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Strategic Workforce Analysis: Identifying Skills and Gaps Among Frontline Public Health Workers Amidst Transformation

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ABSTRACT

Objective: Recent shifts in public health (PH) include consistent budget cuts, workforce attrition, and loss of vital skills and institutional knowledge followed by heightened pandemic-driven attention, new responsibilities, and renewed funding. This study investigates whether frontline employees working in different types of public health departments have different educational characteristics and whether these characteristics are associated with differentials in skill gaps toward informing targeted interventions to nurture a competitive workforce.

Methods: Utilizing 2021 Public Health Workforce Interests and Needs Survey (PH WINS) data, we document variations in educational qualifications, skill gaps, and workforce characteristics among frontline workers in different sizes of health departments and examine attributes associated with skill gaps: level and field of education, years of experience, program areas, and job classifications using a negative binomial model.

Results: Skill gaps in resource management, systems and strategic thinking, and change management persist across all local health departments (LHDs), but the extent of these gaps is greater in small LHDs. Small LHDs also have few employees with graduate and public health degrees. Additionally, whereas public health degrees were not associated with fewer skill gaps, tenure in public health was, suggesting people learn on the job.

Conclusion: The results highlight the role regional training centers can play in emphasizing the need for strategic skills and foundational public health concepts, as well as customizing training content by agency size and educational levels to improve accessibility, particularly for small LHDs with resource constraints.

KEY WORDS: Public Health Training Center, public health workforce, skill gaps assessment, small health departments

Introduction

The governmental public health sector has faced substantial changes leading to chronic underfunding and understaffing. These challenges have persisted for years, beginning with the 2008 recession, and exacerbated by

budget cuts causing the workforce to have reduced since then.¹⁻³ Before the onset of the COVID-19 pandemic, the estimated need for additional employees in the public health sector nationally was high (and stood at almost 80 000).⁴ More recently, public health agencies also lost employees due to staff burnout and the negative public sentiment they had to endure during the

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COVID-19 pandemic,^{5,6} and the sector will continue to lose more workers as baby boomers retire in the next few years.⁷ The impact of attrition extends beyond a mere reduction in staffing levels if the vacated positions cannot be promptly filled—agencies also lose the skills, expertise, capacity, and institutional knowledge of the departing employees.

The COVID-19 pandemic drew attention to the public health sector and the importance of local health departments (LHDs). This is illustrated by the new roles and responsibilities LHDs took on during the pandemic. For instance, traditionally, leadership in public health management and awareness, communication, and epidemiology often was associated with federal or state health agencies like the Centers for Disease Control and Prevention. However, since the COVID-19 pandemic started in March 2020, LHDs have taken on more prominent roles in communicating with their constituents.⁸ Not surprisingly, their workforce needs have changed with more demand for public health informaticians, press information officers, and community health workers,^{9,10} in addition to the nursing positions that have always been in demand in the governmental public health sector.

The public spotlight and new responsibilities imposed during the pandemic also brought additional funding, particularly to LHDs. During the pandemic, the sector benefited from several temporary funding streams to hire contact tracers and procure personal protective equipment. Many jurisdictions directed funds to their public health departments through American Rescue Plan Act dollars, and all state health agencies and several big city, county, and territorial health departments benefited from the Centers for Disease Control and Prevention's infrastructure grant to make improvements related to workforce, foundational capabilities, and data modernization in their agencies.⁹

To strategically utilize the new funding and resources being invested in public health, it is vital to understand the skills and gaps of the existing workforce and identify emerging roles and responsibilities, particularly among frontline workers who assume the bulk of these new responsibilities in managing health emergencies and providing population health services.¹¹ Frontline workers (ie, Tier 1 workers or workers who are not supervisors, managers, or executives) are the backbone of LHDs. They make up about three-quarters of the public health workforce.¹² Frontline workers are often the first point of contact for community members seeking information, and they are responsible for delivering critical public health activities, including disease surveillance, vaccination campaigns, health education, and emergency response efforts. They also serve as a bridge between

the community and the governmental public health system. Frontline workers are crucial in addressing health disparities and promoting health equity, as they often have a deep understanding of the unique needs and challenges faced by their communities.

