



Identifying Characteristics of Local Governmental Environmental Public Health Programs

Thuy N. Kim, MPH, PhD
University of Minnesota
School of Public Health

Gina Bare, RN
National Environmental
Health Association

Craig W. Hedberg, PhD
University of Minnesota
School of Public Health

Nicole Dutra, MPH
National Environmental
Health Association

Christopher Walker, MSEH, REHS
National Environmental
Health Association

David Dyjack, DrPH, CIH
National Environmental
Health Association

Abstract Environmental public health (EPH) operates at the intersection of the environment and human health. The purpose of our project was to determine the factors that governmental EPH professionals consider when making decisions about their programs and workforce, including matters of structure, staffing, and funding for local EPH departments. A survey informed by focus groups and interviews was administered to EPH professionals that showed a high proportion of respondents (76%) work in food safety or food protection programs, and at least 50% of respondents reported they spent time on duties in four other programs. Regarding the duties performed in the other EPH programs, the survey showed that 66% of staff and 73% of managers considered performing 3–4 inspections per field day to be somewhat or extremely reasonable. Across all programs—except emergency preparedness—there was general agreement among staff and managers that a bachelor's degree in a field of science should be the minimum education necessary for staff. More than 50% of respondents recommended either state or national registration as a minimum requirement for the seven core programs.

The dynamic nature of the EPH profession is demonstrated by the range of program activities that EPH professionals conduct on both a seasonal and year-round basis. The combination of a bachelor's degree and a credential could allow for flexibility in performing duties of multiple programs and allow for transferability of skills between EPH departments. There are important commonalities across EPH programs that provide a basis for guidelines that can be widely accepted and scalable to the size and setting of EPH departments.

Keywords: environmental health, Registered Environmental Health Specialist/Registered Sanitarian (REHS/RS) credential, local public health

Introduction

The environmental public health (EPH) workforce makes up the second largest portion of the public health workforce, the majority of whom are employed at the local government-

tal level (Gerding et al., 2019; National Association of County and City Health Officials [NACCHO], 2024). There are over 3,000 local health departments in the U.S. with each operating under different government structures

(NACCHO, 2024). This varied governance, combined with a lack of scalable guidelines for EPH functions, contributes to differences in programs, practices, and funding that affect staffing, workload, and priorities (Kim et al., 2023). Where resources are limited, communities can have increased vulnerability to environmentally caused diseases and disasters (National Environmental Health Partnership Council, 2017).

While staffing rates of full-time equivalent (FTE) employees per 100,000 population served have been used for public health positions, such as epidemiologists (Council of State and Territorial Epidemiologists, 2021), the wider array of services within EPH complicates assessment of the level of staffing needed to fulfill the requirements for all of its programs (NACCHO, 2011). Only one EPH program, food safety, has national guidance establishing benchmarks currently, such as Standard 8 (Program Support and Resources) of the Food and Drug Administration's (FDA, 2024) Voluntary National Retail Food Regulatory Program Standards. Most of the other EPH programs, however, do not have standard guidelines for staffing, training, and educational qualifications and requirements.

