or related majors and/or minors consistent with the core competencies of undergraduate public health education; and (3) increasing the proportion of 2-year colleges that offer public health or related associate degrees and/or certificate programs (HealthyPeople.gov., 2018). While three of the objectives are taking a proactive approach for the incoming public health workforce, there are two objectives that address the current workforce: (1) increasing the proportion of public health agencies that incorporate core competencies into job descriptions and performance evaluations and (2) more continuing education consistent with the core competencies for public health professionals (HealthyPeople.gov., 2018). In order to successfully increase the effectiveness of the current public health workforce, it is important to understand current trends and gaps.

Training Gaps

Based on interviews with representatives from public health membership organizations and federal agencies, workforce development needs and priorities across all disciplines within public health are: systems thinking, communicating persuasively, changing management, information and analytics, problem-solving, and working with diverse populations (Kaufman et

al., 2014). Another study, which compared self-reported data from state chronic disease staff and local health department program managers or directors between 2008 and 2013 from four U.S. national online surveys, examined gaps in evidence-based decision-making (Jacob et al., 2014). Participants rated the importance of evidence-based decision-making competencies, and Jacob et al. found the largest gaps were economic evaluation, communicating research to policymakers, evaluation designs, and adapting interventions. Moreover, Ye, Leep, Robin, and Newman (2015) found top executives considered employees' abilities to ensure that programs are managed within budget constraints as the most important skill, whereas regular staff rated the same skill significantly lower.

Additionally, there are also reported gaps in public health policy skills, such as individuals' abilities to influence policy development. Castrucci, Leider, and Sellers (2015) revealed differences in perceived importance of policy development based on the level of profession. For example, 72% of non-supervisory staff said "influencing policy development" was somewhat or very important in their day-to-day work compared to 89% of directors and program managers (Castrucci, Leider, and Sellers, 2015). Furthermore, of the 72% of non-supervisory staff who said "influencing policy development" was somewhat or very important in their day-to-day work, 35% said they were unable to perform or they were a beginner in this area (Castrucci et al., 2015). In regards to the skill "understanding the relationship between a new policy and many types of public health problems," 75% of staff said it was somewhat or very important to their day-to-day work, and among the 75%, 30% said they were unable to perform the skill or they were a beginner (Castrucci et al., 2015). Additionally, this same study revealed more than 6,400 non-supervisors, 1,900 team leaders, 2,400 supervisors, and 352 executives nationwide are estimated to have skill gaps in one or both of the policy-related skills (Castrucci

et al., 2015). Overall, Castrucci et al. (2015) found higher educational attainment, supervisory status, and awareness of national trends were also associated with greater odds of having the identified policy competency. Interestingly, staff who indicated that continuing education was required or that their organization had staff positions responsible for internal training had greater odds of having the identified competency compared with staff who indicated that their organization did not have these assets.

Additional Gaps

Training gaps also exist in subsets of public health, such as the public health nursing sector. Beck and Boulton (2016) revealed a significant need to strengthen the education and training of public health nurses (PHN). PHN's were reported as having highly variable occupational classifications and educational backgrounds in health departments. Although the American Nurses Association Scope and Standards Practice recommends nursing education be at the Bachelor of Science level, nearly 20% of the state health department and 31% of the local health department PHN workforce had only a diploma or associates degree (Beck & Boulton, 2016). Beck and Boulton (2016) concluded that a large percentage of the PHN workforce was unlikely to have had the formal public health training or educational background needed to develop the skills for these roles. Zahner and Henriques (2014) found PHN's with higher skill competency were associated with the expected frequency of performing essential public health services, a higher degree, and a younger age.

Purpose of the Study

Evidence suggests there are various perceived public health workforce gaps based on public health sector, academic degree, experience, and position level. Multiple researchers recognized the need to provide public health staff with adequate training and development

opportunities in order to decrease the skill deficiency (Honoré & Scott, 2010; Shickle et al., 2014). The purpose of this study is to identify gaps that will aid in improving the public health workforce and as a result, improve the public's health. A competent public health workforce is important to ensuring the success of public health initiatives and programming.