This paper focuses on understanding the skills and gaps of frontline workers in Health and Human Services Region 5 comprising Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin toward informing strategic interventions and policy decisions aimed at strengthening the capabilities of the public health workforce as they navigate the current challenges and new responsibilities. Recognizing the vital role frontline workers play in LHDs, we assess their educational characteristics and skill gaps, explore variations by agency type with special attention to understanding workers in small LHDs,^a and examine the association between education and skill gaps. More specifically, the goal of this paper is to determine whether frontline employees working in different types of public health departments have different educational characteristics and whether these characteristics are associated with differentials in skill gaps among workers. We hypothesize that both higher education levels and specialization in public health will be associated with fewer skill gaps. We also hypothesize that domains with skill gaps are not uniform across frontline workers in LHDs of different sizes; rather small LHDs have unique needs and gaps.

Some studies have documented the training needs and skill gaps in health departments recently.¹³⁻¹⁶ This paper is unique in its assessment of frontline workers across agency sizes, particularly in small LHDs where they often take on higher-level responsibilities. Additionally, employee-level data from staff in small LHDs were excluded from previous waves of the Public Health Workforce Interests and Needs Survey (PH WINS) due to privacy and logistical concerns. Thus, another unique feature of this study is the documentation of small LHDs for whom workforce data are available for the first time. The PH WINS 2021 round included a "PH WINS for All" pilot implemented in partnership with the Regional Public Health Training Centers (PHTCs) in Regions 5 and 10 that sought to encourage small LHDs that had been excluded from earlier waves of the survey to participate and ensured that regionally representative data for small LHDs that abound in Region 5 were available for the first time.¹² Additionally, unlike several other regions, health

^aIn the PH WINS data, small LHDs are defined as agencies serving a population of fewer than 25 000 residents or having a staff of 2.5 FTE or less.

departments across all states in Region 5 have similar decentralized structures, making it possible to study variations within the region without concerns about different governing structures causing variations in outcomes.

Methods

Data

This paper is based on data obtained from the PH WINS 2021 survey, administered by the de Beaumont Foundation and the Association of State and Territorial Health Officials.¹² PH WINS is a nationally representative survey of individual governmental public health workers in the United States. It was first fielded in 2014 as a nationally representative sample of state health agency (SHA) staff and expanded in 2017 to include LHDs.

PH WINS 2021 was sent to 20 023 employees in 207 health departments in Region 5 including LHDs and state health agencies, and a total of 8579 employees in Region 5 participated in the survey. Potential respondents received an invitation to participate in the web-based survey directly from the de Beaumont Foundation via Qualtrics (Qualtrics LLC). The survey was open for 4 months (September 13-January 14). After accounting for staff who had left their position and undeliverable emails, the response rate in Region 5 was 43%. All 6 of Region 5's SHAs participated in the survey and a total of 201 Region 5 LHDs, including 90 small LHDs (823 employees), participated. We used balance replication weights to account for survey non-response and missing data. The PH WINS 2021 methodology has been described elsewhere in detail.¹⁷

PH WINS 2021 collects data on perceptions and satisfaction with the workplace environment, awareness and opinions about core public health concepts, detailed demographic information, employees' intentions and reasons to leave or stay at the organization, and skill levels and needs to perform day-to-day work. In this paper, we focus on the skill gaps and relevant workforce characteristics of the frontline public health workforce in Region 5.

Analysis

We first summarize the distribution of the frontline public health workforce in different types of health departments by their educational characteristics—their highest level of education and whether they have a degree or specialization in public health. We

also summarize the outcome variable—the percentage of employees in different types of health departments reporting skill gaps across domains. Skill gaps are measured for strategic skills defined across 10 domains that are essential for public health workers to perform their duties.¹⁸ Each domain includes 2 to 3 items nested under it, which reflect competencies (knowledge, skills, and abilities) necessary to be proficient in the domain. The domains and strategic skills nested under each domain are presented in Supplemental Digital Content, Appendix A1, available at <http://links.lww.com/JPHMP/B400>. We define respondents as having a skill gap if they indicate their skill level being low in competencies that they self-identify as being of high importance in their day-to-day work. Respondents are indicated as having a gap in the domain if they have a gap in at least 1 of the competencies listed under the domain.