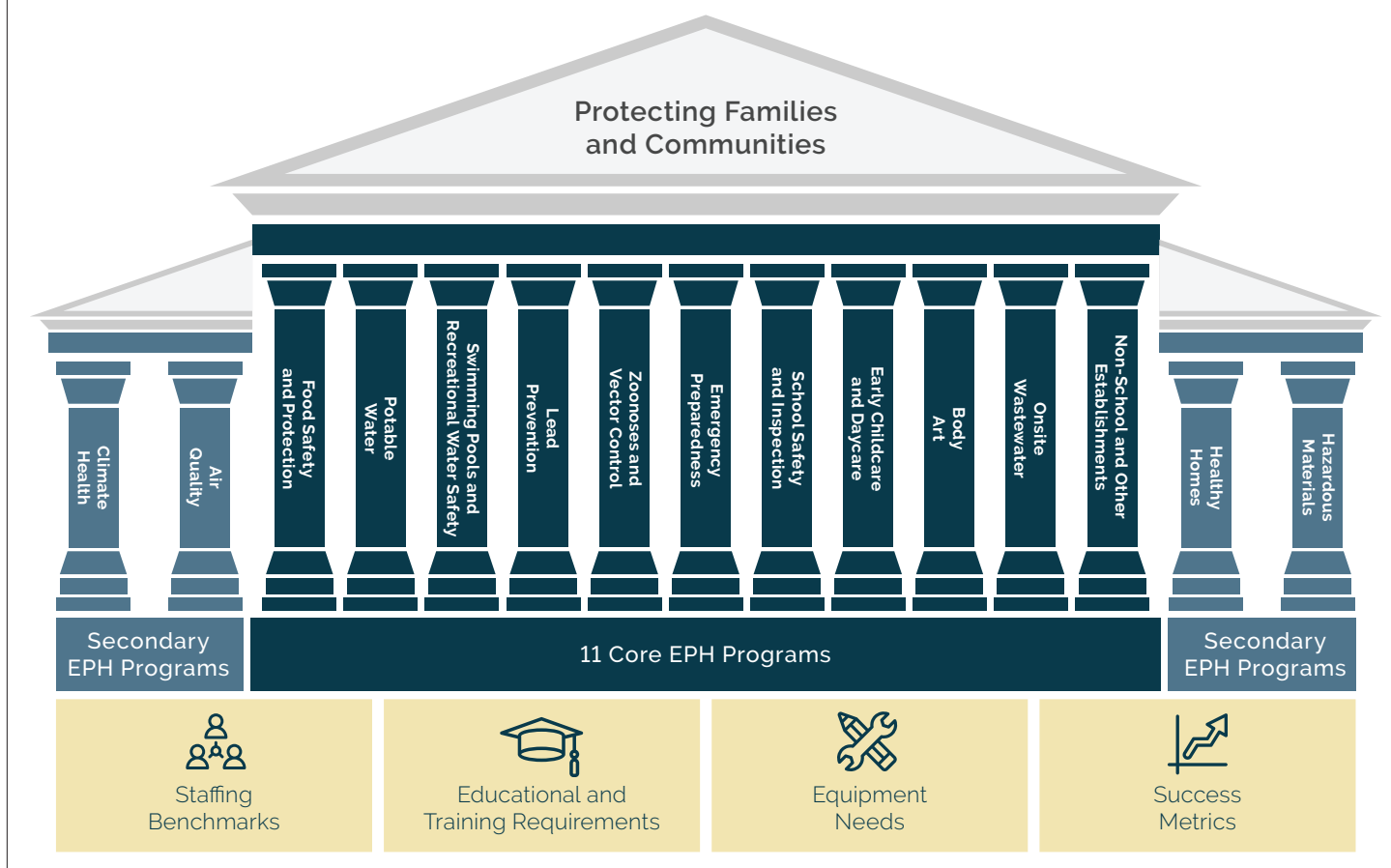
Unlike other components of the public health workforce, such as epidemiology and laboratory, that historically have had sustained federal funding (e.g., via the Centers for Disease Control and Prevention's Epide-

FIGURE 1

Core and Secondary Environmental Public Health (EPH) Programs Determined by the National Environmental Health Association and the University of Minnesota

Pillars of Environmental Public Health

A Guide to Scalable Environmental Public Health Programs



miology and Laboratory Capacity Program), EPH departments often are locally funded based on the number of for-fee services they provide. This fee-per-service structure leaves these departments financially vulnerable (National Environmental Health Association, 2013) and prone to prioritization of fee-generating activities (Meit et al., 2013) or to fluctuations in community needs, such

as the suspension of retail food establishment inspections due to the COVID-19 pandemic in 2020.

Instability in funding also contributes to a greater challenge for staff recruitment and retention. An estimated 46% of public health employees at state and local government levels left their organizations between 2017–2021 (Leider, Castrucci, et al., 2023).

It is estimated that local public health departments require approximately 54,000 more FTEs to implement foundational public health services than are currently filled (Leider, McCullough, et al., 2023; Public Health Accreditation Board, 2022). High rates of turnover limit the ability of EPH programs to effectively respond to changing community needs.

Establishing a widely accepted set of scalable guidelines for the EPH profession will contribute to developing a greater common identity (Gerding et al., 2020) that can allow transferability of skill sets between EPH departments, aid in staff recruitment, and strengthen advocacy for needed resources. This professional standardization is an important step toward protecting families and communities, as it ensures that EPH services are consistent, effective, and delivered by qualified personnel regardless of geographic location or jurisdictional boundaries.

The survey developed for this project was informed by focus groups and interviews with senior EPH professionals and administered to individuals currently working or who have worked in the EPH field. The purpose of this project was to build a foundation for program evaluation, resource allocation, and continuous improvement in governmental EPH service delivery, allowing departments to better serve their communities while also demonstrating their value and impact.