Research Questions

This study discovered if there is a significant difference in perceived confidence in performing various public health skills based on the degree type of respondents to the PH WINS as delineated by public health degree, MPH or DrPH, or a non-public health degree. In addition, this study determined if there was a significant difference in perceived confidence in applying evidence-based approaches to solve public health issues based on years in the public health workforce.

Research Hypotheses

H₀: There is no significant difference of perceived confidence in various public health skills between those with a public health degree and those without a public health degree.

H₁: There is a significant difference of perceived confidence in various public health skills between those with a public health degree and those without a public health degree.

H₀: There is no significant difference between years of experience in the public health workforce and perceived confidence in applying evidence-based approaches to solve public health issues.

H₂: There is a significant difference between years of experience in the public health workforce and perceived confidence in applying evidence-based approaches to solve public health issues.

Method

Design

Secondary data from the 2014 Public Health Workforce Interests and Needs Survey (PH WINS) was used to answer the research questions. PH WINS used a cross-sectional design to collect information on state public health agency workers and local health department workers in various states regarding key matters, such as workforce development priorities, workforce morale, training needs, emerging topics in public health, and demographics. The purpose of this survey was to inform future investments in workforce development, establish a baseline of key workforce development metrics, and explore workforce attitudes, morale, and climate (Monroe, Hunter, Baker, & Jarris 2010). A national sample design was used.

Participants

The final PH WINS national sample comprised of 48,232 public health employees from the 37 states' agencies. The final sample size was 13,472. The surveyed workforce came from the following Health and Human Services regions: New England and the Atlantic (17%), the Mid-Atlantic and Great Lakes (17%), the South (37%), the Mountains and Midwest (12%), and the West (17%). Almost half, 48%, of the workforce was 51 years or older, 36% of the participants were between the ages 36-50, and 17% were 35 years old or younger. This workforce was 72% female and 28% male. A little over half, 52%, of the workforce's supervisory status were not supervisors, while 15 % were team leaders, 29% were supervisors or managers, and 4% were executives. Furthermore, 41% were in a public health science position, 28% were in an administrative position, 14% were in a clinical or lab position, and 16% were in social services. Moreover, less than half (46%) of the workforce had between 1 to 10 years of experience, 29% had 11 to 20 years of experience, and 25% had 21 years or more of experience.

Finally, only 17% of the workforce had any form of public health degree, 18% had their Associates, 75% had their Bachelors, 38% had their Masters, and 9% had their doctoral degree (Monroe, Hunter, Baker, & Jarris 2010).

Procedures

The Association of State and Territorial Health Officials (ASTHO) collaborated with state officials about the state-level sample size options (i.e. Standard, Agency, or Census) available to them in administering the PH WINS survey. For some states, the samples in the national sample were selected using a probability-based selection of the workforce, while the sample for other states included all state public health employees as a census. Thirty-seven states' public health agencies agreed to participate in the survey. Eleven states selected the "standard" state-level sample status, thereby committing to the completion of a minimum of 50 surveys. Three states selected state-level sample status "agency," which meant the state ensured 300 completed surveys. Twenty-three states selected the state-level sample status "census" to support intra-departmental comparisons or due to minimum sample size requirements. Based on results from similar employee surveys, ASTHO anticipated a 35% response rate.

After the desired sample size in each state was confirmed, the samples were drawn and prepared for fielding. First, the sample frame was sorted by state, phone number (if phone number was available), last name and first name, and each case within the state was assigned a random number from a uniform distribution. The sample was selected using systematic random sampling within each state since every state (i.e., strata) had unique probabilities of selection. Finally, each sampled record was assigned a unique identification, and all state samples were combined into one file for fielding. The survey was administered by ASTHO and funded by the de Beaumont Foundation. PH WINS data was handled by NORC through a web-based data

collection mode. For several big cities and other local health departments, local health officials issued the survey to their staff through an anonymous link for web-based data collection (NORC at the University of Chicago, 2015).