We then use a multivariate negative binomial regression model, a statistical model used to analyze count data,¹⁹ to estimate whether skill gaps are associated with the educational characteristics of the workforce. Here the dependent variable is the total number of self-reported competencies with a skill gap. The strategic skills assessed in PH WINS are meant to be crosscutting, i.e., skills essential to all workers regardless of their role. The Council on Education for Public Health has recognized the value of crosscutting skills and their revised accreditation criteria for schools and programs of public health have emphasized the need for adaptive, strategic skills, such as systems thinking, in addition to technical skills.²⁰ By focusing on the number of gaps reported in crosscutting strategic skills, we highlight the need for holistic training opportunities and identify characteristics defining workers who might benefit from such comprehensive training.

The independent variables of interest include whether the respondent has a graduate degree (master's or doctorate), degree or specialization in public health, and the type of health department they work in. Additionally, we also control for other observable workforce characteristics that might affect the outcome variable. Our control variables include years of experience in public health practice, programmatic area, and job classification. All variables used in our analysis are described in Supplemental Digital Content, Appendix A2, available at <http://links.lww.com/JPHMP/B400>. Data were cleaned, managed, and analyzed in Stata 17 (StataCorp LLC). PH WINS 2021 was determined to be exempt by the NORC Institutional Review Board (IRB00000967) under its Federal-wide Assurance #FWA00000142.

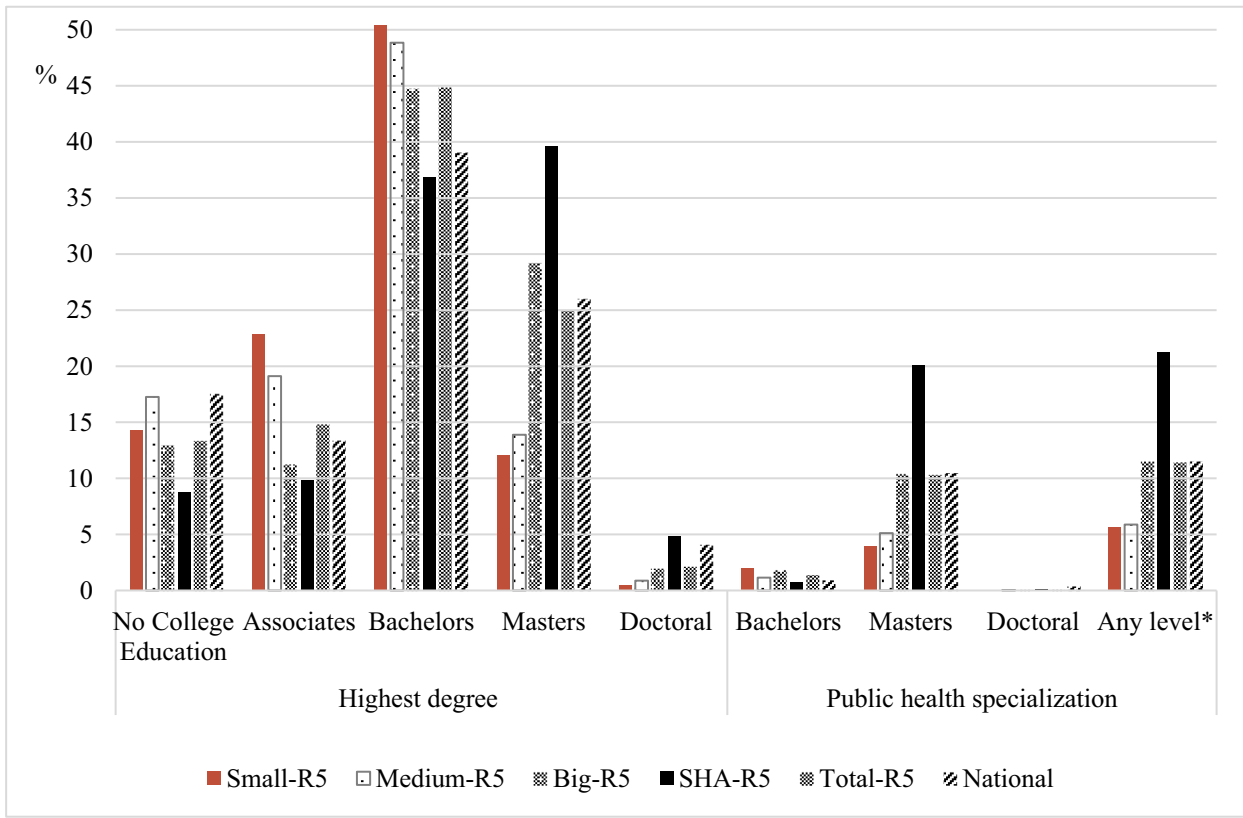


FIGURE 1 Degrees and Specializations of Frontline Workers

*Any level refers to a public health specialization at any of the following 3 levels: the bachelor’s, master’s, or doctoral level. This figure presents the percentage of workers in different settings with no college education, associate’s, bachelor’s, master’s and doctoral degrees, and specialization in public health at different levels. Data for this figure are tabulated in Supplemental Digital Content, Appendix A3, available at <http://links.lww.com/JPHMP/B400>.