Methods

We launched a survey to National Environmental Health Association (NEHA) membership of all position levels on October 9, 2024 (survey closed November 22, 2024; see Supplemental Appendix 1). The survey was distributed via the NEHA membership listserv and NEHA social media posts throughout the 44-day data collection period. Prior to this survey, NEHA worked to identify core EPH programs in 2023; a Delphi panel of senior EPH professionals established 11 core EPH programs (Kim et al., 2023). These previously identified core EPH programs included food safety and protection, potable water, swimming pools and recreational water safety, onsite wastewater, lead prevention, zoonoses and vector control, emergency preparedness, school safety and inspection, early childcare and daycare, body art, and non-school institutions and licensed establishments (Figure 1)—all of which informed our 2024 survey. Qualitative overviews of the 11 programs were provided by focus groups and key informant interviews. The survey was subsequently divided into the core EPH programs with the purpose of capturing any aspects of the programs that might have been missed by the qualitative analysis and, most importantly,

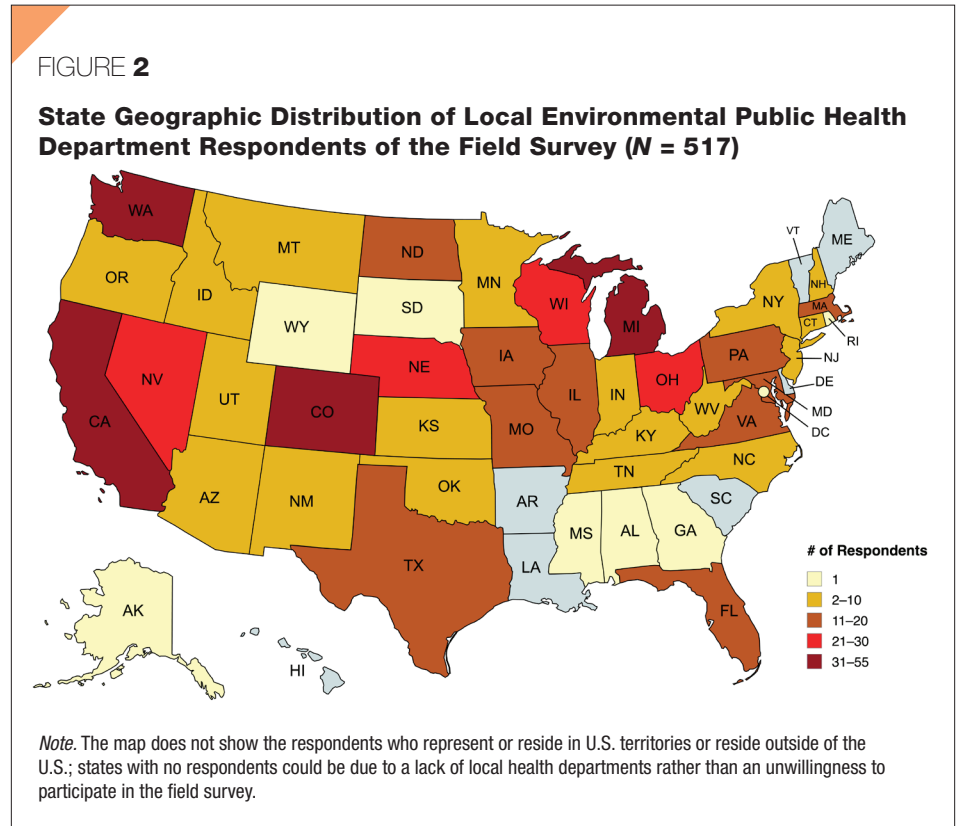


TABLE 1

Characteristics of Respondents to the Field Survey for Environmental Public Health Professionals (N = 523)

Characteristic	#	%
Department governance structure (n = 523)		
County	306	59
District	66	13
City-county combination	59	11
City	51	10
Other (includes township, tribal jurisdiction, multi-county, or state, but working within a local jurisdiction)	41	7
Position level (n = 520)		
Supervisor/manager	180	35
Field staff	178	34
Director/chief	108	21
Other (includes consultants or retirees)	54	10

gaining the insight of individuals who are actively working in the EPH field.