Data Analysis

The minimum sample size required for the independent samples t-test analysis was 176. The sample size was estimated using G*Power software, a priori, effect size d of .5, alpha level .05, and power of .95. The minimum sample size required for the ANOVA was 305. The sample size was estimated using G*Power software, a priori, effect size d of .25, alpha level .05, and power of .95. However, a 10% random sample (n = 1374) was pulled from the original sample (n = 13,472). An independent samples t-test was used to determine the difference of perceived confidence in various public health skills based on attainment of a public health degree (MPH or DrPH). An ANOVA was used to determine the differences of perceived confidence in applying an evidence-based approaches to solve public health problems between respondents with various years of experience in the public health workforce.

Independent Variables and Dependent Variables

For the independent samples t-test, the independent variable was type of degree: public health degree (MPH or DrPH) or no public health degree. The dependent variables were the following 18 public health skills: (1) applying evidence-based approaches to solve public health issues; (2) communicating ideas and information in a way that different audiences can understand; (3) communicating in a way that persuades others to act; (4) collaborating with diverse communities to identify and solve health problems; (5) addressing the needs of diverse populations in a culturally sensitive way; (6) assessing the broad array of factors that influence specific public health problems; (7) understanding the relationship between a new policy and

many types of public health problems; (8) engaging staff within your health department to collaborate on projects; (9) engaging partners outside your health department to collaborate on projects; (10) managing change in response to dynamic, evolving circumstances; (11) anticipating the changes in your environment (physical, political, environmental) that may influence your work; (12) interpreting public health data to answer questions; (13) finding evidence on public health efforts that work; (14) applying quality improvement concepts in one's work; (15) influencing policy development; (16) preparing a program budget with justification; (17) ensuring that programs are managed within the current and forecasted budget constraints; and (18) gathering reliable information to answer questions.

For the ANOVA, the independent variable was the years of experience in the public health workforce, and the dependent variable was confidence in “applying evidence-based approaches to solve public health problems.” This one skill was chosen as most important for analysis due to the crucial role of evidence-based approaches in public health. Not only is evidence-based decision-making an essential part of public health services, but federal agencies, such as the CDC, require the use of evidence-based approaches for project funding (Allen et al., 2018). Furthermore, evidence-based approaches provide a higher likelihood of public health policy and program success, workforce productivity, and efficient use of public and private resources (Lhachimi, Bala, & Vanagas, 2016).

Results

Participants

This sample ($n = 1,374$) was comprised of mainly state health department employees; 32.9% were in administrative work, 18.7% were in clinical and lab jobs, 37.2% were in a public health science, and 9.8% were in social services. This sample is comprised of 72.5% females and 25.5% males. A large portion of the sample, 60%, were between 41 and 60 years old, 24.3% were below 40 years old, and 12.7% was over the age of 61. Moreover, the majority, 70.2%, of the sample were non-Hispanic White, 9.5% were non-Hispanic Black or African American, 5.2% were Hispanic or Latino (2 or more races), and 4.6% were Asian non-Hispanic/Latino.

Very few participants ($n = 155$) had either a Master of Public Health (MPH) degree or Doctorate of Public Health degree (DrPH). The majority of the sample ($n = 1219$) had either an Associate's degree (i.e. nursing); BS/BA, BSN, other baccalaureate degree; another Master's degree (i.e., MA/MS, MBA, MHSA, MPA, MSN, MSW); or another non-public health doctorate (DDS/DMD, DNP, DVM/VMD, JD, MD/DO, or international equivalent, PharmD, or PhD/ScD). Most respondents, 59.8%, were not supervisors, 13.8% were supervisors, 13.3% were team leaders, 9.8% were managers, and 2.8% were executives. Few respondents, 6.8%, made \$95,000 or more as their annual salary; 35.6% made \$55,000 a year or less; 29.9% made between \$55,000.01 and \$95,000.