Results

Small LHDs employ a sizable workforce without a 4-year college degree or a specialization in public health (Figure 1; Supplemental Digital Content, Appendix A3, available at <http://links.lww.com/JPHMP/B400>). This is comparable to the workforce in mid-sized LHDs. On the contrary, more employees in state health agencies and big LHDs in Region 5 had a bachelor’s, master’s, or doctorate degree and a specialization in public health. Among staff in small LHDs, 50% had a bachelor’s degree, with the second highest proportion being those with associate’s degrees (22%), and only 12% had a graduate education. In contrast, big LHDs and SHAs had a higher percentage of staff with a master’s degree or higher (30% and 43%, respectively).

While the domains with the highest skill gaps were the same across different types of health departments, the proportion of employees reporting a gap in each domain was much higher in small LHDs compared to other types of health departments (Figure 2; Supplemental Digital Content, Appendix A1, available

at <http://links.lww.com/JPHMP/B400>). Domains with the highest percentage of employees in small LHDs reporting a training gap included resource (budget and financial) management (65% for small LHDs), systems and strategic thinking (60% for small LHDs), change management (58% for small LHDs), community engagement (56% for small LHDs), and policy engagement (53% for small LHDs). We disaggregated each domain into individual items (competencies) within the domain and observed a similar pattern (Supplemental Digital Content, Appendix A1, available at <http://links.lww.com/JPHMP/B400>).

Finally, the coefficients of the regression analysis representing the relationship between skill gaps and the educational characteristics of workers are presented in Figure 3. We found that workers in small- and mid-sized LHDs were likely to report significantly more gaps than their counterparts in state health agencies (reference group: 0-5 years, 6-10 years: $\beta = -.17, P < .01$; 11-15 years: $\beta = -.23$). Workers with a graduate degree ($\beta = -.17, P < .05$) were likely to report significantly less skill gaps relative to employees without graduate education. There was no significant difference between workers with

