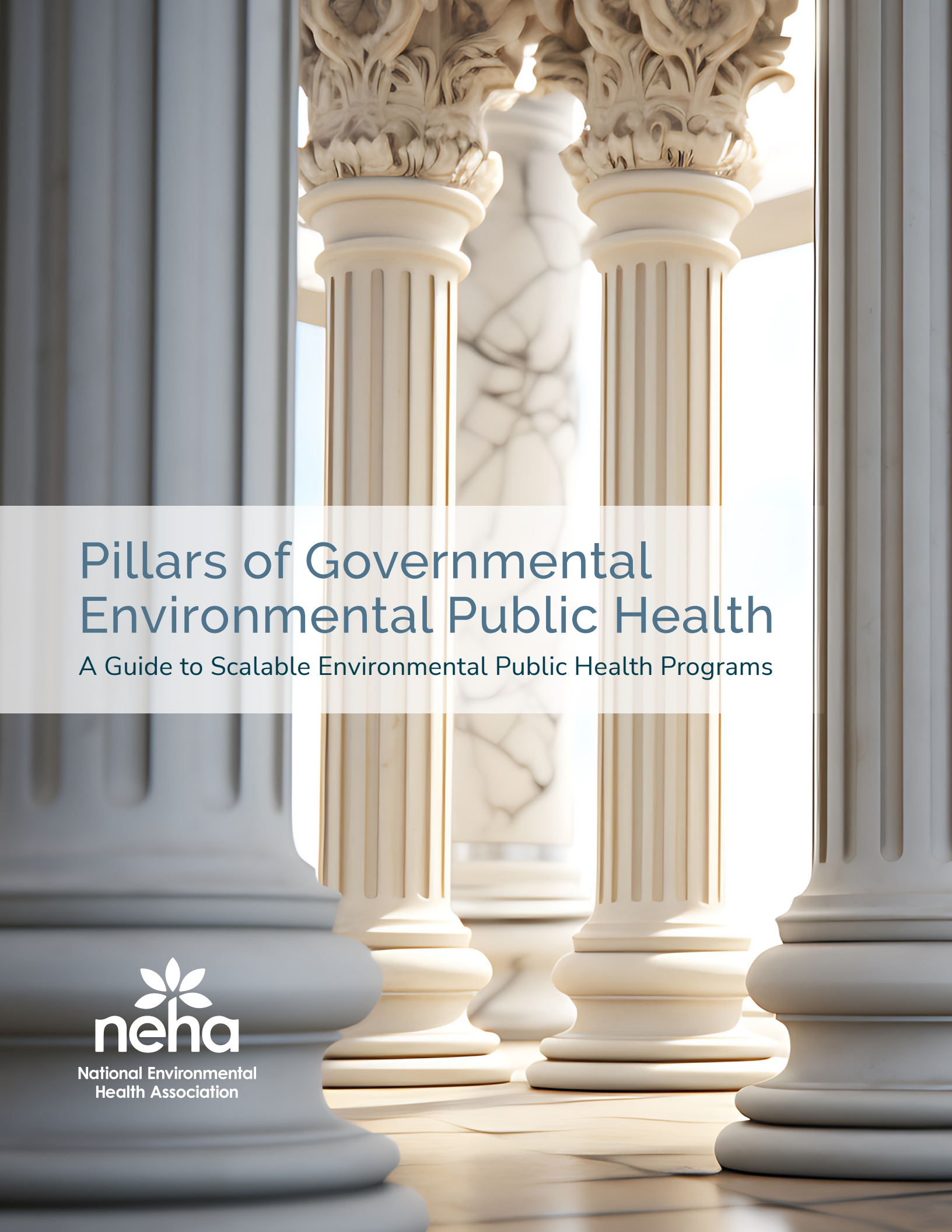

Pillars of Governmental Environmental Public Health

A Guide to Scalable Environmental Public Health Programs

neha
National Environmental Health Association

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Contents

Introduction

Environmental public health (EPH) professionals play a crucial role in safeguarding public health and ensuring the well-being and prosperity of our communities. Local governmental EPH programs employ a significant number of dedicated professionals who work tirelessly to protect the food we consume, the air we breathe, the water we drink, and the environments in which we live, work, and play. The importance of local governmental EPH programs cannot be overstated, as they contribute to the overall health of the public and serve a vital function in national security.

Research has consistently demonstrated the positive impact of local health department (LHD) activities and investments on reducing the incidence of EPH-related diseases (Bekemeier et al., 2015; Fan et al., 2020). Moreover, senior leadership at both state and local health departments has recognized the essential nature of EPH services (Leider et al., 2015). Despite the crucial role EPH professionals play in promoting and protecting public health, national guidance on the optimal structure and organization of local EPH departments is absent.

The absence of a standardized framework for local EPH departments poses significant challenges for EPH officials seeking to secure the necessary resources, including staff, funding, and equipment, to effectively carry out their duties. Without clear benchmarks and guidelines, EPH programs struggle to justify their needs, potentially compromising the health, safety, and prosperity of the communities they serve. To address this gap, this guide presents scalable program guidelines that can be adapted to meet the diverse needs, resources, and organizational structures of EPH departments across different jurisdictions, while maintaining essential standards for protecting community health.

How This Document Was Developed

The Pillars of Governmental Environmental Public Health was developed through a comprehensive research collaboration between the National Environmental Health Association (NEHA) and the University of Minnesota (UMN) School of Public Health. This framework emerged from an extensive study conducted in 2024 that surveyed hundreds of environmental public health professionals across 45 states, the District of Columbia, and Puerto Rico. The research was built on previous work in 2023 that identified 11 core EPH programs through a Delphi panel of senior EPH professionals, followed by focus groups and key informant interviews to capture qualitative insights. This research was specifically designed to gather perspectives from EPH professionals, capturing insights on program structure, staffing standards, educational requirements, credentialing needs, and workload expectations across multiple program areas. The resulting guidelines presented reflect the collective wisdom and practical experience of hundreds of EPH professionals who understand the day-to-day realities of protecting public health while working within diverse organizational structures and resource constraints.

Scalable Guidelines Approach

The recommendations provided are intended as scalable guidelines rather than rigid requirements. Most jurisdictions possess unique EPH challenges, resources, demographics, and governmental structures. What works in a large urban government agency might not be suitable for a small, rural jurisdiction with different priorities and potentially fewer resources.

The scalable guidelines presented here offer a flexible framework that can be adapted to:

- Jurisdictions of varying sizes.
- Agencies with different levels of resources and staffing.
- Communities with distinct environmental health priorities based on culture, geography, climate, industry, and population characteristics.
- Diverse governance structures, including county, city, district, or combined jurisdictions.
- Inconsistent regulatory authorities granted under state and local laws.

The purpose of this guide is to provide EPH directors, managers, supervisors, and field staff with evidence-based recommendations that help them develop, implement, and sustain effective programs. These guidelines serve as a starting point for program assessment and advocacy efforts, offering benchmarks for staffing, education, training, certification, outcome measures, and equipment needs that can be adapted to match specific departmental and community circumstances. EPH leaders can consider these guidelines as a starting point for program development and assessment, adapting the recommendations to match their specific circumstances. Rather than presenting a one-size-fits-all approach, this guide provides evidence-based parameters that can be scaled up or down based on department and community needs, regulatory responsibilities, and available resources.

Background

EPH is a crucial facet of public health that focuses on the interplay between the intersection of environment and human health. It encompasses a wide array of programs and services designed to protect and enhance the health and well-being of communities. These programs identify, assess, and mitigate environmental factors that can adversely impact human health.

The environment plays a significant role in shaping our health outcomes. Exposure to environmental hazards can lead to a range of health effects from acute illnesses to chronic diseases and premature death. According to the World Health Organization, an estimated 24% of the global disease burden and 23% of all deaths can be attributed to environmental factors (Prüss-Üstün et al., 2016). By addressing these environmental determinants of health, EPH professionals contribute to the prevention of disease, the promotion of health, and the overall well-being of communities.

EPH professionals comprise a diverse and highly skilled workforce, including specialists, scientists, technicians, and sanitarians. They possess expertise in a wide range of disciplines, such as epidemiology, toxicology, risk assessment, and environmental science. The EPH workforce is the second-largest profession within the public health workforce, after nursing (NACCHO, 2019). Despite their crucial role, EPH professionals often face numerous challenges such as insufficient staffing, limited resources, and a lack of standardized guidelines for the structure and funding of EPH departments.

Local EPH departments play a vital role in protecting and promoting public health at the community level. They are responsible for providing a wide range of services, including food safety inspections, water quality monitoring, hazardous waste management, vector control, and emergency preparedness, response, and recovery. These services are essential for preventing the spread of infectious diseases, reducing exposure to environmental hazards, and ensuring the overall health and safety of communities.

Studies have consistently demonstrated the positive impact of local EPH department activities and investments on public health outcomes. For example, Bekemeier et al. (2015) found that increased local health department food safety and sanitation expenditures were associated with significant reductions in enteric disease rates. Similarly, Fan et al. (2020) highlighted the critical role of EPH professionals in responding to the COVID-19 pandemic, emphasizing the importance of effective public health and safety nets in mitigating the impact of public health emergencies.

Despite the clear evidence of the value of EPH services, local EPH departments often struggle to secure the necessary resources and support to carry out their essential functions effectively. The lack of national standards and guidance for the structure, staffing, and funding of EPH departments creates significant challenges for local public health officials in advocating for the resources necessary to protect the health of their communities.

This guide recognizes the importance of EPH and the need for a stronger, more resilient EPH system. Further, it provides national benchmarks and recommendations for the structure, staffing, and funding of local EPH departments—a roadmap for strengthening the EPH workforce to ensure communities have access to essential services.

Characteristics of a Successful Environmental Public Health Department

A successful environmental public health department works to protect public health through prevention activities, responsive services, and community engagement while maintaining adaptability to emerging challenges. Based on findings from focus groups, interviews, and surveys with EPH professionals, the following characteristics are commonly observed in well-performing environmental public health departments across various sizes, structures, and program configurations.

Silent Success Through Prevention

The hallmark of a well-functioning EPH department is often what does not happen—disease outbreaks prevented, environmental hazards mitigated, and injuries avoided. This "silent success," sometimes referred to as "negative space," represents the primary mission of EPH—prevention. When an EPH department functions optimally, the community might be largely unaware of its daily activities, as the absence of environmental health crises often reflects effective performance.

Science-Based Decision-Making

EPH departments that perform well generally ground their operations in scientific evidence, using data collection, surveillance, and analysis to identify trends, determine priorities, and guide resource allocation. These departments typically maintain suitable data systems to track environmental conditions, monitor health outcomes, and evaluate program effectiveness, with decisions based on quantifiable and relevant metrics.

Equitable Service Delivery

Excellence in EPH often involves identifying and addressing disparities in environmental health conditions across populations and communities. High-performing departments frequently assess the distribution of environmental health burdens, target resources to areas of greatest need, and work to ensure services are accessible, culturally appropriate, and designed to reduce health inequities.

Balance of Regulatory and Consultative Approaches

While enforcement of environmental health regulations remains essential, many departments increasingly balance traditional regulatory roles with consultative approaches.

> A successful environmental public health department works to protect public health through prevention activities, responsive services, and community engagement while maintaining adaptability to emerging challenges.

This expanded model emphasizes education, technical assistance, and partnership with regulated entities to achieve compliance through collaboration rather than relying primarily on fines and citations.

Effective Partner Relationships

The development and maintenance of strong relationships represents a core competency of many successful environmental public health departments. These relationships span regulated establishments, community partners, healthcare providers, academic institutions, and other governmental agencies. Strong relationships foster trust, enhance communication, facilitate information exchange, and extend the department's impact beyond what can be achieved through direct service provision alone.

Workforce Excellence and Development

Effective EPH departments often invest in their workforce through comprehensive training, continuing education, and professional development opportunities. They cultivate environmental health professionals who possess technical expertise and skills in communication, customer service, cultural competence, and adaptability. These departments frequently create pathways for career advancement and knowledge transfer to ensure continuity of expertise.

Integration and Coordination

Effective EPH departments often integrate their services and coordinate across program areas. This integrated approach recognizes the interconnected nature of environmental health challenges and enables more efficient use of resources, reduces duplication of efforts, and provides more seamless services.

Adequate and Sustainable Resources

Successful EPH departments work to secure and maintain the resources—funding, staffing, equipment, and facilities—necessary to fulfill their core functions. They often diversify funding sources, develop fee structures that reflect service costs, and effectively communicate their value to secure appropriate budget allocations. These departments typically maintain the capacity to respond to routine demands while remaining prepared for emergencies and emerging threats.

Continuous Quality Improvement

Excellence in EPH frequently involves ongoing assessment and improvement. Effective departments often establish meaningful performance measures, regularly evaluate their effectiveness, identify opportunities for enhancement, and implement changes based on evaluation findings. This culture of continuous improvement enables departments to adapt to evolving science, community needs, and environmental challenges.

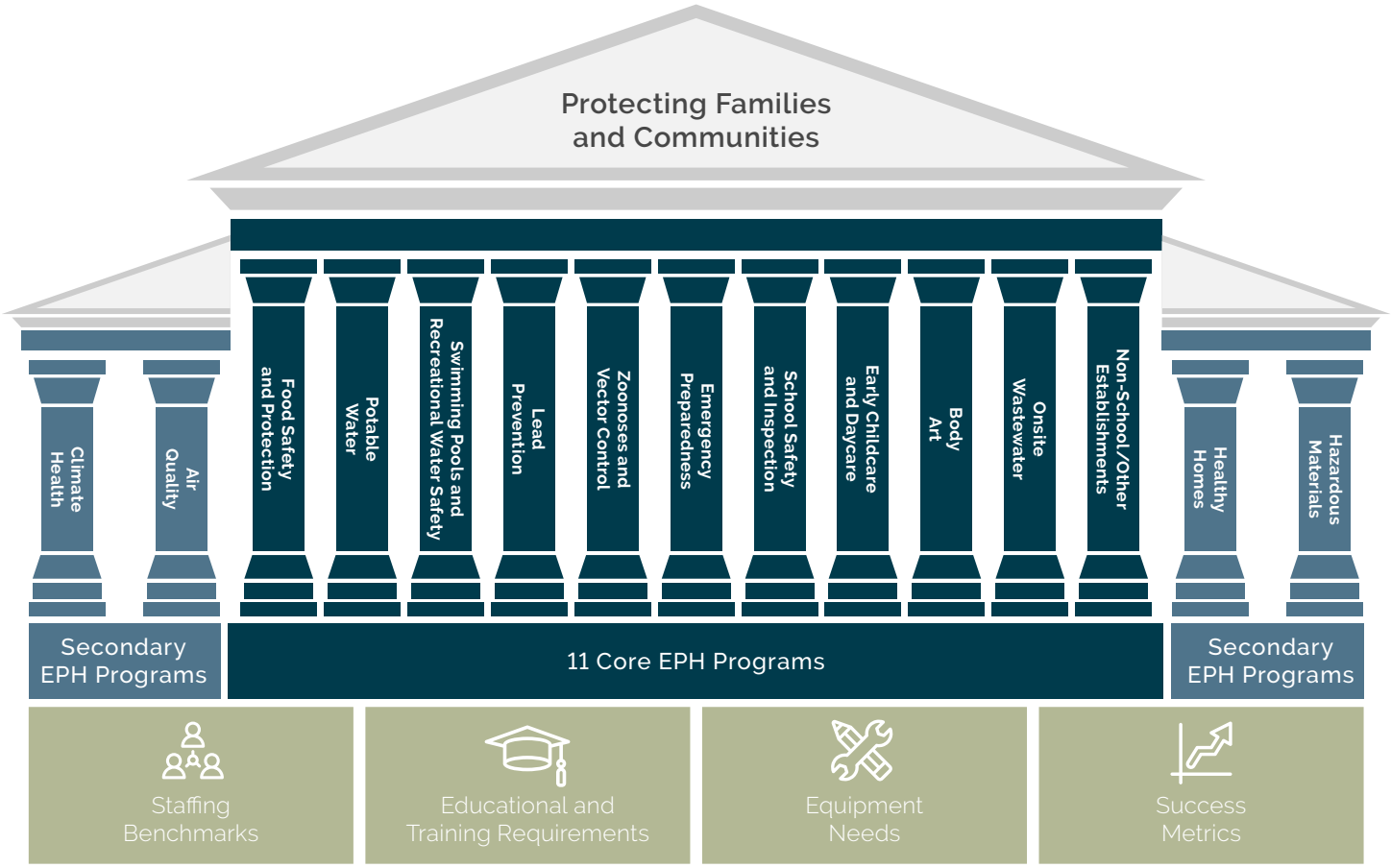
Public Trust and Transparency

By maintaining transparent operations, clear communication about environmental health risks and regulations, and demonstrated commitment to protecting public health, effective EPH departments often earn the trust of their communities. This trust facilitates cooperation during routine operations and proves valuable during emergency response situations when public compliance with health guidance becomes important.