Although survey questions were tailored to each of the 11 core EPH programs, some were consistent across program areas. These consistent questions included perceived rea-

sonableness of optimal workload, credentials/certifications/trainings required, and education required. Survey respondents were asked about the type and level of position they currently hold in their EPH department, the state and the size of the population they serve,

TABLE 2

Core and Secondary Environmental Public Health Program Seasonality of Duty Performance (n = 518)

Program	Duties Performed All Year		Duties Performed Only Seasonally		Overall Total	
	#	%	#	%	#	%
Core program						
Food safety/food protection	390	96	17	4	407	79
Emergency preparedness (includes on an as-needed basis)	284	73	106	27	390	75
Swimming pools/recreational water safety	255	72	99	28	354	68
Potable water	272	87	42	13	314	61
Zoonoses, vectors, pests (vector control)	223	71	92	29	315	61
Onsite wastewater	262	90	28	10	290	56
Non-school institutions and licensed establishments	251	89	32	11	283	55
School safety and inspection	223	80	56	20	279	54
Body art	216	95	11	5	227	44
Early childcare/daycare	192	86	31	14	223	43
Lead prevention	184	88	25	12	209	40
Secondary program						
Indoor air quality and radon	145	73	54	27	199	38
Hazardous materials	146	83	30	17	176	34
Healthy homes	136	88	19	12	155	30
Climate	63	64	35	36	98	19

and in which core EPH programs they have duties. Respondents received only survey questions about the programs in which they performed duties either all year or seasonally. Program-specific questions were used to inform recommendations that outline the core functions of each program. Consistent questions were used as stratifying characteristics to evaluate agreement between groups of the EPH workforce. Respondents who indicated working at a state or federal level were excluded from the analysis.

Furthermore, local governmental EPH work can be housed within different organizational levels across jurisdictions and agencies, including within departments of health; departments of agriculture; and bureaus, divisions, and branches. While we recognize this fact, we will refer to the agencies performing EPH work as departments throughout this article.

Staff and other positions were combined into a single category referred to as staff. These other positions include EPH consultants, retirees, data scientists, office and support

staff, academics, and subject matter experts. Manager-level positions, combined into the category of managers, included a current position level of supervisor, manager, director, or chief. Due to a low number of respondents, staff workload reasonableness results excluded responses from respondents who indicated working part-time. Without the ability to compare staff workloads between full- and part-time EPH professionals, conclusions about workload reasonableness could be made only about full-time workloads.

Staffing workload time units (i.e., activities per field day or activities per field week) depended on the seasonality or number of sites. The unit of activities per day was asked for programs where the bulk of the work was performed during operational periods, typically less than 12 months, or for programs where more granularity was needed (i.e., food safety). The condensed season of operation means staff might perform work in these programs (e.g., swimming pools/recreational water programs) exclusively or for the majority of their working time. Therefore, the

workload averaged by day could be a more accurate measure of staffing workload for seasonal programs.

Recommendations were made from these survey questions in field days or weeks due to the various responsibilities associated with programs, aside from inspections. EPH professionals generally are not expected to be in the field 40 hours a week, nor should they solely conduct field inspections without performing other programmatic and administrative duties associated with the program. For example, additional food safety program duties include plan reviews, complaint and outbreak investigations, enforcement actions, trainings, and attending meetings.

Results

Demographics

Overall, 523 respondents submitted survey responses about their local governmental EPH department (Table 1). Most respondents worked at a county level (59%), followed by 13% at the district level, 11% at

city-county combination level, 10% at the city level, and 8% who identified their work as other (percentages sum to >100% due to rounding). Respondents who chose “other” were from towns/townships, tribal jurisdictions, multi-counties and state levels, but they were working within local jurisdictions. State geographic distribution of respondents showed at least one respondent representing at least one local health department from 45 states, the District of Columbia, and Puerto Rico (Figure 2).

More than one half of respondents identified as being at a managerial level (managers), with approximately 35% identified as a supervisor/manager and 21% as a director/chief (Table 1). Field staff (34%) and individuals holding other positions (10%) made up the remaining respondents (staff).

Staffing Seasonality

The EPH program in which most respondents (96%) performed duties year-round was food safety/food protection, followed by body art (95%) and onsite wastewater programs (90%) (Table 2). Respondents who work in food safety/food protection year-round reported working in this program a median of 50% of their weekly work time. Respondents working in this program seasonally reported a median of 11% of their weekly work time.

Work Distribution

A high proportion (76%) of respondents worked in food safety/food protection programs, spending a median of 50% of their weekly work time on food safety/food protection activities (Table 3). At least 50% of respondents reported spending time on duties in four other programs besides food safety/food protection. The other programs reported included onsite wastewater (median 20% of work time), swimming pools/recreational water safety (median 10% of work time), potable water (median 10% of work time), and emergency preparedness (median 5% of work time).