Major Findings

An independent-samples *t*-test was calculated comparing the perceived confidence in 18 public health skills between those with an advanced public health degree, MPH and/or DrPH ($n = 155$), and those who have a non-public health degree ($n = 1219$). A significant difference was found in 17 of the 18 skills. A significant difference was found ($t(1294) = 9.17, p = .01$) in

“assessing the broad array of factors that influence specific public health problems.” The mean of those who have a public health degree, MPH and/or DrPH, ($m = 3.79, sd = .89$) was significantly higher than the mean of those who do not have a public health degree ($m = 2.71, sd = 1.41$). A significant difference was also found ($t(1296) = 8.062, p = .001$) in “applying evidence-based approaches to solve public health issues.” The mean of those who have a public health degree, MPH and/or DrPH, ($m = 3.82, sd = 1.10$) was significantly higher than the mean of those who do not have a public health degree ($m = 2.81, sd = 1.46$). Moreover, a significant difference was found ($t(1286) = 1.87, p = .01$) in “applying quality improvement concepts in my work.” The mean of those who have a public health degree, MPH and/or DrPH, ($m = 3.71, sd = .92$) was significantly higher than the mean of those who do not have a public health degree ($m = 3.53, sd = 1.33$). A significant difference was found ($t(1301) = 10.46, p = .01$) in “interpreting public health data to answer questions.” The mean of those who have a public health degree, MPH and/or DrPH, ($m = 4.25, sd = .76$) was significantly higher than the mean of those who do not have a public health degree ($m = 3.03, sd = 1.41$). A significant difference was found ($t(1289) = 9.05, p = .01$) in “finding evidence on public health efforts that work.” The mean of those who have a public health degree, MPH and/or DrPH, ($m = 3.80, sd = 1.01$) was significantly higher than the mean of those who do not have a public health degree ($m = 2.713, sd = 1.44$). Therefore, those who have a public health degree are more confident in performing the above analytical/program planning skills than those without a public health degree.

Additionally, a significant difference was found ($t(1291) = 4.68, p = .01$) in “understanding the relationship between a new policy and many types of public health problems.” The mean of those who have a public health degree, MPH and/or DrPH, ($m = 3.47, sd = 1.10$) was significantly higher than the mean of those who do not have a public health

degree ($m = 2.93$, $sd = 1.33$). A significant difference was found ($t(1290) = 4.78$, $p = .01$) in “influencing policy development.” The mean of those who have a public health degree, MPH and/or DrPH, ($m = 3.19$, $sd = 1.10$) was significantly higher than the mean of those who do not have a public health degree ($m = 2.64$, $sd = 1.35$). Therefore, those who have a public health degree are more confident in performing the above public health policy skills than those without a public health degree.

Furthermore, a significant difference was found ($t(1294) = 4.31$, $p = .01$) in “communicating ideas and information in a way that different audiences can understand.” The mean of those who have a public health degree, MPH and/or DrPH, ($m = 4.13$, $sd = .83$) was significantly higher than the mean of those who do not have a public health degree ($m = 3.70$, $sd = 1.18$). A significant difference was also found ($t(1284) = 1.71$, $p = .01$) in “communicating in a way that persuades others to act.” The mean of those who have a public health degree, MPH and/or DrPH, ($m = 3.88$, $sd = .93$) was significantly higher than the mean of those who do not have a public health degree ($m = 3.72$, $sd = 1.08$). Therefore, those who have a public health degree are more confident in performing the above communication skills than those without a public health degree.

In addition to the above analytical, policy, and communication skills, a significant difference was found in cultural competency, community, and collaboration skills. A significant difference was found ($t(1297) = 5.01$, $p = .01$) in “addressing the needs of diverse populations in a culturally sensitive way.” The mean of those who have a public health degree, MPH and/or DrPH, ($m = 3.68$, $sd = 1.01$) was significantly higher than the mean of those who do not have a public health degree ($m = 3.09$, $sd = 1.38$). A significant difference was also found ($t(1289) = 8.44$, $p = .01$) in “collaborating with diverse communities to identify and solve health problems.”