The characteristics outlined above provide a framework for EPH departments to assess their current operations and identify opportunities for growth. While specific program implementations will vary based on community needs, regulatory requirements, and available resources, these foundational elements are commonly observed across well-functioning jurisdictions of various sizes.

Additional Resources

This guide also includes information on the 10 Essential Environmental Public Health Performance Standards and the Public Health Accreditation Board (PHAB) as appendices at the end of the document to provide additional context and guidance for program development and assessment. Additionally, EPH departments may find value in utilizing community health assessment (CHA) and community health improvement plan (CHIP) processes to identify local environmental health priorities and align program development with broader community health needs. Furthermore, a comprehensive reference section includes resources that were consulted during the development of this guide.



Core Environmental Public Health Programs

Core EPH programs represent the most common and essential services that local EPH departments typically provide to protect and promote the health and well-being of the communities they serve. These programs are designed to address the most pressing EPH concerns and are considered foundational to the mission of EPH. The 11 core EPH programs identified in research conducted by NEHA, in cooperation with UMN, include 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.

When local EPH departments focus on these core programs, they can work to provide comprehensive services essential to safeguard public health. Delivery does require adequate staff, funds, and resources, which vary significantly across jurisdictions.

In addition to the 11 core EPH programs, local EPH departments can also provide secondary programs that address specific EPH concerns within their jurisdictions. These secondary programs (e.g., climate health, air quality, healthy homes, hazardous materials) could be considered core programs by some departments based on the unique needs and priorities of the communities they serve (NEHA, 2022).

The determination of which programs might be considered core or secondary likely varies across jurisdictions, as EPH challenges and community needs can differ significantly from one area to another. For example, a jurisdiction with a history of poor air quality or industrial pollution might prioritize air quality monitoring and enforcement as a core program, while another jurisdiction could focus on healthy homes due to elevated rates of childhood asthma.

To effectively identify and prioritize core and secondary EPH programs, local EPH departments can collect and analyze data on the EPH status of their communities, assess community needs and priorities, review applicable regulatory requirements, and engage with inter-

ested partners. This data-driven, community-informed approach can help ensure that EPH departments allocate their resources and efforts toward the programs that will have the greatest impact on protecting and promoting public health.

When local EPH departments tailor their core and secondary EPH programs to the specific needs of their communities, they can develop a comprehensive, responsive, and effective EPH strategy that addresses the most pressing concerns and promotes health equity.

In the sections that follow, we define each core EPH program based on comprehensive research conducted jointly by NEHA and UMN. Through focus groups, interviews, and a national field survey with participants from hundreds of diverse local EPH departments, we provide meaningful outcome measures, staffing benchmarks, educational and certification requirements, essential equipment needs, and common funding sources for each program. This evidence-based information enables EPH departments to develop strong, sustainable programs tailored to their communities' unique needs.

Core Environmental Public Health Programs at a Glance: Key Findings and Recommendations

The following table provides an overview of 10 of the 11 core EPH programs identified through our research. This summary synthesizes key findings from focus groups, interviews, and surveys with EPH professionals nationwide to present essential information for each program area. The 11th program area, Non-School Institutions and Licensed Establishments, is not included in this table due to the significant variability in how jurisdictions define and organize these facilities, which is discussed in detail later in this guide.

All recommendations in this table are designed to be scalable based on jurisdiction size, community needs, available resources, and regulatory requirements. The information shown reflects consensus levels among surveyed professionals and indicates strong field support for these evidence-based benchmarks. Jurisdictions should view this information as a starting point for program development rather than rigid requirements and adapt the recommendations to their specific circumstances and priorities.

The detailed program descriptions that follow in this guide will expand on each of these elements and provide the context and rationale behind these recommendations.

PROGRAM	RECOMMENDED WORKLOAD	EDUCATION AND CREDENTIALS	EQUIPMENT	KEY METRICS
Food Safety and Protection	**3–4 inspections per field day**	• Bachelor's in science • REHS/RS credential • CP-FS credential	• Thermometers and pH meters • Test strips and sampling kits • *Food Code* book • Cameras • Hairnets and hats • Mobile technology and inspection forms	• Number of foodborne illness outbreaks • Number of foodborne illnesses • Number of inspections • Number of critical violations
Swimming Pools and Recreational Water	**3–4 inspections per field day**	• Bachelor's in science • Certified Pool Operator • REHS/RS credential	• Pool chemistry test kits • Tape measures • Optical scanners • Laboratory access • Cameras • Mobile technology and inspection forms	• Number of inspections completed • Number of critical violations • Closure frequency
Onsite Wastewater	**4–5 activities per week**	• Bachelor's in science • REHS/RS credential • Installer training programs	• Soil augers and rock hammers • Tile probes and levels • GPS units and CAD software • Sludge judge sampler • Cameras • Mobile technology and inspection forms	• Contaminated wells ratio • Permit review timelines • System failure reports

PROGRAM	RECOMMENDED WORKLOAD	EDUCATION AND CREDENTIALS	EQUIPMENT	KEY METRICS
School Safety and Inspection	**2–3 inspections per field day**	• Bachelor's in science • REHS/RS credential	• Infrared thermometers • Air quality monitors • Light meters • Playground inspection kits • Cameras • Mobile technology and inspection forms	• Repeat violations • Staff hazard identification • Technical consultations
Early Childcare and Daycare	**3–4 inspections per week**	• Bachelor's in science • REHS/RS credential • Playground safety certification • IPM training	• Thermometers and light meters • Flashlights • Sanitizer test strips • Educational materials • Cameras • Mobile technology and inspection forms	• Number of critical violations • Outbreak control timeframes • Facility closure rate
Zoonoses and Vector Control	**Variable by disease burden**	• Bachelor's in science • REHS/RS credential • Vector control technician training • IPM training	• Traps and collection tools • PPE • Lab supplies and microscopes • Adulticides and larvicides • Mobile technology and documentation forms • Cameras	• Training hours per inspector • Number of human disease cases • Vector index thresholds
Emergency Preparedness	**As needed basis**	• Bachelor's in science or other degree • REHS/RS credential • ICS 100, 200, 700, 800 • EHTER courses	• Communication systems • Emergency power sources • Specialized response equipment • Laboratory access	• Number of staff with required certifications • Response time • Plan review currency
Potable Water	**3–4 field activities per week**	• Bachelor's in science • REHS/RS credential • Drinking water operator certification	• Water quality kits and sampling supplies • Cameras • Measuring tapes and rulers	• Number of well inspections • Safety of water samples • Number of waterborne illnesses associated with drinking water

PROGRAM	RECOMMENDED WORKLOAD	EDUCATION AND CREDENTIALS	EQUIPMENT	KEY METRICS
Potable Water *continued*			• Mobile technology and inspection forms • Educational materials	• Number of educational events • Number of voluntary well water samples submitted • Number of plan reviews completed
Lead Prevention	**2–3 field activities per week**	• Bachelor's in science • REHS/RS credential • Lead risk assessor certification	• XRF analyzers • Dust wipe sampling supplies • PPE • Educational demonstration kits	• Blood lead level reductions • Number of properties deemed lead safe • Environmental assessment completion rates
Body Art	**3–4 inspections per week (Based on part-time employee. See program specific staffing details.)**	• Bachelor's in science • REHS/RS credential • Bloodborne pathogen training	• Thermometers • pH meters • Flashlight • Test strips • Cameras • PPE	• Number of high priority violations cited per establishment • Number of unlicensed or expired licensed artists per establishment • Number of unlicensed artists found who then underwent the process to get licensed • Number of adverse events directly attributed to body art per establishment • Number of complaints received per 50 establishments

Note. Workload recommendations assume staff perform duties other than field work, such as training, meetings, report writing, complaint follow-up, enforcement action, quality assurance, and plan reviews, and are generally not in the field 5 days a week. Assumptions also include that EPH professionals have transportation to sites as needed, basic office supplies, inspection forms, and hands-on training opportunities. It should be noted that some jurisdictions take alternate approaches to requiring degrees. It should further be noted that the 11th core program area, Non-School Institutions and Licensed Establishments, is not included in this table. See full discussion in the program descriptions section. CAD = computer-aided design; CP-FS: Certified Professional–Food Safety; EHTER = Environmental Health Training in Emergency Response; FTE = full-time employee; ICS = Incident Command System; IPM = integrated pest management; PPE = personal protective equipment; REHS/RS = Registered Environmental Health Specialist/Registered Sanitarian.

Food Safety and Protection

Program Overview and Core Services/Activities

PROGRAM	RECOMMENDED WORKLOAD	EDUCATION AND CREDENTIALS	EQUIPMENT	KEY METRICS
Food Safety & Protection	**3-4 inspections per field day**	• Bachelor's in science • REHS/RS credential • CP-FS credential	• Thermometers and pH meters • Mobile technology and inspection forms • Test strips and sampling kits • *Food Code* book • Cameras • Hair nets/hats	• Number of foodborne illness outbreaks • Number of foodborne illnesses • Number of inspections • Number of critical violations

Definition

Food safety and food protection EPH programs involve inspection, permitting, plan review, and complaint and outbreak investigation of food establishments. These establishments include but are not limited to brick-and-mortar restaurants, mobile food units, temporary food events, commissary kitchens or shared kitchens, and food manufacturing and distribution facilities where applicable to promote the safe preparation, production, and service of food in sanitary food facilities; to protect the health of food handlers and consumers by encouraging safe and sanitary on-the-job working conditions; and to ensure consumers have access to proper menu labeling.

Characteristics of a Successful Food Safety Program

The Voluntary National Retail Food Regulatory Program Standards from the Food and Drug Administration (FDA) provide a framework for many food safety programs. In addition to these standards, some departments might want to consider additional areas that the Program Standards do not currently address, such as comprehensive food handler education, alternative enforcement approaches, program sustainability, and succession planning.

Program success is generally measured by reducing violations over time, which corresponds to illness prevention. For many jurisdictions, however, the methods for achieving these outcomes are evolving from traditional enforcement-focused approaches toward consultative models that emphasize education, technical assistance, and relationship-building with regulated entities.

The consultative approach encompasses several key elements: providing and requiring education for food handlers, assisting establishment operators in implementing effective control measures, collaborating with operators during outbreak investigations, and fostering positive relationships with both operators and the general public. This shift represents a fundamental change in how EPH professionals interact with the regulated community.

Some jurisdictions have implemented hands-on technical assistance programs where EPH staff guide operators in adopting policies and practices that reduce violations. These consultative approaches have shown promising results in pilot programs, with at least one federally

funded initiative demonstrating significant decreases in priority violations. Other jurisdictions have engaged external consultants to provide specialized technical assistance to operators.

As consultative approaches become more widespread, comprehensive evaluation of their effectiveness in reducing both violations and foodborne illness becomes increasingly important. Such evaluation can occur at both local and national levels to determine best practices and inform broader adoption of these innovative program models across the field.

Meaningful Outcome Measures

PURPOSE	METRIC
Program effectiveness	• Number of critical violations identified per 1,000 food establishments per year * • Number of complaints received per year *
Workload management	• Average number of inspections per facility type per year
Public health protection	• Number of foodborne illness outbreaks per year • Number of foodborne illnesses per year

* EPH professionals who participated in focus groups, key informant interviews, and/or the national field survey consistently identified this metric as moderately to extremely useful.

FDA reports that most agencies responsible for the oversight of restaurants and other retail food facilities have adopted some version of the FDA *Food Code*. Additionally, many food safety programs also use the FDA Voluntary National Retail Food Regulatory Program Standards as a foundation for program evaluation. Risk factor analyses that examine trends in violation citations and foodborne illness patterns can inform targeted interventions, such as training programs for EPH staff and educational programs for food workers and operators.

Common program effectiveness measures include tracking violation patterns by facility type, which helps identify systemic issues and target resources appropriately. Performance and workload evaluation measures typically encompass the number of inspections completed, as well as time efficiency metrics for inspection completion.

The development of meaningful outcome measures is an emerging challenge for consultative visits, as these have not yet been well-established in the field. Consultative approaches present measurement difficulties because they are more conceptual than traditional violation-based inspections and are often co-mingled with standard regulatory activities. Programs implementing consultative models could benefit from innovative metrics that capture the preventive value and educational impact of these interactions, potentially including measures such as voluntary compliance improvements, operator knowledge gains, or reductions in repeat violations following consultative interventions.

As the field continues to evolve toward more collaborative and educational approaches, developing effective outcome measures for these activities can help demonstrate program value and effectiveness beyond traditional enforcement metrics. The following metrics were derived from the national field survey data.

Staffing

Food safety programs commonly use FDA Standard 8 (280–320 inspections per full-time employee [FTE] per year) as general guidance for staffing rates, though actual inspection volumes vary significantly across jurisdictions. Survey data from local departments show a median of 331 routine inspections per FTE annually (range 184–333), with some programs reporting as low as 280 inspections per FTE while others conduct up to 580 inspections per FTE.

These benchmarks are specific to 1 FTE in food safety programs and might need to be adjusted when EPH professionals also perform duties in other programs. Workload calculations could account for non-food safety responsibilities, which might result in lower inspection targets. Additionally, essential duties such as reporting, responding to

operator inquiries, and public communications could be factored into staffing determinations.