Workload Standards

Many factors can influence staffing levels and perceived workload reasonableness, including duties in other EPH programs. According to full-time staff working in food safety/food protection, when asked to consider the other duties they perform, they reported that they

TABLE 3

Core and Secondary Environmental Public Health Program Work Distribution (n = 478)

Program	% of Weekly Work Hours Spent on Program			#	%
	Maximum	Mean	Median		
Core program					
Food safety/food protection	100	52	50	361	76
Onsite wastewater	100	30	20	241	50
Swimming pools/recreational water safety	100	16	10	237	50
Potable water	100	18	10	253	53
Lead prevention	100	14	5	160	33
Zoonoses, vectors, pests (vector control)	100	13	5	205	43
Non-school institutions and licensed establishments	100	12	5	230	48
School safety and inspection	100	10	5	201	42
Emergency preparedness (includes on an as-needed basis)	100	9	5	262	55
Body art	100	8	4	197	41
Early childcare/daycare	100	9	4	177	37
Secondary program					
Climate	95	20	10	55	12
Healthy homes	100	14	6	122	26
Hazardous materials	100	16	5	132	28
Indoor air quality and radon	100	10	5	131	27

would consider performing 3–4 inspections per field day at maximum to be somewhat or extremely reasonable (66%) (Table 4). Managers agreed (73%) that performing 3–4 food safety inspections per field day was somewhat or extremely reasonable for a full-time EPH professional.

Respondents working in potable water programs agreed that 3–4 activities per week for full-time staff were reasonable (agreement of 67% staff, 82% managers). For swimming pools/recreational water safety programs, most respondents agreed that 3–4 facility inspections per field day were reasonable (agreement of 57% staff, 69% managers). Respondents who conducted school safety inspections indicated a lower optimal rate of 2–3 inspections per field day for full-time staff (agreement of 90% staff, 82% managers). For onsite wastewater programs, 4–5 activities per week were recommended by respon-

dents (agreement of 66% staff, 78% managers), whereas 3–4 inspections per week were considered reasonable for early childcare/daycare facility inspections (agreement of 66% staff, 68% managers). For body art facility programs, 3–4 inspections per week were considered reasonable (agreement of 69% staff, 81% managers), whereas 2–3 activities per week were considered reasonable for EPH professionals in lead prevention programs (agreement of 75% staff, 70% managers).

Education Standards

Across all programs except emergency preparedness, staff and managers agreed that a bachelor's degree in a field of science should be the minimum education necessary for staff working in an optimally performing EPH department (Table 5). For some programs, the preference for a bachelor's degree in a field of science was held by >50% of

TABLE 4

Percent Agreement of Workload per Unit of Time Reasonableness by Program and Position Level

Program	Activity Level	% Agreement * Staff/Manager
Food safety/food protection	3–4 inspections per day	66/73
Swimming pools/recreational water safety	3–4 inspections per day	57/69
	4–5 inspections per day	35/50
Potable water	3–4 activities per week	67/81
	4–5 activities per week	46/70
Onsite wastewater	4–5 activities per week	66/78
	5–6 activities per week	47/59
	>6 activities per week	39/51
School safety and inspection	2–3 inspections per day	90/82
	3–4 inspections per day	42/54
Body art	3–4 inspections per week	69/81
	4–5 inspections per week	32/67
Early childcare/daycare	3–4 inspections per week	66/68
	4–5 inspections per week	29/51
Lead prevention	2–3 activities per week	75/70
	3–4 activities per week	49/55

* Bolded numbers indicate that a majority of both staff and managers agreed with the activity level.

respondents. These programs included food safety/food protection (agreement of 50% staff, 58% managers), potable water (agreement of 55% staff, 56% managers), lead prevention (agreement of 50% staff, 51% managers), and onsite wastewater (agreement of 53% staff, 57% managers). Respondents from other programs, although lower in percentage, still agreed with this preference: body art (agreement of 45% staff, 52% managers), school safety (agreement of 44% staff, 50% managers), early childcare/daycare (agreement of 46% staff, 52% managers), and vector control (agreement of 45% staff, 44% managers). For emergency preparedness, both staff and managers preferred a bachelor's degree, with staff (31%) reporting acceptance of any type of major and managers (29%) preferring that the degree be in the sciences.