The mean of those who have a public health degree, MPH and/or DrPH, ($m = 3.72, sd = 1.05$) was significantly higher than the mean of those who do not have a public health degree ($m = 2.69, sd = 1.43$). Moreover, a significant difference was found ($t(1295) = 5.27, p = .01$) in “engaging staff within your health department to collaborate on projects.” The mean of those who have a public health degree, MPH or DrPH, ($m = 3.98, sd = .88$) was significantly higher than the mean of those who do not have a public health degree ($m = 3.39, sd = 1.31$). Additionally, a significant difference was found ($t(1298) = 7.55, p = .01$) in “engaging partners outside your health department to collaborate on projects.” The mean of those who have a public health degree, MPH and/or DrPH, ($m = 4.00, sd = .98$) was significantly higher than the mean of those who do not have a public health degree ($m = 3.07, sd = 1.47$). Therefore, those who have a public health degree are more confident in performing the above cultural competency, community, and collaboration skills than those without a public health degree.

Furthermore, a significant difference was found ($t(1285) = 2.56, p = .01$) in “anticipating the changes in your environment (physical, political, environmental) that may influence your work.” The mean of those who have a public health degree, MPH and/or DrPH, ($m = 3.57, sd = .98$) was significantly higher than the mean of those who do not have a public health degree ($m = 3.303, sd = 1.26$). A significant difference was found ($t(1291) = 4.02, p = .01$) in “managing change in response to dynamic, evolving circumstances.” The mean of those who have a public health degree, MPH and/or DrPH, ($m = 3.89, sd = .97$) was significantly higher than the mean of those who do not have a public health degree ($m = 3.46, sd = 1.24$). Therefore, those who have a public health degree are more confident in performing the above leadership and systems thinking skills than those without a public health degree.

Lastly, a significant difference was found in financial planning and management skills. A significant difference was found ($t(1300) = 6.76, p = .01$) in “preparing a program budget with justification.” The mean of those who have a public health degree, MPH and/or DrPH, ($m = 3.27, sd = 1.41$) was significantly higher than the mean of those who do not have a public health degree ($m = 2.41, sd = 1.47$). A significant difference was also found ($t(1300) = 4.15, p = .01$) in “ensuring that programs are managed within the current and forecasted budget constraints.” The mean of those who have a public health degree, MPH and/or DrPH, ($m = 3.22, sd = 1.33$) was significantly higher than the mean of those who do not have a public health degree ($m = 2.68, sd = 1.50$). Therefore, those who have a public health degree are more confident in performing financial planning and management tasks than those without a public health degree.

Of the 18 public health skills adapted from the core competencies of public health professionals, there was only one, “gathering reliable information to answer questions,” that did not have a significant difference between respondents with a public health degree and respondents with a non-public health degree. Of those with a public health degree, respondents were least confident in influencing policy development ($m = 3.19, sd = 1.10$), ensuring that programs are managed within the current and forecasted budget constraints ($m = 3.22, sd = 1.33$), preparing a program budget with justification ($m = 3.27, sd = 1.41$), understanding the relationship between a new policy and many types of public health problems ($m = 3.47, sd = 1.10$), and anticipating the changes in your environment (physical, political, environmental) that may influence your work ($m = 3.57, sd = .98$). However, respondents with a public health degree felt most confident in interpreting public health data to answer questions ($m = 4.25, sd = .76$), communicating ideas and information in a way that different audiences can understand ($m = 4.13, sd = .83$), engaging partners outside their health department to collaborate on projects ($m =$

4.00, $sd = .98$), and engaging staff within their health department to collaborate on projects ($m = 3.98$, $sd = .88$).