Daily inspection expectations typically range from 2–3 inspections per day on the low end to 4–5 inspections on the high end, based on departmental experience and operational needs. These expectations can remain adaptable, however, as inspection methods and community needs evolve to ensure an appropriate balance between inspection quality and quantity. Based on a typical 48-week work year (allowing for vacations, holidays, and sick time) and 3 inspections per field day, full-time inspectors would need to be in the field 2–4 days per week depending on departmental demands, with 2–3 field days being more common. This schedule allows time for administrative duties, plan reviews, complaint investigations, and other program responsibilities.

Several facility characteristics can significantly affect inspection duration and daily productivity:

- Facilities with special or lengthy food preparation processes (e.g., ethnic cuisines, smoking, curing, sushi preparation)
- Establishments with attached grocery, deli, or butcher components requiring extended inspection time
- Inspections requiring translation services or cultural consultations
- Mix of full-service restaurants versus fast food or chain establishments
- Type of inspection conducted (violation-focused versus consultation-based visits)

There is growing interest in consultative inspection approaches that emphasize education and prevention over traditional violation-based methods. One jurisdiction adopted a successful inspection model that allocated 0.1 FTE to traditional inspections and 0.75 FTE to consultation services, and the model resulted in a significant reduction in facility-related outbreaks. This consultative model shows promise for food safety and other communicable disease prevention programs, though implementation might require additional staff training or partnerships with external consultants to provide specialized technical assistance.

Education/Training/Certifications

For food safety programs, a bachelor's degree in science combined with Certified Professional–Food Safety (CP-FS) credential provides foundational preparation for successfully executing food safety duties. A strong science background offers a solid foundation on which to build specialized EPH expertise and technical competencies. The Registered Environmental Health Specialist/Registered Sanitarian (REHS/RS) credential was also recognized as a valuable credential across all program areas.

Our research found that jurisdictions could face challenges in workforce recruitment due to limited candidate pools, particularly in areas experiencing outmigration of college-educated individuals to other states. One suggested approach to address these challenges is for jurisdictions to make EPH positions competitive through appropriate compensation and professional development opportunities rather than reduce educational standards for science-based programs.

While the consultative approach emphasizes education and customer service, a scientific foundation remains crucial for program staffing. EPH professionals need to understand and translate the public health significance underlying regulations. Although strong customer service skills enhance communication, they cannot replace scientific knowledge.

Equipment Needs

Common equipment suggested for this program includes transportation or personal vehicle mileage reimbursement, thermometers, pH meter, test strips, hairnets, lab coats (for manufacturing facilitates), sampling kits, temperature discs, humidity meters, phones with cameras, computers or tablets, *Food Code* book, access to translation services, and inspection sheets or forms. Participants indicated that they expect the operators to have much of this equipment and will ask that they demonstrate their use. Some departments have portable printers to print the inspection report or educational materials while on the premises during an inspection.

Funding Sources/Barriers

Food safety programs are typically funded through permitting and inspection fees or general fund appropriations. Some jurisdictions also generate revenue through food

handler permits for individual workers, which require regular renewal. Fee-funded programs that achieve self-sufficiency can provide more reliable revenue streams and can offer protection from staffing and service reductions during budget constraints.

Approaches to fees vary across jurisdictions. Some are set through state statutes with local regulatory implementation, some use commissioning boards with established processes for fee determination, others implement sliding scales based on establishment gross receipts, and some conduct periodic fee assessments tied to population growth and program costs.

Gradual fee increases tend to be more acceptable to the regulated community than substantial periodic adjustments. For example, annual modest increases could generate less resistance than larger increases every 3–5 years. Similarly, incremental staffing increases of 0.5 FTE can be more manageable for both budgeting and workforce development.

External factors can influence fee structures and program operations. Competition with neighboring jurisdictions might constrain fee-setting flexibility, with some fees remaining static for extended periods. Lack of reciprocity agreements or memoranda of understanding between adjacent health agencies can create additional burdens for mobile food vendors, who need to obtain separate permits and inspections for each jurisdiction where they operate. These factors can result in fee structures driven by external competitive pressures rather than internal program needs and community requirements.

Swimming Pools and Recreational Water Safety

Program Overview and Core Services/Activities

PROGRAM	RECOMMENDED WORKLOAD	EDUCATION AND CREDENTIALS	EQUIPMENT	KEY METRICS
Swimming Pools and Recreational Water	**3–4 inspections per field day**	• Bachelor's in science • Certified Pool Operator • REHS/RS credential	• Pool chemistry test kits • Tape measures • Optical scanners • Laboratory access • Cameras • Mobile technology and inspection forms	• Number of inspections completed • Number of critical violations • Closure frequency

Definition

An EPH swimming pools and recreational water safety program conducts health, safety, and structural assessments of recreational water venues such as public swimming pools and beaches to identify and mitigate imminent health and safety threats. Program activities include evaluating pool areas and surrounding infrastructure such as decks, handrails, ladders, and fencing for compliance with safety standards. These programs also respond to sewage or toxic chemical spills affecting recreational water sources and conduct water quality testing to monitor bacterial contamination levels and ensure safe recreational water conditions for public use.

Characteristics of a Successful Swimming Pools and Recreational Water Safety Program

A swimming pools and recreational water program generally conducts damage and health and safety assessments of public swimming pools, spas, hot tubs, splash pads, lazy rivers, and other recreational water venues, as well as public beaches that can pose imminent health and safety threats. This oversight generally includes the areas surrounding pools and water sources such as decks, handrails, ladders, and fencing. These programs can also respond to program-specific sewage or toxic chemical spills and conduct water quality testing of recreational water sources to determine levels of bacterial contamination.

Meaningful Outcome Measures

PURPOSE	METRIC
Program effectiveness	• Percentage of required pool inspections completed during peak operating season (May–August) annually
Workload management	• Average number of pool/recreational water inspections completed per inspector during peak season (May–August) annually * • Percentage of inspections completed at target rate
Public health protection	• Number of critical violations identified per 100 pool inspections annually * • Number of disinfectant violations per 50 facilities per year • Number of in-compliance facilities per number of facilities per year • Number of facility closures per year

* EPH professionals who participated in focus groups, key informant interviews, and/or the national field survey consistently identified this metric as moderately to extremely useful.

Though not specifically discussed in the survey, the Model Aquatic Health Code (MAHC) was established by the Centers for Disease Control and Prevention (CDC) in 2014 and guides jurisdictions to help develop and update their pool codes based on current science and best practices. Based on this code or others like it, programs might find value in tracking the rate of in-compliance pools as a measure of success. Research has shown that some agencies aim for specific reduction targets, such as a 2% decrease for violations of disinfectant levels and a 10% decrease for other violations. Given the typically smaller number of pools compared to restaurants, tracking violation trends is a relatively accessible activity to monitor program progress, and many programs are already implementing this approach. Violations severe enough to warrant facility closure are also important to track as they could represent key indicators of program performance

Staffing

Staffing needs for swimming pools and recreational water safety programs are predominantly seasonal, with peak demand occurring in spring as facilities prepare for the swimming season. Even programs with dedicated year-round FTE positions require additional staffing during facility opening periods to accommodate the inspection workload, particularly for outdoor facilities. During colder months, workload generally decreases and focuses primarily on indoor facilities that maintain year-round operations. This seasonal variation creates unique staffing challenges that differ from other EPH programs with more consistent year-round demands.

For programs that reported needing additional FTEs beyond their current capacity, the suggested number of recreational water facilities/swimming pools, if the budget is not a constraint, would be an average of 180 inspections annually per 1 FTE (range 60–417). This wide range reflects variations in facility complexity, inspection requirements, and local program scope across different jurisdictions.

Programs could consider flexible staffing models that can accommodate seasonal peaks through temporary staff, overtime provisions, or cross-training with other EPH programs to ensure adequate coverage during crucial opening periods while maintaining cost-effectiveness during lower-demand months.

Education/Training/Certifications

This program area shows flexibility in educational requirements, with a bachelor's degree in science being the preferred qualification. Though the REHS/RS credential was recognized as valuable across all programs, there was no strong consensus for this program. Essential qualifications include passing the Certified Pool Operator and Certified Pool Inspector examinations. Practical training through shadowing experienced inspectors is highly recommended, with programs typically requiring 25–30 supervised inspections before allowing independent work. This hands-on approach ensures new inspectors develop competency in identifying violations and understanding facility operations

Equipment Needs

Equipment for swimming pools and recreational water safety programs typically serves as backup to the equipment that operators are required to maintain. Programs find it more useful to verify that operators possess and can properly use their water testing equipment rather than inspectors carrying duplicate supplies.

Essential equipment includes pool water chemistry test kits and tape measures for verifying compliance with spacing requirements for fencing and water depth markings. Some programs have invested in optical scanners that replace traditional water chemistry test strips. While these scanners require additional time and supplies such as chemical tablets, they can be useful for inspectors and operators who have difficulty interpreting color-based test results. Some agencies test for microbiological contamination in water and, therefore, require some type of laboratory capacity or partnership to perform those tests.

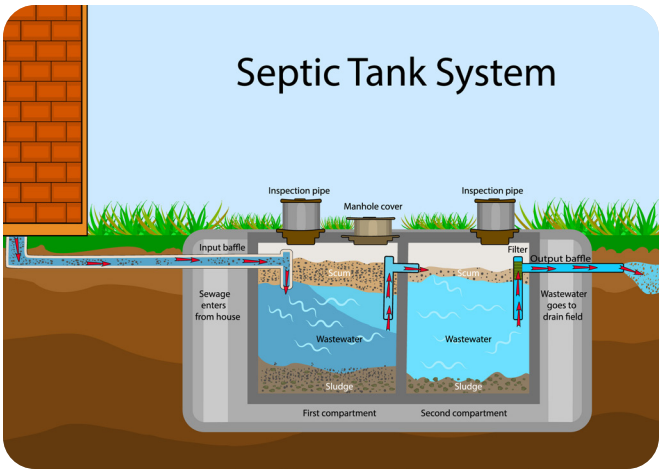
Funding Sources/Barriers

Swimming pools and recreational water safety programs are typically funded through permit and inspection fees, often supplemented by general municipal funding. According to the research, this fee-based model generally provides adequate revenue for current program operations. Some programs operate on a consultative basis rather than an enforcement basis, with enforcement occurring at a different jurisdictional level. In these cases, operators might use consultative inspections as preparation for official enforcement inspections. This arrangement might have implications for funding and staffing, as the need for consultative activities can be less predictable without the direct enforcement component.

Onsite Wastewater

Program Overview and Core Services/Activities

PROGRAM	RECOMMENDED WORKLOAD	EDUCATION AND CREDENTIALS	EQUIPMENT	KEY METRICS
Onsite Wastewater	**4–5 activities per week**	• Bachelor's in science • REHS/RS credential • Installer training programs	• Soil augers and rock hammers • Tile probes and levels • GPS units and CAD software • Sludge judge sampler • Cameras • Mobile technology and inspection forms	• Contaminated wells ratio • Permit review timelines • System failure reports



Definition

Onsite wastewater programs involve the planning, permitting, inspection, monitoring, and complaint response for systems used to treat and dispose of or recycle wastewater from onsite sewage treatment and disposal systems. Jurisdictional responsibility for onsite systems varies and can be defined by daily volume capacity, wastewater type and characteristics, facility square footage requiring soil sizing, or population served. These defining factors generally distinguish onsite systems from community-wide wastewater systems, which are typically regulated by state agencies. Program scope often encompasses the full lifecycle of onsite wastewater management from initial system design through ongoing operational oversight.

Characteristics of a Successful Onsite Wastewater Program

Success in onsite wastewater programs can be demonstrated through the prevention of contamination of water sources through early detection and prompt remediation of older, damaged, failing, or illegally installed systems while minimizing repair timeframes to protect both public health and property owners from extended exposure to contaminated conditions.

Effective programs might emphasize collaboration and education with property owners, contractors, installers, and academic institutions through a customer service approach. We found that some jurisdictions conduct industry surveys to assess relationship quality with wastewater system installers and other partners, recognizing that positive industry relationships facilitate compliance and system quality. Regulatory consistency across jurisdictions can also improve program effectiveness by allowing installers to work efficiently across multiple areas with uniform codes and fee structures.

Some EPH departments are involved in plan review and initial permitting. Ongoing maintenance and monitoring activities represent important considerations for long-term public health protection, though such activities were not reported as common across many jurisdictions.

Meaningful Outcome Measures

PURPOSE	METRIC
Program effectiveness	• Number of contaminated wells within a certain distance of a septic system/ number of inspected wells within a certain distance of a septic system • Number of complaints per year
Workload management	• Average time (in days) from plan submission to permit approval per year * • Number of initial permit reviews performed within 2 weeks • Number of site location assessments completed per year *
Public health protection	• Number of repaired septic systems/number of detected failing systems
Partner engagement	• Number of partner education events/contacts conducted per year

* EPH professionals who participated in focus groups, key informant interviews, and/or the national field survey consistently identified this metric as moderately to extremely useful.

To measure success, a program can benefit from having records of the location of wastewater systems within its jurisdiction. EPH departments with adequate resources can store geolocation for systems in the jurisdiction in a centralized electronic database. This process allows wastewater programs to more easily monitor and maintain current systems, plan the installation of new systems, or expedite the identification of problematic systems.

For areas with both wells and septic systems, the number of wells showing sewage contamination (exceeding critical coliform limits) could indicate how well the inspection program is performing. In areas where there are agricul-

tural activities, testing samples for coliforms might not be a good indicator as it could be difficult to determine the source of contamination—human or livestock. In these cases, programs can use presence/absence testing for coliforms or markers from detergents (e.g., optical brighteners) to determine areas of interest and then investigate the source of contamination with further bacteriology.

Plan review was noted as an important EPH function for most jurisdictions. A metric of program function could be the length of time to perform permit review from submission to determination. Additionally, the number of initial permit reviews performed or completed within a certain number of days could provide insight into program effectiveness. A reflection of how well plan review and construction permitting activities are functioning could be seen in the number of failing septic systems, which are typically reported by the public to the EPH department. Assuming that complaint calls have a high sensitivity rate due to unmistakable sewage odor, this metric could also be measured by how many complaint calls are received about failing systems. In areas where pumping and maintenance of septic systems are required by EPH departments, a measure of EPH education to the public could be the percentage of homeowners who are fulfilling the requirement of pumping and maintenance.

Septic systems might not be appropriate to install in population-dense areas, as they can contaminate groundwater. Therefore, a metric based on population would need to consider codes that require connection to community sewage systems within a certain distance of a service line.

Although customer service was identified as a potential characteristic of success, measuring this quality using methods like customer satisfaction surveys can be challenging. Often, customers are satisfied or dissatisfied with the installation process or quality, which is performed by third-party private companies not associated with the EPH department. Even if the initial installation was efficient from the EPH department perspective, customers might not know who to contact for installation failures. Therefore, outcome measures for customer service might not prove helpful. Given that environmental public health departments generally take complaints of various kinds, customers could be more likely to complain to the department even though the issue is reflective of the department's part in the process. Therefore, the metric of complaints per year is recommended for the purpose of ensuring the department has methods to receive complaints related to onsite wastewater issues from the public and can assess possible well water contamination to advise on next steps.

Staffing

Onsite wastewater programs typically involve permitting, inspection, and complaint follow-up activities, with third-party contractors often responsible for soil evaluation and system installation. Research participants suggested calculating staffing rates by the number of systems inspected per person per day, excluding complaints and follow-up monitoring activities.