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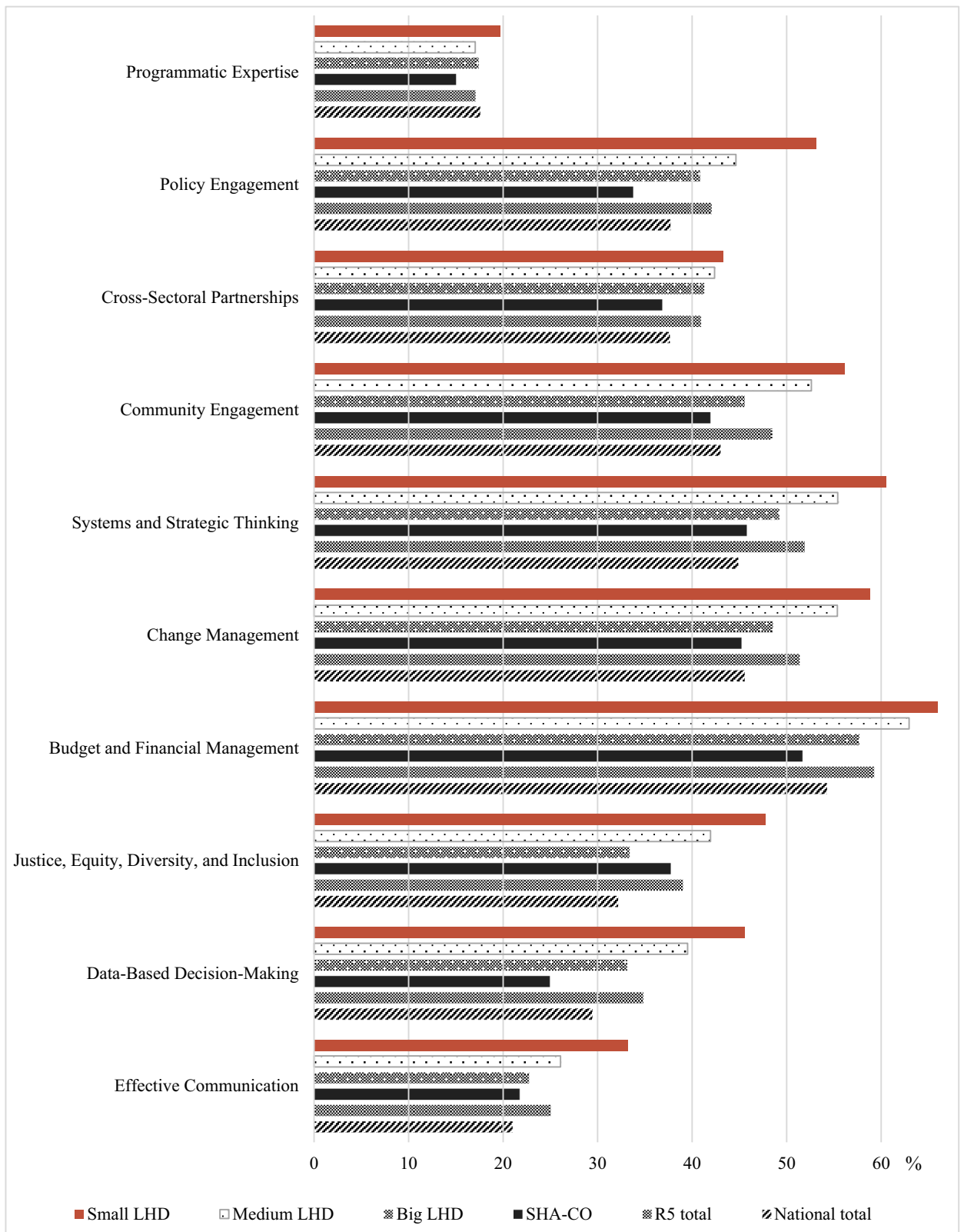


FIGURE 2 Frontline Workers With at Least 1 Gap
 This figure presents the percentage of workers in each setting reporting a skill gap in at least 1 competency in each of the 10 domains. Data for this figure are tabulated in Supplemental Digital Content, Appendix A1, available at <http://links.lww.com/JPHMP/B400>.

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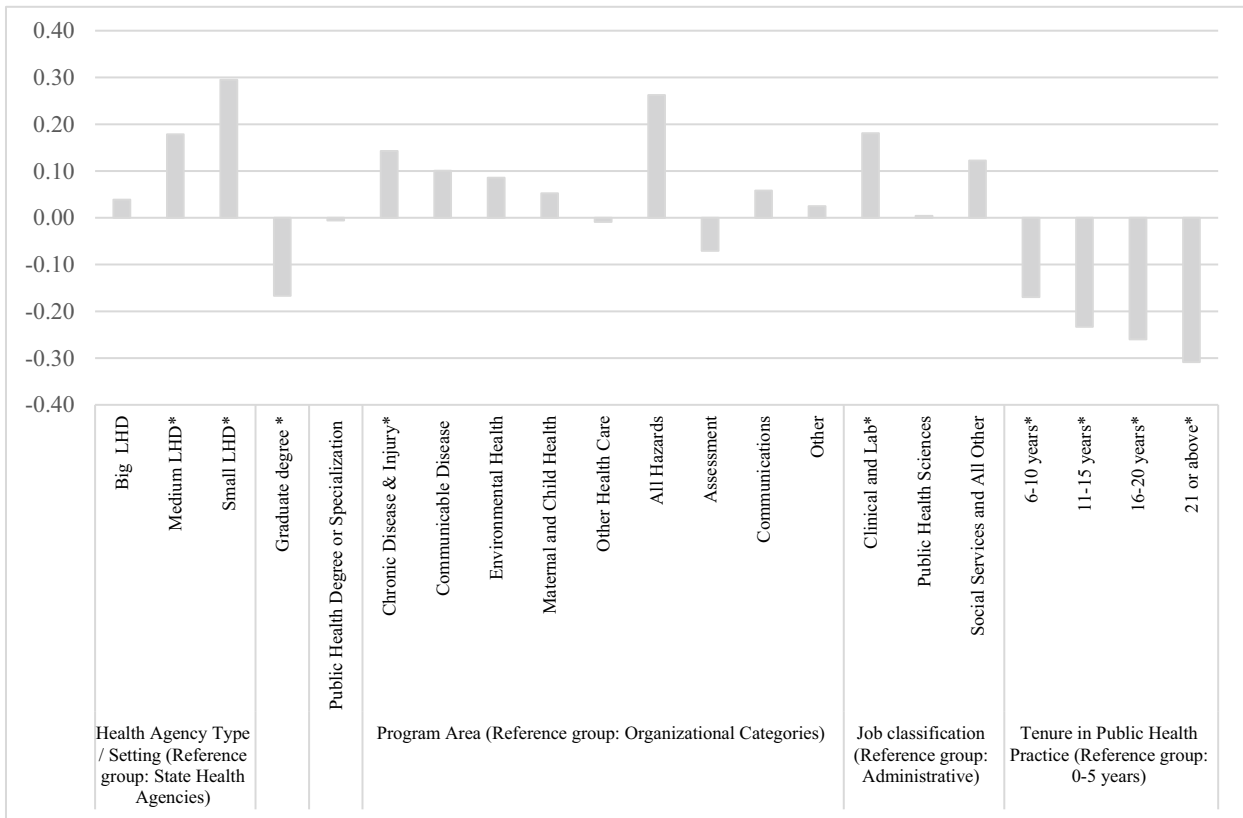