Credentialing Standards

The Registered Environmental Health Specialist/Registered Sanitarian (REHS/RS) is a generalist credential administered by some

individual states and NEHA. In our survey, REHS/RS registration was recognized as a valuable credential across all program areas (Table 6). In total, >50% of respondents recommended either state or NEHA registration as a minimum requirement for food safety/food protection (agreement of 63% staff, 69% managers), school safety (agreement of 66% staff, 68% managers), onsite wastewater (agreement of 59% staff, 65% managers), potable water (agreement of 59% staff, 64% managers), early childcare/daycare (agreement of 53% staff, 61% managers), body art (agreement of 59% staff, 56% managers), and swimming pools/recreational water safety (agreement of 54% staff, 55% managers). Other programs, although lower in percentage, still agreed that the REHS/RS is a valuable credential: lead prevention (agreement of 60% staff, 43% managers), vector control (agreement of 45% staff, 46% managers), and emergency preparedness (agreement of 38% staff, 36% managers).

Specialty credentials were recommended for several programs where knowledge

requirements exceeded those covered by the generalist REHS/RS. For emergency preparedness, the Federal Emergency Management Agency (FEMA) Incident Command System (ICS) series was recommended. Because a high proportion of EPH staff and managers participate in emergency preparedness activities on an as-needed basis, ICS training should be valuable for all EPH professionals.

Other specialty trainings noted by >50% of both staff and managers included:

- Certified pool operator training for staff in swimming pool and recreational water programs
- Integrated pest and vector management training for vector control programs
- Installers for onsite wastewater programs
- Bloodborne pathogens training for body art programs
- Lead risk assessor certification for lead prevention programs

Although not a formal credential, a high value was ascribed to on-the-job training across all program areas (Table 6). This finding likely reflects the need for staff to become familiar with local regulations and community standards for programs that could be specific to the agency.

Discussion

The dynamic nature of the EPH profession is demonstrated by the range of program activities that governmental EPH professionals conduct on both a seasonal basis and year-round. The results of our survey could help promote a greater common identity of governmental EPH programs and staff by suggesting guidelines for EPH education, training, and professional activities that are both widely acceptable and capable of being scaled to meet the diverse needs of both large and small EPH departments.

Although our study assessed the EPH profession on a program basis, there are EPH duties that lie outside of formally established programs. EPH—specifically local EPH—is an essential workforce that contributes to the daily protection of population health and also serves as a capacity workforce for emergency response when needed. For example, responding to the increasing occurrence of severe weather events could require EPH efforts that are not funded through fee-per-service activities of established programs in most local EPH departments.

TABLE 5

Percent Agreement of Recommended Educational Requirements by Program Area According to Staff and Manager Respondents

Program	% Agreement * Staff/Manager				
	High School Diploma or GED	Associate's Degree		Bachelor's Degree	
		Science	Any Field	Science	Any Field
Food safety/food protection	7/6	15/18	7/1	50/58	21/17
Emergency preparedness (includes on an as-needed basis)	18/23	7/11	20/12	23/27	22/19
Swimming pools/recreational water safety	17/14	17/18	9/7	45/43	13/18
Potable water	12/11	15/16	6/4	55/56	12/13
Zoonoses, vectors, pests (vector control)	13/20	21/18	8/9	45/44	13/9
Onsite wastewater	8/7	14/17	8/6	54/56	15/14
School safety and inspection	9/10	13/15	13/5	44/50	22/19
Body art	8/13	11/15	10/3	45/52	20/18
Early childcare/daycare	10/8	12/16	22/6	46/52	10/18
Lead prevention	13/19	20/9	0/9	50/51	17/12

* Bolded numbers indicate that a majority of both staff and managers agreed with the education level.

Work Distribution and Flexibility of the Workforce

More than 50% of respondents performed duties in at least five different EPH program areas. The range of activities required for food safety/food protection, onsite wastewater, swimming pools/recreational water safety, and potable water programs requires an understanding of microbiology and chemistry as well as systems thinking. Education and training across these domains allow for workforce flexibility to meet diverse program needs. A flexible workforce is also needed to staff seasonally active programs and respond to natural or human-made disasters. Training investments should consider these cross-cutting topic areas and emerging needs to ensure adequate response to community needs. Moreover, responding to natural disasters is an important aspect that should be incorporated across programs.

Workload Standards

Developing common expectations for workload demands is a vital part of defining a shared sense of identity among EPH professionals and their departments. Workload expectations for specific programs should

account for the duties they perform in other EPH programs. Comparisons between staff and manager responses showed only small differences in reasonable workloads for most programs, with the strongest agreement for food safety/food protection. The high degree of workload agreement between staff and managers for food safety/food protection is likely due to more data points (i.e., more food establishments and, therefore, more inspections) for this program to inform the views of both staff and managers. Additionally, national guidance from FDA has been widely accepted (FDA, 2024).