A reasonable inspection rate was noted as two septic system inspections per person per field day, with each system requiring 2–4 hours of work. Staffing needs increase significantly if EPH professionals are responsible for soil evaluation and design proposal rather than just field verification. Programs requiring comprehensive technical evaluation should adjust staffing ratios accordingly. If EPH professionals are responsible for permitting and evaluating soil and proposing a design rather than just field checking, then that should be considered when determining staffing rates. As population density grows, staffing rates should consider the number and size of new and proposed subdivisions in the jurisdiction.

Staffing benchmarks vary based on program scope and local conditions. One approach allocates 1 FTE for 120 new and repair systems annually, while another suggests a maximum of 350 systems per FTE per year. Population-based calculations might use 10,000 population served per FTE, though this number can be adjusted based on population density and development patterns. These metrics could have limited applicability in urban areas with centralized sewer systems or rural areas where septic systems predominate, requiring jurisdictions to adapt benchmarks to their specific infrastructure mix.

Regular assessment of whether onsite wastewater duties can be completed with available FTEs is import-

ant for maintaining program effectiveness. University partnerships can supplement capacity by providing some additional testing capacity, such as sampling groundwater for contaminants of human metabolites that indicate sewage contamination.

Staff numbers are often constrained by available funding through permit fees and supplemental funding sources rather than actual workload needs. Research findings indicated efforts to align staffing with demand, particularly during periods of increased permit activity. Some jurisdictions indicated having notable increases in new septic permits, yet the number of FTEs remained unchanged. Hiring generalist EPH professionals could be easier for flexible staffing allocation between programs during periods of expanding or contracting needs, but at a minimum, staff members should have backups to allow for continuity of duties during staff absences.

Education/Training/Certifications

Educational requirements for onsite wastewater programs show flexibility, with a bachelor's degree in science being the preferred qualification. Research participants agreed that the REHS/RS credential provides comprehensive foundational knowledge for program duties. For jurisdictions not requiring an REHS/RS credential, a bachelor's degree in science with coursework in hydrology, soil science, or geology could provide useful foundational knowledge.

EPH departments could send EPH inspectors to the same certificate training that wastewater installers attend, which might be available through state-specific organizations or local colleges or universities. These certifications are desirable in addition to the REHS/RS. The National Onsite Wastewater Recycling Association (NOWRA) provides generally recognized training. Hands-on training in the form of joint inspections with more experienced EPH professionals that go through various stages of the permitting and construction process might be preferable as well.

Research indicates that some jurisdictions use alternate approaches to degree requirements when unable to hire candidates with specific degrees. These jurisdictions focus on skills-based hiring that prioritizes communication abilities, learning capacity, and customer service skills over formal education. Participants from these programs noted that inspection skills are primarily acquired through on-the-job experience. They also noted that degree requirements can limit access to the EPH field for individuals who have the aptitude but lack resources for a formal education. Professional certifications and training programs could offer an alternative educational pathway for individuals without formal degrees.

Programs might choose to balance accessibility with technical competency requirements, potentially establishing tiered qualification systems that allow various entry pathways while ensuring appropriate expertise for different system types and responsibilities.

Equipment Needs

For EPH professionals evaluating soil, useful tools include soil augers and rock hammers. Tools for inspection include tile probes, engineering scales, tape and optical measures, measuring wheels, lock levels, laser levels, sludge judges for evaluating depth of sludge in septic systems, and U.S. Department of Agriculture soil texture charts.

Technology needs can include computers, cameras for documentation, GPS units for system location mapping, and computer-aided design (CAD) software for plan review and system design activities.

General program equipment includes some type of reliable transportation, either through county or state-owned vehicles or personal vehicle reimbursement programs. Cell phones with good coverage in rural areas are important considerations, as onsite wastewater systems are typically installed in more rural areas.

Programs can ensure equipment is properly maintained and calibrated to support accurate field assessments and regulatory compliance documentation. The specialized nature of onsite wastewater work requires an investment in quality tools that can withstand field conditions while providing precise measurements important for public health protection.

Funding Sources/Barriers

Research indicates that onsite wastewater programs are primarily fee-funded for most jurisdictions, with new construction permits generating the most revenue. Juris-

dictions experiencing limited new construction, however, can encounter funding challenges under this model. Some jurisdictions have low permit fees, but if they were to move to a fully fee-funded model, the fees would reach over $1,000 per permit, which might not be desirable to the public or supported by local political will.

State and county funding availability varies significantly, but it might provide more sustainable support for jurisdictions with minimal new construction or areas where ordinances require sewer connections within specified distances of existing lines. Programs operating under statewide oversight might benefit from enhanced state funding support, though many jurisdictions report that current state contributions do not cover inspection costs, requiring supplementation through county levy funding or general funds.

Research participants noted keeping costs to the public for the services of this program in line with expectations is an important consideration. It is their opinion that fees associated with a program can be set at an amount that is reasonable enough to cover the costs of the program but should not be excessive or inflated to support other (non-onsite wastewater) programs for public transparency and accountability.

Another potential source of funding, while not applicable to most jurisdictions, comes from oil and gas industry revenue. With this funding, there are some departments that can support one half of their environmental health EPH department while the other half comes from the fees incurred from permitting. This model demonstrates how alternative revenue sources can provide funding stability for EPH programs in specific geographic or economic contexts.

School Safety and Inspection

Program Overview and Core Services/Activities

PROGRAM	RECOMMENDED WORKLOAD	EDUCATION AND CREDENTIALS	EQUIPMENT	KEY METRICS
School Safety and Inspection	**2–3 inspections per field day**	• Bachelor's in science • REHS/RS credential	• Infrared thermometers • Air quality monitors • Light meters • Playground inspection kits • Cameras • Mobile technology and inspection forms	• Repeat violations • Staff hazard identification • Technical consultations

Definition

A school safety and inspection program generally involves comprehensive inspection of educational facilities to protect the health and safety of students, staff, and visitors. Activities include the inspection of food preparation areas, chemical safety and storage practices, emergency procedures, indoor air quality, climate and extreme weather preparedness, pest management, facility planning, and facilities and equipment management. Inspections cover various school infrastructure including playgrounds, portable classrooms, and other educational facilities to ensure they are in proper condition to protect the health of students, staff, and visitors.

Characteristics of a Successful School Safety and Inspection Program

The ultimate measure of program success is to establish schools as healthy, safe, and equitable learning environments for all students. This goal encompasses not only regulatory compliance but also the creation of educational settings that actively support student health, safety, and academic achievement. Successful programs ensure that all facility components, from food service areas to classrooms and recreational spaces, contribute to an environment where students can learn and thrive without health or safety concerns.

Success in school safety and inspection programs could be demonstrated when school facilities can serve as models for other establishments. For example, bringing operators of struggling facilities into well-managed schools to demonstrate best practices in safety and compliance standards.

Meaningful Outcome Measures

PURPOSE	METRIC
Program effectiveness	• Percentage of permitted school cafeterias inspected annually* • Decrease in the number of major or repeat violations per school per inspection cycle
Workload management	• Percentage of school inspections completed during peak season (September–November) annually • Average number of school safety inspections completed per inspector annually*
Public health protection	• Number of critical violations identified per 100 school inspections annually

* EPH professionals who participated in focus groups, key informant interviews, and/or the national field survey consistently identified this metric as moderately to extremely useful.

A key measure of program effectiveness and educational impact is the reduction in repeat violations cited during inspections. Violation severity is typically weighted based on population impact and problem scope, with system-wide issues such as malfunctioning plumbing that affects entire schools receiving higher priority than localized problems like individual classroom handwash sink failures.

Educational effectiveness can be measured through the school staff's ability to identify and address potential hazards between formal inspections. Programs that operate on multiyear inspection cycles should track reductions in both major violations and repeat violations as indicators of successful knowledge transfer and technical assistance.

Staffing

The number of staff for school safety and inspection programs varies based on local funding mechanisms, jurisdiction size, and inspection frequency requirements. Research findings indicate that some programs use county-level funding based on income tax revenue and the number of schools requiring inspection, creating direct connections between local resources and program capacity.

Inspection scheduling affects staffing needs significantly. Programs operating on rotating schedules, such as full school inspections every 3 years with kitchen inspections each semester, require different staffing models than annual inspection programs. To meet the demands of performing school inspections during school operational periods, research findings indicate that programs might use multiple staff members who can perform these inspections quickly and then return to other EPH programs, demonstrating how shared staffing approaches can address the timing constraints of educational facility inspections.

Calculations to determine the number of staff needed might consider the percentage of FTE time dedicated to school routine inspections. Factors include school types within the jurisdiction, inspection capacity per workday for different school categories, and the balance between routine and non-routine inspection activities. Survey data indicates a median of 140 school inspections per FTE annually across programs. Staff time could be allocated to other program

areas during summer months when schools are generally closed, such as vector control or recreational water programs that experience increased activity during this period.

Staffing assignments can consider the geographic location of schools and drive time, as well as factor in the type of schools assigned to each inspector. High schools tend to take longer to inspect than elementary schools and larger facilities usually take longer than smaller schools. Programs can periodically change the routes of inspection assignments to redistribute the workload and get a fresh pair of eyes to evaluate the inspected facilities.

Education/Training/Certifications

A bachelor's degree in science and an REHS/RS credential were both identified as important for this role, providing the technical background useful to understand complex facility systems and health hazards. Additional certifications, such as a certified playground safety inspector, could enhance program effectiveness for specific facility components. Additional training on topics such as integrated pest management (IPM) and other school-specific topics could expand inspector competency beyond basic EPH knowledge.

In-house shadowing and training through shadowing experienced inspectors were noted as important for developing competency across different educational settings. Research participants recommend that new inspectors shadow experienced inspectors for at least three school levels—elementary, junior high, and high school. While elementary schools can be more straightforward, higher-level schools have chemistry laboratories or other programs that require more involved inspections. Having exposure to these types of schools and the inspections they entail gives a new inspector the breadth needed to graduate to conduct joint inspections with limited oversight and then eventually solo inspections.

Equipment Needs

School safety and inspection programs need equipment for school inspections, including temperature measurement tools such as infrared thermometers to check classroom temperatures to ensure they are within state requirements.

Indoor air quality assessment equipment such as rotating vane anemometers that can measure air velocity, air volume, and temperature, and similar monitors and detectors can check indoor air quality and relative humidity. Light meters are useful to ensure classrooms are not too dark.

General inspection tools include flashlights to aid in looking under sinks and checking for pest activity. Infrared cameras can help identify moisture issues in walls and ceilings.

A playground inspection kit for playground safety inspections is highly recommended. Additionally, for programs that also conduct school kitchen inspections, similar tools needed for food safety inspections are needed for school kitchen inspections as well—thermometers, chemical test strips for pH and cleaning solutions for dishwashers, etc.

Funding Sources/Barriers

School safety and inspection programs are funded through varied mechanisms, with significant differences across jurisdictions.

Common sources of funds include state appropriations and general funds that provide funding for school EPH programs in some states; local health department general funds that often support school inspections as part of broader EPH services; fee-based systems where some jurisdictions charge inspection or permit fees to schools; and grant funding through EPH education grants from the U.S. Environmental Protection Agency (U.S. EPA), school integrated pest management grants, and other competitive federal and state grant programs.

Challenges around funding include jurisdictional complexity where the authority for school EPH often spans multiple agencies (e.g., health departments, education departments, facilities management). These challenges create issues in coordinating resources and responsibilities and limit the dedicated funding streams for school EPH programs, with some programs competing for resources within broader EPH or education budgets, infrastructure funding gaps, and inequitable resource distribution.

Early Childcare and Daycare

Program Overview and Core Services/Activities

PROGRAM	RECOMMENDED WORKLOAD	EDUCATION AND CREDENTIALS	EQUIPMENT	KEY METRICS
Early Childcare and Daycare	**3–4 inspections per week**	• Bachelor's in science • REHS/RS credential • Playground safety certification • IPM training	• Thermometers and light meters • Flashlights • Sanitizer test strips • Educational materials • Cameras • Mobile technology and inspection forms	• Number of critical violations • Outbreak control timeframes • Facility closure rate

Definition

An early childcare and daycare program generally involves comprehensive inspection of facility cleanliness, safety, and pest control management; verification of proper sanitizing and disinfecting procedures; ensuring appropriate storage of medications and chemicals; measuring hot water temperatures; providing education to control communicable disease transmission; facilitating disease management; ensuring appropriate vaccinations of attendees and staff; assessing safety hazards including pools, playgrounds, electrical outlets, strangulation risks, and tip hazards; documenting presence of required policies and procedures for diapering, potty training, handwashing, emergency preparedness, and illness exclusion; connecting facilities to mental health resources; and conducting kitchen inspections where applicable.

Childcare and daycare facilities are typically categorized as residential or commercial operations. Some jurisdictions also establish limits on the number of children allowed in residential settings. Inspections are generally conducted as part of licensing processes. Sometimes the licensing process is administered by agencies other than EPH departments. When multiple agencies are involved in licensing, each might focus on different facility aspects, requiring coordination to ensure comprehensive oversight while avoiding duplication of efforts.

Characteristics of a Successful Early Childcare and Daycare Program

Success in early childcare and daycare programs is primarily defined by the ability to effectively control communicable disease transmission within care facilities. Effective programs work with operators to create safe and healthy environments where parents can confidently place their children, knowing that appropriate health and safety standards are maintained and enforced.

Meaningful Outcome Measures

PURPOSE	METRIC
Program effectiveness	• Average number of critical violations cited per 100 facilities per year * • Decrease in the number of facility closures per year *
Workload management	• Number of inspections completed per inspector per year
Public health protection	• Average number of days between illness outbreak detection and the end of transmission per year. • Percentage of facilities with complete vaccination records *

* EPH professionals who participated in focus groups, key informant interviews, and/or the national field survey consistently identified this metric as moderately to extremely useful.

Disease prevention in childcare settings involves ensuring proper vaccine documentation and limiting the spread of disease. Disease can transmit easily in childcare facilities; therefore, EPH programs should verify that facilities main-

tain vaccination records and ensure attendees and staff are properly vaccinated.

Facility closures due to unsatisfactory conditions could be seen as a measure of program performance. Facilities remaining open could indicate good compliance. Like other EPH inspection programs, tracking the number and types of violations cited provides important outcome measures.

Research participants did not feel that illness or outbreak numbers would be good measures of program success or effectiveness. Diseases such as norovirus, influenza, and hand, foot, and mouth disease inevitably occur in these types of facilities, especially for diseases where no vaccine currently exists. Tracking outbreak control timeframes from detection to resolution could provide insight into facility preparedness. While not the consensus opinion, EPH programs might find it useful to track how long it takes to control an outbreak once detected and whether it has spread to the community. Shorter control periods could indicate that facility staff were trained in infection control measures and had proper protocols to prevent ongoing transmission.

Inspection completion rates represent another practical outcome measure. Some research participants mentioned that their programs aimed to complete 90% of required childcare and school inspections per year, which leaves flexibility for seasonal camps and similar facilities that might not operate during certain seasons. Such facilities maintain licenses but do not require inspection when non-operational.