FIGURE 3 Relationships Between Skill Gaps and Worker Attributes

* indicates coefficient is significant. This figure indicates worker characteristics associated with significantly higher number of skill gaps, with y-axis representing the coefficient, x-axis representing the variables, and an asterisk (*) at the end of the variable category indicating that the category is significant. The regression tables are presented in Supplemental Digital Content, Appendix A4, available at <http://links.lww.com/JPHMP/B400>.

and without a degree or specialization in public health, although longer tenure in public health was associated with significantly decreasing skill gaps (reference group: 0-5 years, 6-10 years: $\beta = -.17$, $P < .01$; 11-15 years: $\beta = -.23$, $P < .01$; 16-20 years: $\beta = -.26$, $P < .01$, 21 years or more: $\beta = -.31$, $P < .01$). In terms of programmatic areas, except chronic disease ($\beta = .14$, $P < .01$) and all hazards ($\beta = .24$, $P < .01$), workers in all other programmatic areas were not significantly likely to report skill gaps compared to the reference group assessment. Finally, relative to administrative staff, clinical and lab workers ($\beta = .14$, $P < .01$) were significantly more likely to report skill gaps.

Discussion

Recognizing the importance of a competent frontline public health workforce, we explored the educational characteristics of frontline public health professionals and identified skill gaps with attention to small LHDs in Region 5. We observed varying educational levels and expertise among public health professionals in different types of agencies in Region 5 with small

and medium LHDs employing fewer individuals with higher education and public health specialization compared to big LHDs and state health agencies. These trends in Region 5 are overall comparable to national trends. Contrary to our hypothesis, domains with skill gaps were similar across agencies of different sizes but a higher percentage of employees in small LHDs reported skill gaps compared to big LHDs and state health agencies. The number of gaps was significantly associated with graduate education and years of experience, but not with a public health degree. We discuss these key findings in turn subsequently.

Small LHDs had fewer employees with graduate degrees and public health specialization (Figure 1). Although in our results, graduate education was significantly associated with fewer training gaps (Figure 3), we recognize that education is not the sole indicator of capability or skills. Lower education levels without public health specialization can indicate fewer opportunities and resources for formal education, continuing education, or specialized degrees. Small LHDs, especially those located in rural areas or health professional shortage areas face recruitment challenges^{21,22} as they cannot afford to

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pay the salaries that workers with higher education, certifications, and skills expect. To overcome workforce shortages within the financial and human resource constraints they face, it is often more feasible for small rural LHDs to recruit and train community health workers and paraprofessionals from their communities rather than attract those with graduate degrees.^{23,24} The insignificant association between public health specialization and gaps reported and a significant positive association with years on the job suggests merit in this strategy (Figure 3). The inverse relationship between skill gaps and tenure suggests that employees learn on the job as familiarity with their role and agency increases over time. With appropriate training resources, new employees can be trained in and prepared for their new public health responsibilities faster. Training resources that take into consideration the barriers small LHDs face, particularly limited funds to support continuing and higher education,²³ highlight the importance of no-cost training material developed by federally funded regional training centers.