Education and Certification Standards

To promote versatility and flexibility in staff, a minimum education requirement for an EPH professional is recommended as a bachelor's degree. A bachelor's degree with some completion of science courses is required for some credentialing, such as the NEHA-administered REHS/RS, which was a highly valued credential across all programs. These credentials provide a foundational framework for credential holders to work across program areas, which adds value to the credential.

Preference between state- or NEHA-administered REHS/RS might be due to state-specific registration requirements. Another added value to the credential is the requirement for continuing education attainment that ensures EPH professionals stay current on methods and practices. Therefore, prioritizing EPH professionals who have an REHS/RS will aid in maximizing workforce flexibility and the utility of training dollars.

The combination of a bachelor's degree and REHS/RS credential is likely the most desirable because the combination allows for flexibility in performing duties for multiple programs and allows for transferability of skills between EPH departments. The combination might also enhance staff promotion potential and allow managers flexibility to adjust FTEs as budgets dictate, thereby facilitating workforce retention.

In addition to education and credentials, most respondents emphasized the importance of on-the-job training. The high level of agreement between staff and managers in this regard might be the result of a professional culture that prioritizes field experience. EPH professionals generally start in the field as staff and, as opportunities arise, they are promoted

TABLE 6

Percent Agreement of Recommended Credential Requirements by Program Area According to Staff and Manager Respondents

Program	% Agreement * Staff/Manager				Description	
	On-the-Job Training	REHS/RS Registration			Specialty Credential	
		State	NEHA	Either State or NEHA		
Food safety/food protection	60/49	51/57	44/49	63/69	24/23	Certified Professional–Food Safety (CP-FS)
					17/21	Integrated pest management
Emergency preparedness (includes on an as-needed basis)	58/63	29/25	28/28	38/36	89/93	ICS 100 **
					86/90	ICS 200 **
					72/79	ICS 700 **
					57/65	ICS 800 **
Swimming pools/recreational water safety	50/50	37/43	38/40	54/55	61/55	Certified Pool Operator (CPO)
					43/48	Certified Pool Inspector (CPI)
Potable water	56/58	44/48	39/46	59/64	30/46	Drinking water operator on public systems certification
Zoonoses, vectors, pests (vector control)	59/65	36/31	37/34	45/46	68/56	Integrated pest and vector management training
					36/23	Vector control technician
					33/34	Pesticide application and safety training and licensing
Onsite wastewater	62/63	45/47	41/47	59/65	65/56	Training required of installers
					44/47	National or State Onsite Wastewater Recycling Association trainings
School safety and inspection	60/54	50/50	42/47	66/68	21/20	Integrated pest management
Body art	61/61	43/42	45/41	59/56	84/71	Bloodborne pathogens training and certifications
					47/35	Training required of body artists
Early childcare/daycare	76/60	43/38	31/45	53/61	21/20	Integrated pest management
Lead prevention	47/54	42/29	47/34	60/43	80/80	Lead risk assessor certification
					38/37	Lead technician certification

* Bolded numbers indicate that a majority of both staff and managers agreed with the credential requirement.

** Incident Command System (ICS) training courses from the Federal Emergency Management Agency.

Note. NEHA = National Environmental Health Association; REHS/RS = Registered Environmental Health Specialist/Registered Sanitarian.

to managerial positions. This agreement might also be reflective of the community-centric approach to EPH services, an approach that emphasizes the importance of specific customs and protocols within each department.

Limitations

It is estimated that there are 3,000 local health departments (LHDs) in the U.S.

(NACCHO, 2024). Although our study did not capture individual LHDs linked to responses, it is plausible that the responses might be representative of most LHDs given the geographic distribution and distribution of known EPH programs in which respondents indicated they worked. Due to the different structures of health departments and the focus of this study on LHDs,

states without respondent representation might not have local health departments. Furthermore, EPH programs and the responsibilities of the programs might be influenced by delegation agreements with external entities, which vary significantly among jurisdictions and were not measured in this survey.

Conclusion

Although the saying “if you’ve seen one local health department, you’ve seen one local health department” stems from the idea that local health department activities should meet the unique needs of the communities they serve, it discounts the unifying values and functions that define EPH as a profession. Important commonalities exist across EPH departments and programs that value a strong basic education, certification for key program areas, and flexibility for staff to work across programs. These commonalities pro-

vide a basis for guidelines that can be widely accepted and scalable to the size and setting of EPH departments.