Staffing

Adequate staffing levels might enable programs to complete required facility inspections within established timeframes. Programs that track inspection completion rates, such as achieving 90% of required inspections annually as mentioned by participants, can use these metrics to identify when staffing adjustments are necessary.

For some participants, being able to track the amount of time in each type of facility (i.e., childcare, family care homes, group care) can help determine the amount of staffing needed for this program. Research findings indicate that 3–4 early childcare or daycare facility inspections per week were considered reasonable by both staff and managers for full-time staff.

Education/Training/Certifications

A bachelor's degree in a field of science was identified as the preferred minimum education requirement for early childcare and daycare programs. REHS/RS credentialing was also recommended for professionals working in this program area.

Participants suggest a playground safety inspection certification as it provides good training for a setting where there are many hazards to child health and safety. Having some type of IPM training (not necessarily a certificate) would be useful, as EPH professionals would be more informed about pesticide applications in areas where children are exposed.

On-the-job training was valued for early childcare and daycare programs. Participants mentioned considering a person to be a fully trained EPH specialist after 2 years of training.

Participants noted that if departments make registration a mandatory educational requirement, it is important that they build in the resources to enable staff to pursue and maintain this registration.

Equipment Needs

Early childcare and daycare inspection programs will likely require standard EPH equipment to assess facility condi-

tions and safety compliance. Participants recommended thermometers, light meters, tape measures, sanitizer test strips, thermal labels or heat disks, labels for cleaning solutions, gloves, masks, and shoe booties or covers.

Funding Sources/Barriers

Childcare and daycare EPH programs operate under different funding models. Some programs are fee-based, while others receive funding from general funds through taxes. Participants noted that in less urban or sparsely populated areas, general fund allocations do not fully cover program needs.

Some participants whose programs rely on general funds expressed interest in implementing permit fees for childcare facilities. These participants indicated that permit fees could generate revenue to supplement general funds, particularly in less populated areas. According to participants, consistent funding supports both routine inspections and less frequent activities such as outbreak investigations.

Zoonoses and Vector Control

Program Overview and Core Services/Activities

PROGRAM	RECOMMENDED WORKLOAD	EDUCATION AND CREDENTIALS	EQUIPMENT	KEY METRICS
Zoonoses and Vector Control	**Variable by disease burden**	• Bachelor's in science • REHS/RS credential • Vector control technician training • IPM training	• Traps and collection tools • PPE • Lab supplies and microscopes • Adulticides and larvicides • Cameras • Mobile technology and documentation forms	• Training hours • per inspector • Number of human disease cases • Vector index thresholds

Definition

A zoonoses and vector control program generally involves the surveillance, investigation, and control of diseases directly or indirectly transmitted by animals and insects that affect human health. These include mosquito-borne diseases, tickborne diseases, rabies, fleaborne diseases such as plague, and other diseases transmissible from animals and insects to humans. Activities include case investigations, mapping of vector sources, implementation of vector awareness strategies, monitoring of emerging and reemerging vectorborne diseases, response to outbreaks, and assistance with the coordination of specimen collection and safe disposal of animals and vectors.

Characteristics of a Successful Zoonoses and Vector Control Program

Phased response plans for disease response and mitigation are an important part of success and include the ability to analyze historical data to determine thresholds. Public trust and good customer service are valuable drivers that ensure programs address non-outbreak-related vectorborne disease issues in a way that instills confidence and trust in public health. This strategy could mean regular assessment of program gaps and response to those gaps to strengthen areas of weakness.

Forecasts are an important element for the success and continued success of a vectorborne program as climate change expands the range of vectors that can carry diseases. Human disease tracking and surveillance can detect vector movement and disease emergence in a jurisdiction. For example, mosquito indices can be calculated as the average number of infected vectors collected per trap-night.

A vector index for mosquitoes, such as an index of 0.5 for 2 weeks, can help departments know when to consider implementation of more drastic control measures like aerial spraying.

Meaningful Outcome Measures

PURPOSE	METRIC
Program effectiveness	• Number of disease outbreaks responded to within target timeframe per year * • Number of case investigations completed within the required timeframe per year • Number of specimen collections and safe disposals completed per season.
Workforce development	• Percentage of staff completing required integrated pest management training annually *
Partner engagement	• Number of partner education events/contacts conducted per year *

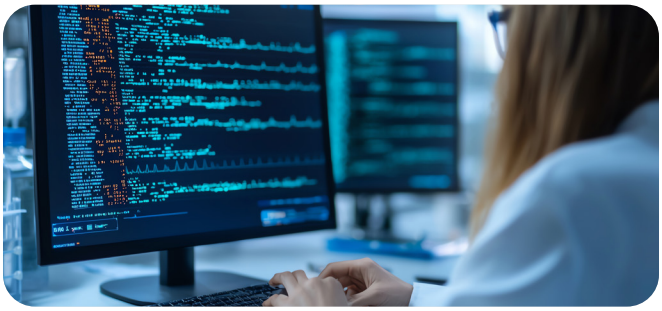
* EPH professionals who participated in focus groups, key informant interviews, and/or the national field survey consistently identified this metric as moderately to extremely useful.

Support of the public is important because funding for program activities often comes from taxes and special districts. This support is difficult to measure, but departments can use needs assessments to try to capture some indicators.

Our research found that training completion serves as an important outcome measure for this program. Specifically, tracking whether staff receive annual integrated pest or vector management training provides a key indicator of program implementation success.

EPH departments often develop risk thresholds for each disease relevant to their area and have a plan to act once the thresholds are surpassed. These thresholds might be vector-specific, such as a vector index, and/or human-specific, such as the number of human disease cases. Data analysis of disease trends plays a big part in establishing thresholds and considering environmental and surveillance factors into disease response is essential for this program with very mobile vectors. For example, assuming surveillance is consistent, a department's jurisdiction could be in a vulnerable position if surveillance does not detect disease activity for an extended period. In the case of West Nile virus, this could mean that the birds in the area are increasingly susceptible to the virus, therefore increasing the viral abundance in the environment, which might result in an increase in human cases in the upcoming year.

Staffing



The workload for this program is disease and vector dependent; the more diseases that are monitored and investigated, the more staffing is generally necessary. Mosquitoes seem to be a ubiquitous problem, but some diseases like hantavirus or Lyme disease tend to be regional or in concentrated areas.

Tourism might also play a role in the determination of staff numbers. Mosquitoes and pests can hinder the growth of a tourism economy and, therefore, some jurisdictions where tourism is a big economic driver might choose to invest more in their mosquito or pest control programs in target areas.

Partnerships and internships with local universities can provide some seasonal staffing support from students needing to fulfill a practicum or applied experience intern-

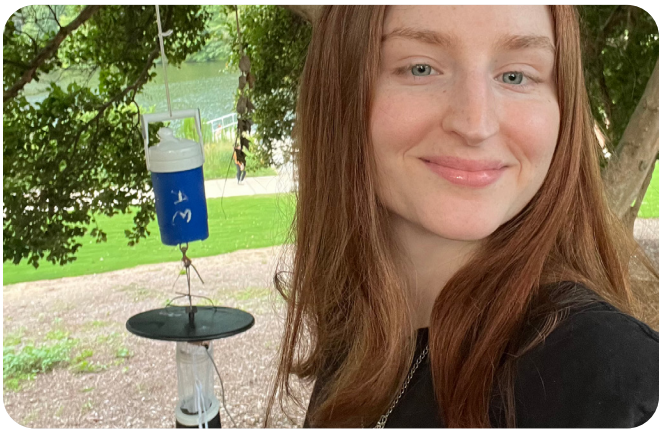
ship. Given its seasonal nature, it was suggested that the student workforce might be better used for special projects or disease investigation rather than routine duties.

Participants suggest having dedicated staff for each of the various EPH programs to ensure programs are operating as necessary. They shared an example where during a large outbreak of a vectorborne disease, the media reported that because EPH staff were pulled from conducting restaurant inspections to outbreak response, many of the restaurants were not being inspected. To avoid a drastic shift in functionality, they advocate for at least one dedicated staff person per EPH program area to maintain consistency. Unfortunately, in jurisdictions where there are no dedicated mosquito control districts or dedicated programs, EPH professionals are likely doing mosquito control work as an add-on duty to their regular roles, which can lead to under-training and potentially less effective prevention efforts. Contrarily, specialization might make it difficult to move staff between programs to support seasonal needs.

Access to an entomologist and veterinarian could prove helpful to jurisdictions. Sometimes these relationships exist through partnerships with state health departments. Additionally, partnerships with laboratories for testing are also essential to confirm disease presence.

Overall, staffing for this program is generally driven by the number of diseases and vectors relevant to the geographic area of the department, economic needs and funding availability, and population served. From the key informant interviews, we estimate about 0.45 FTEs per 100,000 population served for a jurisdiction where tourism is not a big factor. In an area with higher tourism, we estimate a need of approximately 1.35 FTEs per 100,000 population served.

Education/Training/Certifications



For supervisory positions, participants recommend a bachelor's degree in the science field.

The REHS/RS credential was recommended for this program area, particularly for supervisory positions, though specialized vector control certifications and training were often prioritized. For some jurisdictions, a vector control technician certification license could be required by the state. Because vectors are geographically significant, EPH professionals might seek training specific to their state.

Integrated pest and vector management training was identified as valuable for professionals in this program area. Due to the potentially hazardous chemicals and risks involved, such as pesticide spraying and vector trapping and flagging, participants recommend that EPH professionals performing the duties of a vectorborne program be properly and specially trained for each activity.

Equipment Needs

Field work often requires specialized equipment, including protective gear (e.g., insect repellent, Tyvek suits), collection tools (e.g., flea drags, tick cloths, traps, lures, aspirators, vials, insect cages), inspection tools (e.g., plumbing snakes for rodent burrow examination), and control products (e.g., adulticides and larvicides).

Common unspecialized equipment includes flashlights, UV lights for detecting urine, and probes for testing holes (since openings larger than 1/4 in. can allow small mice to enter or exit). Additional basic tools include cameras or phones for documentation, computers or tablets for recording information, and personal protective equipment (PPE) such as eye protection and gloves.

Jurisdictions with laboratory facilities might require specialized equipment, including dedicated refrigerators and freezers for sample storage, coolers and ice packs for shipping specimens to labs, microscopes for examination, forceps for handling specimens, pinning equipment for mounting, and larval or sorting trays for organizing samples.

Funding Sources/Barriers

For many jurisdictions, vectorborne program funding originated with local general funds. Some participants shared that their programs receive some funds from the state through property taxes. Federal funding through grants like the Public Health Emergency Preparedness grant or the Epidemiology Laboratory Capacity Cooperative Agreement has provided resources for activities like laboratory testing for priority diseases, such as mosquito testing for West Nile virus.

Grants through member-based organizations have provided some one-off funding for some programs, but pursuing these types of opportunities can sometimes require adapting the program to meet funding requirements rather than the needs of the communities the departments serve.

For a few participants, funding is a multifactorial process that takes into consideration the tourism industry and public opinion and support. Media coverage of disease outbreaks, such as a West Nile virus outbreak or even resulting lawsuits, can garner public attention and incentivize politicians to allocate more funds to the vectorborne program. This method of funding, however, can be unpredictable and unsustainable but has provided a much-needed funding boost for the programs that otherwise would not have received it.

Potential sources of revenue for this program could be through a variety of taxes or fees on the populace—mosquito abatement fees on utility bills, income taxes, property and parcel taxes, or pet registration taxes. Participants spoke about an instance where the National Park Service was able to negotiate an agreement with a local public health program to pay them for services. Using the funds from this agreement, the environmental public health program was able to hire an FTE for this program.

Emergency Preparedness

Program Overview and Core Services/Activities

PROGRAM	RECOMMENDED WORKLOAD	EDUCATION AND CREDENTIALS	EQUIPMENT	KEY METRICS
Emergency Preparedness	**As needed basis**	• Bachelor's in science or other degree • REHS/RS credential • ICS 100, 200, 700, 800 • EHTER courses	• Communication systems • Emergency power sources • Specialized response equipment • Laboratory access	• Number of staff with required certifications • Response time • COOP plan review currency

Definition

The role of EPH programs in emergency preparedness is primarily thought of as a program concentrating on human health and the environmental effects in the preparation and response to natural and human-made emergencies and disasters. EPH professionals are important to the assessment and restoration of many services in the community such as food supply, sewage treatment, drinking water, solid waste disposal, and other essential services.

It is important to note that many state public health agencies have an emergency preparedness program; however, disaster response is profoundly local. EPH responders are not typically thought of as first responders, but they have a vital role in response and recovery.

Characteristics of a Successful Emergency Preparedness Program

Because EPH professionals are not necessarily performing emergency preparedness activities as daily duties, building and maintaining relationships with emergency preparedness professionals and agencies in their state is essential to a successful emergency response. As one participant stated, "You don't want to exchange business cards at the disaster."

> You don't want to exchange business cards at the disaster.

Successful programs would have updated policies and procedures, such as a continuity of operations plan (COOP) that supports the EPH workforce's ability to respond.

As an emergency preparedness capacity workforce, it is important that EPH departments clearly outline the roles, responsibilities, and competencies of their EPH professionals related to emergency response. This outline fosters a shared understanding of the skills and training that EPH professionals possess and expedites mutual aid requests between agencies.

While not specifically discussed in this research, jurisdictions might find our Environmental Public Health Emergency Preparedness and Response (EPHEPR) capability framework helpful. EPHEPR provides guidance for assessing and strengthening readiness to address core public health issues in disasters. The framework includes 15 functional areas with corresponding tasks that explain each function necessary to protect against environmental health threats. Additionally, our guidance on EPH strike teams is available to support the development of scalable units that can deliver targeted assistance during emergencies. More information on these resources can be found at https://www.neha.org/epr-framework and https://www.neha.org/PDFs/Strike_Team_White_Paper_FINAL.pdf

Meaningful Outcome Measures

PURPOSE	METRIC
Program effectiveness	• Percentage of staff who complete at least one emergency preparedness training per quarter annually • Percentage of emergency response plans and protocols reviewed and updated per year * • Percentage of continuity of operations plans reviewed or updated annually * • Percentage of staff with required ICS certifications (100, 200, 700, 800) per year * • Percentage of emergency responses followed by completed after-action reviews with documented lessons learned per year *
Response capability	• Average time from emergency notification to full operational response (in hours) per year *

* EPH professionals who participated in focus groups, key informant interviews, and/or the national field survey consistently identified this metric as moderately to extremely useful.

The ability to provide a capable and competent workforce in the field when needed is a meaningful measure of EPH capacity in emergency preparedness and response. Training for the EPH workforce to serve as responders to health-related emergencies is an important metric of response capacity. After-action reviews that recommend actionable steps to improve planning and response to future emergencies provide a meaningful perspective on the effectiveness of those trainings.

Staffing

EPH capacity in emergency response is generally based on a comprehensive threat assessment and vulnerability analysis to determine potential needs. Some emergencies or natural disasters, such as tsunamis, earthquakes, wildfires, hurricanes, and flooding affect some jurisdictions and not others.

Participants shared that EPH professionals in their jurisdictions are trained in emergency response so that they could be deployed in an emergency capacity. Though not

generally housed in EPH, jurisdictions shared that approximately 30% of 1 emergency coordinator FTE was dedicated to their jurisdictions per roughly 50,000 people.