Furthermore, respondents without a public health degree felt least confident preparing a program budget with justification ($m = 2.41$, $sd = 1.47$), influencing policy development ($m = 2.64$, $sd = 1.35$), ensuring that programs are managed within the current and forecasted budget constraints ($m = 2.68$, $sd = 1.50$), collaborating with diverse communities to identify and solve health problems ($m = 2.69$, $sd = 1.43$), assessing the broad array of factors that influence specific public health problems ($m = 2.71$, $sd = 1.41$), finding evidence on public health efforts that work ($m = 2.713$, $sd = 1.44$), applying evidence-based approaches to solve public health issues ($m = 2.81$, $sd = 1.46$), and understanding the relationship between a new policy and many types of public health problems ($m = 2.93$, $sd = 1.33$). However, respondents without a public health degree felt most confident in communicating in a way that persuades others to act ($m = 3.72$, $sd = 1.33$), communicating ideas and information in a way that different audiences can understand ($m = 3.70$, $sd = 1.18$), applying quality improvement concepts in their work ($m = 3.53$, $sd = 1.33$), managing change in response to dynamic, evolving circumstances ($m = 3.46$, $sd = 1.24$), and engaging staff within their health department to collaborate on projects ($m = 3.39$, $sd = 1.31$).

While it is important to understand the skills both groups are most and least confident in, it is also important to understand the major difference between the groups. Of the top five largest confidence gaps, the mean difference between respondents with and without a public health degree was interpreting public health data to answer questions ($m = 1.23$), finding public health efforts that work ($m = 1.09$), assessing the broad array of factors that influence specific public health problems ($m = 1.08$), collaborating with diverse communities to identify and solve public health problems ($m = 1.02$), and applying evidence-based approaches to solve public health

issues ($m = 1.01$). These confidence gaps indicate the importance of having a public health degree when doing public health work.

Furthermore, a one-way ANOVA comparing the perceived confidence of public health workers in applying evidence based approaches based on the years of experience (not type of degree) was computed. A significant difference was found among the grouped years of experience ($F(3, 1245) = 3.51, p = .007$). There was a significant difference in perceived confidence, proficient or expert, in applying evidence-based approaches between those with 0 to 5 years of experience ($n = 148$), 6 to 10 years ($n = 120$), 11 to 15 years ($n = 106$), 15 to 20 years ($n = 81$), and 21 or more years ($n = 174$).

Discussion

Summary of Major Findings

These findings indicate the strengths and weaknesses of those with a public health degree and those without a public health degree. It seems respondents with a public health degree were least confident with policy development, policy influence on public health issues, and program budgeting. However, they felt most confident in communication, collaboration, and interpretation of public health data to answer questions. Respondents without a public health degree felt unconfident with policy development and influences, and program budgeting as well. However, these respondents also felt unconfident about solving public health issues by collaborating with diverse communities, assessing the broad array of factors that influence specific public health problems, finding evidence on public health efforts that work, and applying evidence-based approaches. On the other hand, these respondents felt most confident in communication, applying quality improvement concepts, and managing change in response to dynamic, evolving circumstances.

Additionally, the skills that have the largest confidence gaps between the two groups indicate the effect of receiving a training in public health. Respondents with a public health degree were significantly more confident in interpreting public health data to answer questions, finding public health efforts that work, assessing the broad array of factors that influence specific public health problems, collaborating with diverse communities to identify and solve public health problems, and applying evidence-based approaches to solve public health issues. The skills largely impact the effectiveness—and are therefore vastly important—of the workforce's efforts in solving public health issues. Evidence-based strategies provide assurance that the effort

or work being done will produce the desired results in addition to demonstrating that resources (i.e. money) are used wisely and efficiently.

Public Health Implications

These findings provide direction for ensuring federal, state, and local health agencies have the necessary infrastructure to effectively provide essential public health services (HealthyPeople.gov., 2018). Moreover, these findings assist in meeting public health workforce objectives defined in the Department of Health and Human Services 2018-2022 strategic plan (DHHS, 2019). DHHS' goal is to promote effective and efficient management and stewardship by managing human capital to achieve the Health and Human Services mission. Thus, knowing the areas of skill deficiencies leads to more effective workforce improvement and continuing education.

Additionally, this study's findings are helpful in developing public health workforce training programs specific to those who do not have a public health degree. Training programs catering to this audience should heavily emphasize policy development, budgeting, finding evidence on public health efforts that work, and applying evidence-based approaches to solve public health issues. Very little of the dollars spent on health care go to public health and prevention programs; therefore, the public health workforce needs to demonstrate they are competent in handling the money they do receive to produce the desired health outcomes in a effective and sustainable way.