From our study, we identified several implications for policy and practice:

- EPH staff perform duties across multiple program areas.
- EPH staff and managers generally agreed on scalable standards for education, certification, and workload expectations.
- Requiring a bachelor’s degree in a field of science with REHS/RS certification provides flexibility for EPH staff and programs.

- Workload standards for specific programs should account for duties performed in other EPH programs. ✨

Acknowledgment: The authors acknowledge the support of the NEHA Board of Directors.

Corresponding Author: Gina Bare, RN, Director, Program and Partnership Development, National Environmental Health Association, 1400 South Colorado Boulevard, Suite 325, Denver, CO 80222-9998. Email: gbare@neha.org

References

- Council of State and Territorial Epidemiologists. (2021). *2021 epidemiology capacity assessment*. https://cdn.ymaws.com/www.cste.org/resource/resmgr/eca/2021_ECA_Report_FINAL.pdf
- Food and Drug Administration. (2024). *Voluntary National Retail Food Regulatory Program Standards—November 2024*. <https://www.fda.gov/food/voluntary-national-retail-food-regulatory-program-standards/voluntary-national-retail-food-regulatory-program-standards-november-2024>
- Gerding, J.A., Brooks, B.W., Landeen, E., Whitehead, S., Kelly, K.R., Allen, A., Banaszynski, D., Dorshorst, M., Drager, L., Eshenaur, T., Freund, J., Inman, A., Long, S., Maloney, J., McKeever, T., Pigman, T., Rising, N., Scanlan, S., Scott, J., . . . Sarisky, J. (2020). Identifying needs for advancing the profession and workforce in environmental health. *American Journal of Public Health*, 110(3), 288–294. <https://doi.org/10.2105/AJPH.2019.305441>
- Gerding, J.A., Landeen, E., Kelly, K.R., Whitehead, S., Dyjack, D.T., Sarisky, J., & Brooks, B.W. (2019). Uncovering environmental health: An initial assessment of the profession’s health department workforce and practice. *Journal of Environmental Health*, 81(10), 24–33.
- Kim, T.N., Karnik, H., Leider, J.P., & Hedberg, C.W. (2023). *Environmental health department food safety programs structure project report* [Internal report]. National Environmental Health Association.
- Leider, J.P., Castrucci, B.C., Robins, M., Hare Bork, R., Fraser, M.R., Savoia, E., Piltch-Loeb, R., & Koh, H.K. (2023). The exodus of state and local public health employees: Separations started before and continued throughout COVID-19. *Health Affairs*, 42(3), 338–348. <https://doi.org/10.1377/hlthaff.2022.01251>
- Leider, J.P., McCullough, J.M., Singh, S.R., Sieger, A., Robins, M., Fisher, J.S., Kuehnert, P., & Castrucci, B.C. (2023). Staffing up and sustaining the public health workforce. *Journal of Public Health Management and Practice*, 29(3), e100–e107. <https://doi.org/10.1097/PHH.0000000000001614>
- Meit, M., Knudson, A., Dickman, I., Brown, A., Hernandez, N., & Kronstadt, J. (2013). *An examination of public health financing in the United States*. NORC at the University of Chicago. <https://norc.org/content/dam/norc-org/pdfs/PH%20Financing%20Report%20-%20Final.pdf>
- National Association of County and City Health Officials. (2011). *Local public health workforce benchmarks*. <https://www.naccho.org/uploads/downloadable-resources/local-public-health-workforce-staffing-benchmarks.pdf>
- National Association of County and City Health Officials. (2024). *2022 national profile of local health departments*. <https://www.naccho.org/uploads/downloadable-resources/NACCHO-2022-Profile-Report.pdf>
- National Environmental Health Association. (2013). *Assessment of foodborne illness outbreak response and investigation capacity in US environmental health food safety regulatory programs*. <https://neha.org/sites/default/files/publications/NEHA-Assessment-Foodborne-Illness-Outbreak-Response.pdf>
- National Environmental Health Partnership Council. (2017). *Environmental health playbook: Investing in a robust environmental health system*. https://nchh.org/resource-library/nehpc-environmental-health-playbook_investing-in-a-robust-environmental-health-system.pdf
- Public Health Accreditation Board. (2022). *The foundational public health services*. <https://phaboard.org/center-for-innovation/public-health-frameworks/the-foundational-public-health-services>

Did You Know?

We support your continuing education (CE) needs by providing educational opportunities to complement your credentials and lifelong learning. We have improved and expanded our virtual CE offerings, which are available in a variety of formats and free to members. Learn more at www.neha.org/continuing-education.