Education/Training/Certifications

Participants indicated that a bachelor's degree was the preferred educational requirement for emergency preparedness programs. Additionally, some participants mentioned that having a master of public health (MPH) would also adequately prepare someone to lead environmental public health planning and actions during an emergency response.

While the REHS/RS credential was recognized as valuable for this program area, it was not considered as essential as program-specific emergency management training.

Appropriate and up-to-date training was noted as important and recommended for EPH emergency responders. These trainings include the Federal Emergency Management Agency's Incident Command Systems (ICS) courses that are available online for free:

- ICS 100: Introduction to the Incident Command System
- ICS 200: Basic Incident Command System for Initial Response
- ICS 700: National Incident Management System (NIMS), an Introduction
- ICS 800: National Response Framework (NRF), an Introduction

Participants also noted that first aid, cardiopulmonary resuscitation (CPR), and AED training could be important training for some professionals, depending on their roles. Also recommended was the Center for Domestic Preparedness's Environmental Health Training in Emergency Response (EHTER), a 5-day in-person training at FEMA facilities in Anniston, Alabama, which has been well-received and highly recommended by participants.

Participants mentioned other useful credentials, but these credentials were not recommended to be required of EPH professionals. These included the certified hazardous materials manager certification and emergency management certification.

Equipment Needs

Access to or a relationship with a laboratory to conduct food, water, and air quality testing was noted as being important for biological and environmental monitoring to detect and monitor emergency situations. Communication among responders is also important during emergencies; therefore, recommended equipment includes cell phones, radios, internet, computers, and government emergency telephone systems (GETS) and Wireless Priority Service (WPS) to maintain uninterrupted communication lines. To support this technological equipment, generators or alternative sources of power were also noted as important. Specialized equipment could be required for specific types of emergencies and disasters, such as radioactive detection equipment to handle emergencies involving radioactive waste.

Funding Sources/Barriers

Participants indicated that funding for emergency preparedness programs often comes through federal grants and from general funds. Some jurisdictions reported using hotel occupation tax or tipping fees from waste haulers at landfills to fund emergency preparedness activities. Revenue generated by state lotteries was mentioned as another potential funding source, though participants noted these funds are not always sustainable.

Potable Water

Program Overview and Core Services/Activities

PROGRAM	RECOMMENDED WORKLOAD	EDUCATION AND CREDENTIALS	EQUIPMENT	KEY METRICS
Potable Water	**3–4 field activities per week**	• Bachelor's in science • REHS/RS credential • Drinking water operator certification	• Water quality kits and sampling supplies • Cameras • Measuring tapes and rulers • Mobile technology and inspection forms • Educational materials	• Number of well inspections • Safety of water samples • Number of waterborne illnesses associated with drinking water • Number of educational events • Number of voluntary well water samples submitted • Number of plan reviews completed

Definition

Potable water programs in EPH departments can include public drinking water systems; ground or well water disinfection, construction, testing, sealing, and repair; chemical runoff; leaking or failing sewage systems; and severe weather effects (e.g., drought, severe cold, severe heat).

These programs work to ensure safe drinking water through oversight of water systems. Programs perform activities such as approving new water systems and wells through permitting processes, conducting testing for contaminants, performing inspections for compliance with health and safety standards, and implementing enforcement actions when necessary. Programs also issue water safety advisories and provide education on water safety practices to protect public health.

Characteristics of a Successful Potable Water Program

A potable water program generally works to ensure safe locations for wells and onsite wastewater systems through sanitary surveys. The program ensures that wells are properly constructed, and that the groundwater source is safe through appropriate sampling to test for coliforms and other contaminants in drinking water.

Part of ensuring a safe location for wells for many jurisdictions includes having a registry that identifies where these systems and onsite wastewater systems are in the jurisdiction. If the information is not housed locally, having access to state-level data of well locations and depths can be useful in constructing or decommissioning wells, if such data exists.

Education for property owners, well drillers, builders, and other industry partners is an important activity for potable water programs. Strong relationships with associations for well drillers, building and safety, and onsite wastewater help EPH professionals serve as a resource for industry partners as they do their work. Often, government agencies that permit oil, gas, or mining industries are different from health agencies. In these cases, collaboration between health agencies and these industry partners protects groundwater and prevents contamination of drinking water supplies.

Meaningful Outcome Measures

PURPOSE	METRIC
Program effectiveness	• Percentage of well inspections completed within required timeframes per year * • Percentage of plan reviews completed within target timeframes per year.
Workload management	• Average number of potable water activities completed per staff member per week annually.
Public health protection	• Percentage of water samples meeting all applicable quality standards per year. • Number of waterborne illness cases associated with regulated water systems per 100,000 population per year *
Partner engagement	• Number of education events on water testing conducted per year. • Number of voluntary well water samples submitted per 1,000 known wells per year *

* EPH professionals who participated in focus groups, key informant interviews, and/or the national field survey consistently identified this metric as moderately to extremely useful.

Potable water program outcome measures should consider weather seasonality as contaminant levels are affected by rainfall, drought, and other weather-related incidents.

Population density can affect the number of possible contamination sources and should be considered when developing policies allowing new well construction and drilling.

As a metric of the impact of consumer education, potable water programs could estimate the number of well water samples voluntarily submitted for contaminant testing by well owners per the number of known wells in the jurisdiction per year.

Staffing

Potable water program responsibilities differ among agencies. Some agencies ensure the proposed site of a well is suitable, while some are more involved in siting, surveying, and maintenance. Staffing rate determination for this program mighty consider the level of involvement of EPH personnel from reviewing permits, ground surveying, siting location, and construction oversight, to providing education and routine maintenance inspections.

Research indicated that 3–4 potable water field activities per week were considered reasonable for EPH professionals. Jurisdictions need to have a general understanding of how many annual field activities are anticipated to determine the FTE needed for their potable water program.

In addition to considering the potable water efforts of local departments, consideration should be given to what other agencies—such as state agencies and academic partners—are doing to support the protection of public health in this field.

Additionally, as demands for new construction of homes with private wells increase and in- and out-migration occur, the need for more dedicated staff is rising for many jurisdictions. To allow for maximum flexibility, adequate staffing for this program would mean existing wells are inspected and maintained the appropriate number of times required by legislation.

Education/Training/Certifications

A bachelor of science in a science field with some courses in geology, biology, microbiology, and hydrology is highly recommended by survey respondents.

Given the intricacies of installing and maintaining a potable water system that go hand-in-hand with onsite wastewater systems, participants also recommend requiring an REHS/RS credential for inspectors performing potable water program activities.

Additionally, drinking water operator and public systems certifications offered by many states and well driller associations can help EPH professionals become more acclimated to perform some of the duties of this program.

Equipment Needs

Equipment for potable water programs varies based on specific program responsibilities and activities. Common equipment includes inspection and assessment tools such as measuring tapes, rulers, and digital cameras for documentation purposes.

Water sampling and testing equipment represent a critical component of potable water programs. This includes sterile water sampling containers, sample preservation materials and coolers, chain of custody documentation forms, and transportation materials for sample delivery to laboratories. Programs often rely on proper sampling equipment to ensure accurate water quality assessment and regulatory compliance. Educational and outreach materials, including brochures and fact sheets about water safety, support programs in communicating important information to system operators and the public. Administrative and technical equipment encompasses computers and printers for plan review and documentation, technical reference materials and regulatory guides, communication devices (cell phones, two-way radios), and vehicles for field inspections and site visits.

Programs that engage in soil sampling or well-siting activities might require additional specialized equipment, including soil sampling tools for contamination assessment and basic surveying equipment for well-siting evaluations. Equipment selection varies based on the scope of services provided and specific regulatory requirements within each jurisdiction.

Funding Sources/Barriers

Funding for potable water programs in many jurisdictions is based on fees incurred from the construction and maintenance of potable water systems. New construction fees are common among participating departments in this focus group. Some departments charge an annual fee for maintenance inspections. Participants did not charge a fee for operating wells, which could mean that their primary source of income for this program relies solely on new construction, thereby making their program vulnerable to population migration.

Lead Prevention

Program Overview and Core Services/Activities

PROGRAM	RECOMMENDED WORKLOAD	EDUCATION AND CREDENTIALS	EQUIPMENT	KEY METRICS
Lead Prevention	**2–3 field activities per week**	• Bachelor's in science • REHS/RS credential • Lead risk assessor certification	• XRF analyzers • Dust wipe sampling supplies • PPE • Educational demonstration kits	• Blood lead level reductions • Number of properties deemed lead safe • Environmental assessment completion rates

Definition

An EPH lead prevention program generally involves the surveillance, investigation, remediation referrals, and education of lead exposure in response to child blood lead detection. Exposure sources can occur from lead-based paint, lead water service lines, food, or lead-contaminated soil.

Lead prevention programs usually have two main components: 1) exposure-driven intervention and 2) prevention, education, and outreach.

It was noted by participants that the term "elevated child blood lead levels," though still often used, is being reconsidered. This terminology shift emphasizes that there is no acceptable level of lead in the blood of children, with an understanding that testing instrument limitations can limit detection, and departments might choose to only investigate cases where results yield a reading of over 3.5 µg/L of lead per dL of blood per CDC and U.S. EPA guidelines.

Characteristics of a Successful Lead Prevention Program

A successful lead prevention program often has good community awareness and relationships so that the communities it serves feel comfortable using the services. The program engages communities, empowers nonprofit or community-based organizations to assist, and facilitates the relationships needed to protect the health of those in the communities.

The program addresses the needs of the community by conducting surveillance and educational programs and, equally as important, helps the community follow through to remediate issues that are found through the surveillance.

Meaningful Outcome Measures

PURPOSE	METRIC
Program effectiveness	• Percentage of home inspections completed where lead hazards were identified and addressed annually * • Percentage of elevated blood lead level investigations completed within target timeframe annually * • Percentage of children with elevated levels whose blood lead levels returned to acceptable ranges within target timeframe annually *
Workload management	• Average number of lead prevention activities completed per staff member per week annually
Public health protection	• Percentage reduction in children with elevated blood lead levels annually *
Partner engagement	• Number of public education events or contacts about lead exposures conducted per year

* EPH professionals who participated in focus groups, key informant interviews, and/or the national field survey consistently identified this metric as moderately to extremely useful.

Based on the authority given to the EPH department, some can enforce remediation activities such as removal of lead-based paint from homes within their jurisdiction

whether it be rental properties or owner-occupied properties. Because rental homes often provide housing for people who have lower incomes, it is important to make sure the program protects the health of this at-risk population to ensure that rental properties comply with lead-safe requirements through assessment and remediation. Lead testing as part of a rental registry can help identify properties of concern. An outcome measure could be the proportion of rental properties that have been deemed lead-safe out of the number of rental property registrations there are. This measure can apply to rental property permits but also construction permits. When a contractor applies for a construction permit on an older home, a meaningful outcome measure would be how many of those permits or homes have a lead assessment conducted by the EPH program.

Another helpful measure was stated as being able to track the number of children with blood lead levels and how many of those cases continue to have elevated levels after multiple tests and having their property undergo remediation strategies once they enter the surveillance system. This measure requires surveillance systems that can track individuals and laboratory reports over time.

Partnerships with community-based organizations to reach at-risk communities might also be an important part of their work. There could be community development organizations that serve as community ambassadors and consultants who can conduct lead consultations. Through partnerships with these organizations, healthcare providers, and clinics, programs can promote screening and education so that children are tested for blood lead levels.

Staffing

Lead prevention programs can determine staffing based on three key factors: 1) population served, 2) number of pre-1978 properties, and 3) geographic coverage area. Home visits generally represent a core program function, particularly when children test positive for lead. The travel time required for these visits directly affects staff capacity and workload.

Research indicates that 2–3 lead prevention activities per week were considered reasonable for EPH professionals. Programs can use this guidance along with their estimated annual activity needs to determine appropriate staffing levels. Respondents in the focus groups also noted that jurisdictions could consider the desirable minimum staffing for this EPH program as a median of 1.2 FTEs per 100,000 population served.

Some participants also noted that much of the remediation work is currently being conducted by private third-party companies who can charge property owners drastically different prices. Additionally, some noted that jurisdictions might want dedicated FTEs to do the remediation work that is currently done by third-party companies, though there was no consensus on this suggestion.

Education/Training/Certifications

A bachelor's degree in a science field was identified as the preferred minimum education requirement for lead prevention programs. For some specialized roles, participants noted that community health educator positions could benefit from degrees in public health or nutrition, while community health worker roles could have a high school diploma as a minimum requirement.

The REHS/RS credential was recognized as valuable for this program area. While not considered essential for performing lead prevention duties, the credential provides foundational knowledge that supports EPH professionals across program areas.

A state lead risk assessor license might be necessary in some jurisdictions to conduct lead investigations and make recommendations for remediation. Respondents mentioned that for some state requirements, only a sanitarian

with a 4-year degree in science, 3 years of mentoring, and a lead risk assessor license can fully perform the duties needed for this program.

It is also important to note that U.S. EPA requires individuals and firms who perform abatement projects in pre-1978 target housing and child-occupied facilities to be certified and follow specific work practices. Many states have additional requirements for conducting lead services, including lead inspection, lead risk assessment, lead hazard screening, lead mitigation, and lead abatement work and supervision in regulated facilities.

Aside from educational requirements, participants noted that meticulous notetaking skills and being able to use analytical tools and retain and apply knowledge are desirable skills.

Equipment Needs

Essential equipment for lead prevention programs includes various categories of specialized tools and safety equipment.

For sampling and testing, programs might use lead dust wipe sampling supplies that meet ASTM E1792-96 standards, paint chip collection tools and containers for laboratory analysis, and soil sampling equipment for exterior assessments. Clean sample collection containers that will not contaminate samples are useful, along with sample documentation materials such as labels and chain of custody forms. Measuring tools such as tape measures and rulers help calculate sample areas, while digital cameras document conditions. Templates for standardized dust wipe sampling areas can help ensure consistent collection procedures.

Analytical equipment may include X-Ray Fluorescence (XRF) analyzers for non-destructive lead paint testing, which allows for surface-by-surface paint inspection without damaging materials. Field test kits provide preliminary screening capabilities, though laboratory confirmation is typically required for regulatory compliance. Access to accredited laboratory services is helpful for analysis of collected samples.

Personal protective equipment supports staff safety and can include disposable nitrile gloves to prevent skin contact with lead-containing materials, N95 respirators or half-mask respirators with P100 filters specifically designed for lead when disturbing lead-containing materials, and disposable protective clothing such as Tyvek suits to prevent contamination of personal clothing. Shoe covers help prevent tracking lead dust, while safety glasses or goggles protect eyes from dust. Handwashing and equipment decontamination supplies support proper hygiene and safety protocols.

Programs that conduct educational outreach can maintain demonstration kits and educational materials to help residents, property owners, and contractors understand lead hazards and prevention measures. Digital tools for data collection and case management are useful for tracking at-risk properties and follow-up activities.

Equipment selection varies based on the program's scope and the types of lead hazard assessments conducted. Programs that focus primarily on surveillance and educational activities usually use less specialized equipment than those programs that conduct comprehensive lead risk assessments and clearance testing.