Skill gaps tend to be higher in crosscutting skills rather than technical skills. Our results (Figure 2) are consistent with previous studies that have highlighted gaps in domains representing crosscutting skills such as resource management, systems and strategic thinking, change management, community engagement, and policy engagement across employees in different governmental public health settings,^{13,16,25-27} and these gaps tend to be significantly higher among clinical and lab workers compared to nonclinical and non-lab employees (eg, administrative staff). LHDs in Region 5 are predominantly staffed by individuals who are well-trained in technical skills, indicated by a low percentage of employees reporting gaps in programmatic expertise (Figure 2). Moreover, small LHDs have few employees who tend to be employed in technical positions such as nurses, administrative staff, agency leadership, and environmental health workers.²⁸ They are nonetheless often responsible for multiple roles requiring crosscutting skills, leading to lower proficiency in areas outside of their primary discipline. In small LHDs, this skill gap may be greater due to resource and staffing constraints.

Training needs persist despite available learning opportunities. Public health programs are increasingly focusing curricula on foundational competencies to align with skills needed in the workforce, yet relatively few working in governmental public health have a public health degree. Many organizations offer public health workforce development programs, but there is a need to coordinate their efforts.²⁹ Training needs may also persist as the context of public health work evolves. Over the past decade, there has been an

increasing focus on the need for systems change to advance health equity and improve population health outcomes and on the potential of the public health workforce to contribute to it.²⁶ This is reflected in revisions to major public health frameworks and learning agendas. Furthermore, addressing the complex issues contributing to population health outcomes requires iterative learning at different levels.^{30,31} For instance, workforce development needs to include collective learning at the agency- and individual-level training.³¹ More recently, public health practice has evolved with new roles and responsibilities brought on over the last 3 years due to the COVID-19 pandemic,⁹ and staffing compositions changed with increased attrition due to chronic stress, burnout, and experiences of bullying from the pandemic.²¹ As new staff step into the public health workforce, it is important to understand their skills and experience and develop training resources to meet their needs including more holistic rather than domain-based training where appropriate.

Our study is not free of the limitations of survey research, such as response bias. Respondents with more experience may report lower skill gaps because they feel more accomplished in their work. Similarly, studies have demonstrated increased confidence in Justice, Diversity, Equity and Inclusion concepts among Black/African American staff compared to other racial groups.³² Our study did not investigate how differences in race and ethnicity influence awareness and lived experiences that might bias responses. Examining the intersectionality between race, ethnicity, tier, and tenure may lead to considerations for future training and workforce development approaches. Similarly, voluntary participation in PH WINS may affect the generalizability of the findings to the entire public health workforce nationwide. Despite these limitations, the findings remain valuable for understanding the skill gaps in the frontline public health workforce and the role that PHTCs can play in workforce development and policy planning within the public health sector.

Conclusion

The 2021 PH WINS offers an opportunity to understand the skills and gaps among the Region 5 frontline workforce after the COVID-19 pandemic started, particularly for employees of small LHDs whose data are available for the first time. While certain high-priority skill gaps are similar across all LHDs, the extent of these gaps is distinctly greater in small LHDs that abound in Region 5. Frontline staff comprise a significant proportion of the governmental public health workforce,¹² so addressing

28. National Association of County and City Health Officials. *National Profile of Local Health Departments, 2019*. 2020.
29. Welter CR, Bekemeier B, McKeever J. Results and recommendations from a national public health workforce development systems assessment conducted in the United States. *Pedagogy Health Promot*. 2021;7:272-279.
30. Scallan Walter EJ, Mousavi CT, Elnicki J, Davis S. Training public health professionals on adaptive challenges—an innovative approach using remote learning modalities. *J Public Health ManagePract*. 2022;28:S240-S248.
31. Welter C, Davis S, Elnicki J, et al. Public health learning agenda for systems change toolkit: national pilot evaluation results. *J Public Health ManagePract*. 2023;29(2):202-209.
32. Porter JM, Giles-Cantrell B, Schaffer K, Dutta EA, Castrucci BC. Awareness of and confidence to address equity-related concepts across the US governmental public health workforce. *J Public Health ManagePract*. 2023;29:S87-S97.
33. Alperin M, Bekemeier B. Regional Public Health Training Centers: an essential partner in workforce development. *J Public Health ManagePract*. 2022;28:S199-S202.