While this research looked at perceived confidence in performing multiple skills, future research should explore actual competence of the workforce in performing various public health skills. Future research should also seek a wider sample of the public health workforce by including non-profit organizations, private sectors, and schools, and surveying more federal and

local health agencies. Moreover, researchers should examine perceived confidence in performing various public health skills based on years in the workforce and if any moderators, such as degree type or continued (post-college) education, heavily influence the relationship.

Limitations

A major limitation of this study was the sample. Only 8% of the sample had a public health degree; this could impact the validity of the study, thereby creating a Type I error, by causing results to appear significant for many different skills. Furthermore, these results do not stretch across all public health sectors but rather just state health agencies. Therefore, results can not be generalized to the totality of the public health workforce, and readers should understand findings apply only to state health agencies. Moreover, the data could not be generalized across the nation because not every state participated, and the sample's ethnicity does not reflect the same percentages nationwide.

In addition to the sample, the manner in which PH WINS sorted degree information impacted the analysis. The public health degree group consisted of only those who attained a Master of Public Health (MPH) or Doctorate of Public Health degree (DrPH). It is possible that respondents who indicated they have a BS/BA could have attained it in public health but could not specify that on the survey.

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Appendix

Table 1

Gender, Age, and Ethnicity of Sample

		n	Percent
Gender	Male	351	25.5
	Female	996	72.5
Age	21 to 40	542	24.3
	41 to 60	825	60
	61 or above	175	12.7
Race & Ethnicity	H/L American Indian or Alaska Native	1	0.1
	H/L Asian	1	0.1
	H/L Black or African American	8	0.6
	H/L White	50	3.6
	H/L Two or more races	71	5.2
	Non-H/L American Indian or Alaska Native	10	0.7
	Non-H/L Asian	63	4.6
	Non-H/L Black or African American	131	9.5
	Non-H/L Native Hawaiian or Other Pacific Islander	6	0.4
	Non-H/L White	964	70.2
	Non-H/L Two or more races	19	1.4

Table 2

Degree and Employment Status

		Frequency	Percent
Public Health Degree	No	1219	88.7
	Yes	155	11.3
Supervisory status	Non-supervisor	822	59.8
	Team leader	183	13.3
	Supervisor	190	13.8
	Manager	135	9.8
	Executive	38	2.8

Table 3

Means of Perceived Confidence in Performing 18 Different Skills Between Respondents with a Public Health Degree and Non-Public Health Degree

Skill	MPH or DrPH	N	Mean	Std. Deviation
Communicating ideas and information in a way that different audiences can understand	Yes	149	4.13	0.827
	No	1147	3.7	1.182
Anticipating the changes in your environment (physical, political, environmental) that may influence your work	Yes	148	3.57	0.977
	No	1139	3.3	1.264
Gathering reliable information to answer questions.	Yes	148	4.35	0.679
	No	1141	3.96	0.969
Interpreting public health data to answer questions	Yes	150	4.25	0.761
	No	1153	3.03	1.41
Finding evidence on public health efforts that work	Yes	151	3.8	1.007
	No	1140	2.71	1.439
Applying evidence-based approaches to solve public health issues	Yes	147	3.82	1.098
	No	1151	2.81	1.462
Applying quality improvement concepts in my work	Yes	147	3.71	0.923
	No	1141	3.53	1.133
Influencing Policy Development	Yes	151	3.19	1.1
	No	1141	2.64	1.353
Preparing a program budget with justification	Yes	150	3.27	1.413
	No	1152	2.41	1.47
Ensuring that programs are managed within the current and forecasted budget constraints	Yes	151	3.22	1.331
	No	1151	2.68	1.506
Communicating in a way that persuades others to act	Yes	148	3.88	0.925
	No	1138	3.72	1.084
Collaborating with diverse communities to identify and solve health problems	Yes	149	3.72	1.053
	No	1142	2.69	1.43
Addressing the needs of diverse populations in a culturally sensitive way	Yes	150	3.68	1.019
	No	1149	3.09	1.381
Assessing the broad array of factors that influence specific public health problems	Yes	149	3.79	0.887
	No	1147	2.71	1.411
Understanding the relationship between a new policy and many types of public health problems	Yes	150	3.47	1.103
	No	1143	2.93	1.338
Engaging staff within your health department to collaborate on projects	Yes	148	3.98	0.884
	No	1149	3.39	1.318
Engaging partners outside your health department to collaborate on projects	Yes	150	4	0.976
	No	1150	3.07	1.467
Managing change in response to dynamic, evolving circumstances	Yes	150	3.89	0.973
	No	1143	3.46	1.241