Funding Sources/Barriers

Research showed that many jurisdiction lead programs are funded through a variety of state and federal government money, including U.S. Department of Housing and Urban Development (HUD) funds for replacement windows and doors for qualifying property owners. State delegated authority might pay an average fee for testing, Medicaid funds testing in children, and city general funds support lead safe certificate programs. A variety of smaller grants through coalitions and other nongovernment organizations can provide some funding for incentives for property owners to remediate their properties.

Focus group participants believed that funding should be expanded to incentivize remediation rather than being limited to surveillance and education. Participants felt that grant funding, such as that available through HUD, should be based on the number of people served. A large portion of participant funding currently comes from U.S. EPA as their jurisdiction is a superfund site. Most of the funding for this program seems to be allocated to education and outreach programs for screening, assessing, and advertising.

Body Art

Program Overview and Core Services/Activities

PROGRAM	RECOMMENDED WORKLOAD	EDUCATION AND CREDENTIALS	EQUIPMENT	KEY METRICS
Body Art	**3–4 inspections per week***	• Bachelor's in science • REHS/RS credential • Bloodborne pathogen training	• Thermometers • pH meters • Flashlight • Test strips • Cameras • PPE	• Number of high priority violations cited per establishment • Number of unlicensed or expired licensed artists per establishment • Number of unlicensed artists found who then underwent the process to get licensed • Number of adverse events directly attributed to body art per establishment • Number of complaints received/50 establishments

* Research findings indicate that 3–4 body art inspections per week were considered reasonable for part-time EPH professionals, keeping in mind that most participants reported they did not have enough facilities for a full-time inspector.

Definition

Body art programs often include the licensing/permitting, inspection, enforcement, plan review, and provision of education information for or to technicians, establishments, events, and consumers of and about body art practices, including but not limited to piercing (microdermal and dermal), tattooing, branding, scarification, cosmetic tattooing, permanent or temporary subcutaneous skin art, and other body markings or modification practices.

Characteristics of a Successful Body Art Program

While each department has its levels of priority and violation thresholds for permitting, body art program success can be defined by the absence or decrease in the risk of communicable disease, infection, or injury resulting from body art practices. Another, although less easily quantifiable, some participants defined success by the degree of confidence in

the level of public safety they feel with their performance and their interactions with operators and artists. Programs can work toward achieving these characteristics by having a thorough onboarding process for inspectors that can help ensure consistent and effective inspection practices, building relationships with operators and artists, and ensuring inspectors conduct follow-through actions related to consumer complaints and waste disposal.

Trust building with operators and artists is important for success, as this allows them to be honest about the procedures they are doing and to gain information from inspectors to protect their clients and themselves. As a participant put it simply, "The goal isn't necessarily compliance with the rule as it's written. The goal is public health."

The regulatory authority of a body art program in terms of licensing and permitting contributes to how the program can successfully implement enforcement and infection and injury control measures. Some departments license or permit the establishment only, some license each body artist only, and some license both.

Those programs that license or permit only the body art establishment indicate that the state agency licenses individual artists. In this situation, oversight is on both entities involved in body art—the artist and the establishment in which the artist practices. Those programs licensing or permitting the artists indicated that the licensing and permitting is tied to a body art establishment. Relocation of an artist would require the artist to get a new license. For those that license and permit both the establishment and artist, it was important to them that they retain the ability to take regulatory action, if necessary, on either entity, depending on where an issue occurs.

While not part of the original research, jurisdictions might find it helpful to use the Body Art Model Code (BAMC) developed by NEHA in 1998, with subsequent updates in 2019 and 2024. Created with input from environmental health and industry professionals, the BAMC serves as voluntary guidance that jurisdictions can use as a resource to develop or update their body art codes, which can help reduce the risk of bloodborne pathogen transmission and other health hazards associated with body art procedures.

Meaningful Outcome Measures

PURPOSE	METRIC
Program effectiveness	• Percentage of body art establishments inspected within required timeframes per year • Number of violations identified per 100 body art inspections per year * • Percentage of body art establishments maintaining current permits and licenses per year * • Percentage of body artists maintaining current licenses per year * • Percentage of inspection staff completing required bloodborne pathogens training annually *
Workload management	• Average number of body art inspections completed per staff member per week and annually
Public health protection	• Number of reported infections and/or adverse events associated with body art establishments per year * • Number of complaints received annually

* EPH professionals who participated in focus groups, key informant interviews, and/or the national field survey consistently identified this metric as moderately to extremely useful.

The number and type of violations being cited during inspections of body art establishments can be meaningful measures of how well body art inspection programs are educating operators and artists to prevent exposure to potential health hazards. Along these lines, the frequency of re-inspections and complaint inspections can also be useful measures.

For situations where different agencies are licensing establishments and artists, navigating multiple licensing processes might be complicated and can result in unlicensed artists, a common citation according to some participants. In these instances, the ability of the body art program inspectors to assist operators and artists in navigating these processes and becoming licensed can be reflected in an outcome metric.

While direct attribution of bloodborne disease incidence to a specific body art procedure might be difficult due to long incubation periods, acute skin infections at the body art site could be a useful metric for body art inspection programs

where operators are required to notify health department staff on recognition of such infections. This metric can also be a measure of how well a program's complaint surveillance is working to detect adverse events.

Staffing

Many participants reported their body art programs use a fee-based model. Given that most participants indicated having fewer than 200 body art establishments in their jurisdictions, staff in this program likely perform duties in other EPH programs. Body art establishments can be assigned to inspectors based on geographic location in districts and routes, specialties of the establishment, specialties of the inspector, or proximity of the establishment to other establishments that need inspecting, while keeping in mind maintaining a balanced workload for each inspector.

Research findings indicate that 3–4 body art inspections per week were considered reasonable for part-time EPH professionals, keeping in mind that most participants reported they did not have enough facilities for a full-time inspector. Programs can use this guidance along with their estimated number of annual body art inspection needs to determine appropriate staffing levels.

In addition to confirmation that establishments receive the requisite number of inspections per year in each jurisdiction, one way to determine needed staffing levels is to consider the number of facilities, number of artists, and number of inspections required to be performed per year. Participants who license artists suggest that staffing rates might also need to consider the number of artists per establishment, and another suggested consideration of the volume of business the shop does to determine length of time of an inspection. In addition to drive time factors, these elements could influence staffing needs for programs that require check-ins with each artist.

When programs consider staffing needs, participants note that inspector workload analysis helps determine if more staffing is needed and have provided evidence of unmet inspection frequency requirements to support staffing requests.

Education/Training/Certifications

A bachelor's degree in a science field was identified as the preferred education requirement for body art programs, though some participants noted that a 4-year degree might not be essential for performing body art program duties specifically.

The REHS/RS credential was also recommended for EPH professionals in body art programs.

On-the-job training is also recommended for body art program staff. Additionally, bloodborne pathogen training is recommended for body art program staff and might be required by many jurisdictions. Participants indicated that inspectors of body art programs benefit from undergoing the same training and testing that is required of operators and artists in their jurisdiction.

Equipment Needs

Much of the equipment used by inspectors for body art programs are non-specific tools that can be used when performing duties for other EPH programs, such as computers, thermometers, cell phones with cameras, flashlights, light meters, and educational materials for operators.

For establishments with an autoclave, a Type 5 integrator/Cat 5 test strips are needed to ensure the autoclave is running appropriately.

Processes, protocols, and guidance documents provide the foundation that supports EPH professionals who inspect body art facilities, which underlies all these basic equipment needs.

Funding Sources/Barriers

Body art programs are largely fee-based in that they generate revenue by charging licensing or permitting fees of the establishments and/or artists.

Given the fact that body art programs are typically smaller compared to other EPH programs such as food safety, most participants felt that the fees generated from this program were enough to adequately cover the cost of the program. For some programs, however, body art fees were not enough to sustain the program without additional funding from other EPH services that they provide or from local taxes.

For participants, being fee funded is favorable as it allows EPH to define itself because it can often fund itself without reliance on grant or state money of which they get very little. This income self-sufficiency also provides a sense of security for the program and the overall department in times of departmental budget reductions.

Non-School Institutions and Licensed Establishments

Program Overview and Core Services/Activities

The survey section for this program differed from other sections because no qualitative data were collected for this program. There were considerable differences among participants in how to group these facilities and what settings should be included. For this survey, those participants who indicated performing tasks related to non-school institutions and licensed establishments were asked what settings they would include in this ambiguous title. Of the 172 respondents of this question, the most often identified settings included hotels/motels/lodging facilities, nursing facilities, assisted living facilities, hospice, group homes, halfway houses, hospitals, campgrounds, jails/correctional/detention facilities, shelters, Greek life organization campus residences (i.e., fraternity and sorority houses), mobile home parks, rehabilitation centers, country clubs, private social clubs, and many more.

Given this wide array of settings that could define this title, it is difficult to pinpoint potential priorities or develop a group of questions that could accurately reflect the type and number of activities required of EPH professionals. While many of these settings entail a lodging component, many specifically cater to at-risk populations, meaning specialized training for staff could be beneficial. Future research to classify and define the settings mentioned here might be helpful.

Secondary Environmental Public Health Programs

Introduction to Secondary Program Recommendations

While the core EPH programs form the foundation of governmental EPH services, secondary programs are meant to address additional environmental health concerns that might be priorities based on specific community needs, geographic considerations, or emerging environmental challenges. This section provides recommendations for four key secondary EPH programs: climate health, air quality, healthy homes, and hazardous materials.

Unlike the core program recommendations, which were developed through primary research, including focus groups, key informant interviews, and surveys of EPH professionals, these secondary program recommendations were developed through complementary methodological approaches.

These approaches included:

1. Analysis of existing secondary program structures in exemplary EPH departments across various jurisdictions.
2. Review of professional standards and guidance documents from relevant national organizations.
3. Consultation with subject matter experts in each program area.
4. Examination of peer-reviewed literature on program effectiveness.
5. Synthesis of common elements from established programs to create scalable recommendations.

The recommendations for each secondary EPH program follow the same structure as the core programs, but use the approaches listed above. By using these methods, each secondary program provides recommendation that are scalable to different department sizes and adaptable to various jurisdictional contexts. Each secondary EPH program includes:

- Definition
- Characteristics of a successful program
- Meaningful outcome measures

EPH departments can evaluate these secondary programs in the context of their specific community needs, existing regulatory responsibilities, available resources, and strategic priorities. While not every department will implement secondary programs, this guidance provides a framework for those seeking to develop or strengthen these important EPH services.

Climate Health

Definition

A climate health program can involve surveillance, assessment, planning, education, and response to health impacts related to climate change. Activities include monitoring climate-sensitive health outcomes, conducting vulnerability assessments, developing climate adaptation and mitigation strategies, implementing education and outreach initiatives, collaborating with multiple sectors, and participating in emergency response related to climate events like extreme heat, flooding, wildfires, and vectorborne disease outbreaks. Climate adaptation focuses on adjusting systems and communities to reduce vulnerability to current and expected climate impacts, while mitigation involves efforts to address the underlying causes of climate change and prevent further impacts.

Characteristics of a Successful Program

A successful climate health program likely establishes clear metrics for tracking climate-related health impacts and vulnerabilities, integrates climate considerations into existing environmental health programs, and implements targeted interventions that protect vulnerable populations. The program can build community resilience through education, partnerships, and policy advocacy while maintaining the capacity to respond to climate-related emergencies. Success might be demonstrated through reduced climate-related morbidity and mortality, especially among at-risk populations, and increased community understanding of climate health connections.

Meaningful Outcome Measures

PURPOSE	METRIC
Program effectiveness	• Percentage of vulnerable populations (e.g., older adults, children, low-income individuals) covered by climate adaptation interventions annually • Number of climate adaptation and mitigation strategies implemented per year
Public health protection	• Number of heat-related emergency department visits and hospitalizations per 100,000 population during extreme heat events per year.
Partner engagement	• Number of climate health educational materials distributed or training sessions conducted per year • Number of formalized partnerships with other departments and organizations addressing climate change per year

Climate health programs can track metrics that demonstrate both preparedness for climate impacts and effectiveness in reducing climate-related health burdens. Essential metrics include tracking climate-sensitive diseases (e.g., heat-related illnesses, vectorborne diseases), assessing community climate vulnerability, monitoring implementation of adaptation measures, and evaluating emergency response effectiveness during climate events.

Air Quality

Definition

An air quality program can involve the assessment, monitoring, education, and mitigation of both indoor and outdoor air pollutants that affect human health. Pollutants of concern include particulate matter, ozone, nitrogen dioxide, sulfur dioxide, carbon monoxide, volatile organic compounds, radon, mold, allergens, and secondhand smoke. Core activities might include ambient air monitoring, indoor air assessments, air quality forecasting and alerts, radon testing and mitigation guidance, developing and enforcing relevant regulations, educating the public about air quality risks, and collaborating with partners including planning departments, transportation agencies, housing authorities, schools, and healthcare providers to improve air quality.

Characteristics of a Successful Program

A successful air quality program likely establishes clear standards and guidelines for air quality, maintains effective monitoring and technical assistance services, develops effective warning systems for poor air quality days, implements educational resources for the public and professionals, and builds partnerships that extend program reach. The program might identify high-risk populations and settings for targeted interventions while maintaining the capacity to respond to emerging air quality concerns, such as wildfire smoke or industrial releases. Success is demonstrated through improved air quality indicators, implementation of mitigation measures, and reduced prevalence of respiratory and cardiovascular conditions related to air pollution.

Meaningful Outcome Measures

PURPOSE	METRIC
Program effectiveness	• Percentage of homes that completed mitigation for elevated radon (≥4 pCi/L) per year
Workload management	• Number of indoor air quality assessments conducted per year
Public health protection	• Number of days the Air Quality Index exceeds unhealthy levels per year
Partner engagement	• Number of air quality educational events or alerts conducted per year

Air quality programs can track metrics that demonstrate both program activities and health outcomes. Important metrics include tracking air quality indices, mitigation implementation, exposure levels, related health conditions, and educational reach.

Healthy Homes

Definition

An EPH healthy homes program takes a comprehensive approach to address multiple housing-related health and safety concerns simultaneously, rather than focusing on single hazards. This integrated approach addresses lead hazards, indoor air quality, mold and moisture, pest management, injury hazards, asthma triggers, and general housing conditions that affect health. Core activities include home assessments, education and outreach, referrals for remediation services, policy development, and cross-sector collaboration with housing, healthcare, and social service providers.

Characteristics of a Successful Program

Successful EPH healthy homes program generally implement the seven principles of healthy housing (keep it dry, clean, safe, well-ventilated, pest-free, contaminant-free, and maintained) through a coordinated set of assessment, education, and intervention services. The program successfully identifies high-risk households for targeted interventions, builds capacity among housing providers and residents to address housing hazards, and advocates for policies that promote healthy housing at scale. Success is demonstrated through improved housing conditions, reduced housing-related illnesses and injuries, and increased community capacity to maintain healthy homes.