Note. Participants were asked to rate the degree to which they are confident; (1) equating to unable to perform, (2) beginner, (3) proficient, and (4) expert.

Table 4

Perceived Confidence in Performing 18 Different Skills Between Respondents with a Public Health Degree and Non-Public Health Degree

Skill	F	Sig.	t	df	Mean Difference
Communicating ideas and information in a way that different audiences can understand	21.891	0.000	4.311	1294	0.431
Anticipating the changes in your environment (physical, political, environmental) that may influence your work	24.009	0.000	2.557	1285	0.276
Gathering reliable information to answer questions.	0.075	0.785	4.733	1287	0.389
Interpreting public health data to answer questions	103.165	0.000	10.464	1301	1.227
Finding evidence on public health efforts that work	155.132	0.000	9.049	1289	1.093
Applying evidence-based approaches to solve public health issues	99.637	0.000	8.062	1296	1.007
Applying quality improvement concepts in my work	10.580	0.001	1.866	1286	0.182
Influencing Policy Development	55.367	0.000	4.780	1290	0.549
Preparing a program budget with justification	14.013	0.000	6.760	1300	0.859
Ensuring that programs are managed within the current and forecasted budget constraints	38.755	0.000	4.155	1300	0.535
Communicating in a way that persuades others to act	5.812	0.016	1.711	1284	0.160
Collaborating with diverse communities to identify and solve health problems	120.124	0.000	8.442	1289	1.024
Addressing the needs of diverse populations in a culturally sensitive way	47.257	0.000	5.014	1297	0.585
Assessing the broad array of factors that influence specific public health problems	175.087	0.000	9.165	1294	1.087
Understanding the relationship between a new policy and many types of public health problems	18.920	0.000	4.682	1291	0.534
Engaging staff within your health	84.017	0.000	5.269	1295	0.587

department to collaborate on projects					
Engaging partners outside your health department to collaborate on projects	108.506	0.000	7.549	1298	0.930
Managing change in response to dynamic, evolving circumstances	28.061	0.000	4.024	1291	0.424

Table 5

Mean of Perceived Confidence in Applying Evidence Based Approaches to Solve Public Health Issues Based on Years in the Workforce

Years In The Public Health Workforce	N	Mean	Std. Deviation
0 – 5 years	343	2.81	1.44
6 – 10 years	234	2.91	1.52
11 – 15 years	214	2.91	1.44
16 – 20 years	160	2.99	1.43
21 or more years	299	3.22	1.41
Total	1250	2.97	1.45

Table 6

The 18 Public Health Skills Adapted from the Core Competencies of Public Health Professionals

Skill
Communicating ideas and information in a way that different audiences can understand
Anticipating the changes in your environment (physical, political, environmental) that may influence your work
Gathering reliable information to answer questions.
Interpreting public health data to answer questions
Finding evidence on public health efforts that work
Applying evidence-based approaches to solve public health issues
Applying quality improvement concepts in my work
Influencing Policy Development
Preparing a program budget with justification
Ensuring that programs are managed within the current and forecasted budget constraints
Communicating in a way that persuades others to act
Collaborating with diverse communities to identify and solve health problems
Addressing the needs of diverse populations in a culturally sensitive way
Assessing the broad array of factors that influence specific public health problems
Understanding the relationship between a new policy and many types of public health problems
Engaging staff within your health department to collaborate on projects
Engaging partners outside your health department to collaborate on projects
Managing change in response to dynamic, evolving circumstances