Meaningful Outcome Measures

PURPOSE	METRIC
Program effectiveness	• Percentage of identified hazards successfully remediated following assessment and intervention per year • Number of housing policies, codes, or standards adopted that incorporate healthy homes principles per year
Workload management	• Number of comprehensive healthy homes assessments conducted per year
Public health protection	• Percent reduction in asthma-related emergency department visits or hospitalizations among program participants per year
Partner engagement	• Number of individuals who receive healthy homes training per year • Number of healthy homes training sessions conducted per year

EPH healthy homes programs can track metrics that demonstrate both improvements in housing conditions and resulting health outcomes. Essential metrics include tracking assessment and intervention activities, physical housing improvements, health outcomes, and policy changes.

Hazardous Materials

Definition

A hazardous materials program includes the oversight, regulation, and management of substances that pose significant risks to human health and the environment when improperly handled, stored, transported, or disposed of. Core activities include permitting and inspecting facilities that generate, store, or handle hazardous materials; responding to spills or releases; providing technical assistance and education to businesses and communities; coordinating with emergency response agencies; and enforcing relevant regulations to protect the health of the public and their communities.

Characteristics of a Successful Hazardous Materials Program

A successful hazardous materials program establishes clear standards and compliance requirements, maintains effective inspection and enforcement systems, develops emergency response capabilities, provides effective technical assistance to regulated entities, and builds partnerships with emergency management agencies. The program works to successfully prevent unplanned releases of hazardous materials while maintaining the capacity to respond effectively when incidents occur. Success is likely demonstrated through high compliance rates, reduced incidents, effective response to emergencies, and protection of public health during hazardous material events.

Meaningful Outcome Measures

PURPOSE	METRIC
Program effectiveness	• Number of hazardous materials incidents or spills per year • Average response time to hazardous materials incidents (in hours) per year • Number of enforcement actions taken and resolved per year • Number of technical assistance activities or training sessions provided to regulated facilities per year.
Workload management	• Number of regulated facilities inspected per year

Hazardous materials programs can track metrics that demonstrate both regulatory compliance activities and emergency response capabilities. Essential metrics include tracking inspection activities, compliance rates, incident response, and educational outreach.

Other Considerations for Secondary EPH Programs

Staffing Considerations

While our research did not encompass specific FTE recommendations for these programs, jurisdictions can determine appropriate staffing levels based on several interconnected factors. Secondary EPH programs benefit from flexible staffing approaches that can be adapted to each jurisdiction's specific needs and context, including community-specific EPH needs, population characteristics, geographic considerations, regulatory requirements, integration opportunities with core EPH programs, available funding sources, and program maturity and scope.

Furthermore, departments might consider recording their staffing decisions and rationale to contribute to the development of evidence-based staffing models for these important, often under-resourced program areas. This approach acknowledges the diversity of EPH challenges across jurisdictions while providing a framework for making informed staffing decisions that align with local priorities and capacity.

Education and Training Considerations

Staff in secondary EPH programs would benefit from educational qualifications that align with the specialized knowledge needed while remaining adaptable to each jurisdiction's context and capacity. While the scope of our research did not establish specific educational requirements for these programs, jurisdictions can consider the technical complexity of program responsibilities, regulatory requirements, availability of qualified professionals in their region, and integration with core EPH programs when establishing minimum qualifications. A foundation in environmental health sciences, public health, or related fields provides essential background knowledge, with specialized training or certifications in program-specific areas enhancing effectiveness. EPH departments should balance the need for specialized expertise against workforce realities, potentially establishing tiered qualification systems that allow entry-level positions while requiring advanced degrees or certifications for leadership roles. Departments can support ongoing professional development to build capacity in these emerging areas of practice. This flexible approach to educational requirements acknowledges the evolving nature of secondary EPH programs while maintaining the professional standards necessary for protecting public health.

Equipment Considerations

Secondary EPH programs may need to utilize diverse equipment portfolios that balance specialized technical needs with practical budget constraints. Equipment requirements typically include standard field assessment tools, monitoring devices specific to program areas, mobile technology for data collection and documentation, communication systems for emergency response and public outreach, and personal protective equipment appropriate to program hazards. Programs can prioritize equipment that serves multiple functions across program areas while ensuring access to specialized tools necessary for technical assessments and regulatory compliance. Departments could consider equipment sharing arrangements, partnerships with other agencies or institutions, and phased acquisition plans that align with program development stages. Regular maintenance, calibration, and replacement planning is essential for ensuring equipment reliability and to meet professional standards. The diversity of secondary program equipment needs benefits from strategic planning that considers both immediate operational requirements and long-term program sustainability.

Funding Considerations

While our research did not establish specific funding considerations for these programs, secondary EPH programs likely face unique funding challenges due to their cross-cutting nature and emerging status within traditional environmental health frameworks. Funding strategies might combine multiple sources, including federal grants, state appropriations, fee-based revenue from regulated entities, foundation grants, and partnerships with other sectors such as healthcare, housing, and emergency management. The evolving nature of these programs often benefits from flexible funding approaches that can adapt to changing priorities and available opportunities. Departments can develop diversified funding portfolios to reduce the dependence on single sources while building sustainable revenue streams through permit fees, inspection charges, and cost-recovery mechanisms where appropriate. Grant funding often provides initial program development support, but long-term sustainability can benefit from integration with ongoing operational budgets. Cross-sector partnerships can extend program reach and effectiveness while sharing costs across multiple benefiting agencies and organizations.

Strategic Considerations for Program Enhancement

While this guide focuses on EPH programs, EPH leaders might recognize several cross-cutting elements that can strengthen their program implementation. These include topics such as:

- Development of integrated approaches that address multiple EPH issues simultaneously.
- Incorporation of health equity principles to address disparities.
- Implementation of effective data systems to track activities and outcomes.
- Community engagement through transparent risk communication.
- Adaptation to climate change impacts across programs.
- Preparation for emerging environmental hazards.
- Development of sustainable funding strategies.
- Investment in workforce development, succession planning, and staff retention.
- Engagement in policy development and advocacy.
- Cultivation of interagency collaborations and partnerships.
- Implementation of performance management systems for continuous improvement.

These considerations, though beyond the scope of our project, may prove important for EPH leadership that seeks to maximize their impact on public health and adapt successfully to evolving EPH challenges.

Building on Common Foundations

While this guide has outlined specific core program considerations for staffing, education, equipment, and funding, several common foundations emerge across EPH programs:

1. **Qualified, well-trained personnel** are the most essential resource for EPH programs. The combination of appropriate education, specialized training, and professional credentials provides the foundation for effective practice. Departments can prioritize both the recruitment of qualified professionals and ongoing professional development to maintain and enhance workforce capacity.
2. **Adaptable program structures** that can be scaled to meet local needs and resources are essential for effective implementation. This guidance offers a starting point that can be tailored to match community-specific needs, department resources, and regulatory requirements across jurisdictions of varying sizes and contexts.
3. **Data-driven approaches** enable departments to target resources effectively, measure progress, and demonstrate impact. Investment in effective data systems, assessment methodologies, and outcome evaluation is a crucial component of modern EPH practice.
4. **Sustainable funding mechanisms** are important for program stability and effectiveness. EPH departments can develop diverse funding strategies that combine fee-based revenue, governmental appropriations, grants, and innovative financing approaches to ensure program sustainability.
5. **Strategic partnerships** extend the reach and impact of EPH programs. Collaboration with community organizations, healthcare systems, academic institutions, and other governmental agencies multiplies the resources available for addressing environmental health challenges.
6. **Properly equipped staff** with appropriate tools, technology, and resources are fundamental to program effectiveness. EPH professionals benefit from special-

ized equipment for field assessments, reliable transportation for site visits, current technology for data collection and analysis, and adequate facilities for laboratory work and administrative functions. Departments can regularly assess and update equipment inventories to ensure staff can perform their duties safely, efficiently, and in accordance with current professional standards.

From Guidelines to Implementation

The guidance provided in this document serves as a roadmap, but ultimately, implementation benefits from leadership, commitment, and adaptation to local contexts. EPH directors and managers can use these guidelines as a starting point to:

- Assess current program strengths and gaps
- Develop strategic plans for program enhancement or development
- Advocate for appropriate resources and authority
- Establish meaningful metrics for program evaluation
- Build the partnerships necessary for effective implementation

While the document outlines 11 core and 4 secondary EPH program areas, jurisdictions can prioritize the program areas based on their unique EPH challenges, community needs, and available resources. This prioritization can be informed by EPH assessment data, partner collaboration, and consideration of the most significant local health risks.

The Evolving Landscape of Environmental Public Health

The field of EPH has evolved significantly since its origins in sanitation and infectious disease control. Today's EPH professionals address complex challenges, including climate change impacts, emerging contaminants, technological innovations, and persistent EPH disparities. As our understanding of EPH connections deepens, the scope of EPH practice continues to expand, benefiting from greater integration and collaboration across program areas, disciplines, sectors, and jurisdictions.

Despite this evolution, the foundational principles of EPH remain constant. Prevention remains the primary goal, with EPH programs designed to identify and mitigate hazards before they result in disease, injury, or harm. Science remains the cornerstone of practice, with evidence-based approaches guiding program development and implementation. By the same token, equity remains a central concern, recognizing that the benefits and burdens of EPH are not evenly distributed across American society.

A Call to Action

The work of EPH professionals often goes unnoticed when it is most successful. When contamination is prevented, when health outcomes improve, when outbreaks are avoided—these successes rarely make headlines. Yet this work forms an essential foundation for public health and community wellbeing.

As communities face environmental challenges that increase daily, from climate change impacts to emerging infectious diseases, the role of EPH professionals becomes ever more crucial. This might involve:

- Elevation of the visibility and value of EPH work through effective communication and documentation of impact.
- Strengthened EPH workforce through recruitment, training, retention, and succession planning.
- Modernized systems and approaches that leverage new technologies, data science, and integrated program delivery.
- Enhanced community engagement and trust through transparent practices and meaningful participatory opportunities.
- Advocacy for policies and resources that recognize the essential role of EPH in overall community health and wellbeing.

Conclusion

EPH stands at the intersection of human health and the environments in which we live, work, and play. As this guide has demonstrated, the field encompasses a broad range of core and secondary programs, each of which contributes to the essential mission to protect and promote public health through environmental interventions. The Pillars of Governmental Environmental Public Health guide provides a framework to build effective and resilient EPH departments capable of responding to both longstanding and emerging challenges. Through the application of this framework at scales that meet community needs, EPH departments can build the capacity to meet today's challenges while they prepare for tomorrow's demands.

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Appendices

Appendix A

10 Essential Environmental Public Health Performance Standards

The 10 Essential Environmental Public Health Services, developed by the Centers for Disease Control and Prevention (CDC, 2021) and derived from CDC's 10 Essential Public Health Services, comprise the "collective set of capacities and activities necessary in an environmental public health system or program to effectively support the provision of services and programs needed to improve and protect environmental health."

They also serve as the framework for CDC's Environmental Public Health Performance Standards, which is an instrument that EPH programs can use to assess their performance and identify areas for improvement (CDC, 2010), as well as for the Public Health Accreditation Board's (2013) Standards and Measures, which are used to demonstrate eligibility for public health department accreditation.

These services are consistent with the foundational capabilities of the Institute of Medicine (2012), which are a set of six competencies that all public health departments should have the capacity to support, as well as the Foundational Public Health Services and the Public Health National Center for Innovations (de Beaumont, 2025; PHNCI, 2022). Many of these EPH services are also indicated in the World Health Organization's (WHO, 2018) International Health Regulations. Most of the recommendations given by the documents included in this review can be categorized into one of the 10 Essential Services, which are enumerated and described in detail:

1 Assess and monitor population health status and community needs.

Jurisdictions should perform regular community health assessments to identify trends in health problems and environmental hazards. Health offcials can use the results of this assessment to identify health disparities and inequities, prioritize issues and allocate resources, and compare their community to state and national health indicators (Association of State and Territorial Health Offcials [ASTHO], 2018; PHNCI, 2022).

A survey conducted by the Association of State and Territorial Health Offcials (ASTHO) in 2012 found that only 45% of state EPH departments had completed a health impact assessment in the past 2 years, although this number was up from 23% in 2010 (ASTHO, 2014). Resources for conducting assessments include the National Association of County and City Health Offcials' (NACCHO) Protocol for Assessing Community Excellence in Environmental Health, NACCHO's Mobilizing for Action Through Planning and Partnerships Handbook (NACCHO, 2015), and the National Association of Local Boards of Health's (NALBOH) Public Health Governing Entity Assessment Handbook (NALBOH, 2013). Once the assessment is completed, NACCHO's Local Implementation Guide can be used to help local health departments take action based on the identified trends (NACCHO, 2013).

In addition to a community health assessment, jurisdictions should have the capacity to collect, store, and analyze EPH data using the most up-to-date methods and technologies (American Public Health Association [APHA], 2001; NACCHO, 2005). They should be able to interpret results and visualize trends over time and have a plan to address any gaps in data. Jurisdictions should also participate in a surveillance system that enables them to undertake rapid risk assessments of environment-related diseases and should maintain records and documentation of all surveillance activities (APHA, 2001; NALBOH, 2013).

2 Investigate, diagnose, and address health problems and hazards.

EPH programs ideally should have 24/7 access to laboratories that can support public health laboratory testing and timely EPH investigations, which can enable staff to quickly respond to outbreaks (NALBOH, 2013; PHNCI, 2022). Staff should also be able to perform inspections, testing, licensing, and regulation of a wide range of establishments, including food service facilities, recreational waters, drinking water, wastewater, body art facilities, schools, childcare facilities, and other institutions. Every department must develop an all-hazards emergency response plan, as EPH plays a role in preparing for and responding to all disaster types, including natural, biological (including pandemics), chemical, and radiological public health emergencies (PHNCI, 2022).

3 Inform, educate, and empower people about EPH issues.

EPH professionals should be able to effectively communicate environmental health risks and convey the importance of EPH programs to partners, media, and the public (APHA, 2001; NALBOH, 2013; PHNCI, 2022). A successful EPH program is often "invisible," meaning the community is generally unaware of the benefits of EPH, so it is diffcult to generate support (CDC, 2003; Herb et al., 2021). Communication plans should disseminate data from the community health assessment (APHA, 2001) and should include an emergency communication plan developed alongside the program's all-hazard emergency response plan. Jurisdictions should also create policies and interventions that promote health education (NALBOH, 2013; PHNCI, 2022). All information, resources, and communications should be accessible and culturally and linguistically appropriate (APHA, 2001; ASTHO, 2018; NALBOH, 2013; PHNCI, 2022).

4 Mobilize community partnerships.

To maximize EPH program effectiveness, staff should partner with other government agencies, academic and research institutions, and members of the private sector who can contribute to or benefit from environmental health. Potential partner organizations include health, transportation, housing, and environmental groups (PHNCI, 2022). Creating partnerships might involve identifying key constituents and partners, maintaining a comprehensive directory of those groups with an interest in EPH services, and encouraging constituents to participate in decision-making and policy development.

Wherever possible, staff should share data and resources and collaborate with partners to address EPH problems, including health equity and access to resources (APHA, 2001; ASTHO, 2018; ASTHO, 2021; NALBOH, 2013).

5 Create and implement policies, plans, and laws.

Data collected by EPH programs should be used to inform policies, programs, and interventions intended to improve community health (NALBOH, 2013; PHNCI, 2022). This

work involves developing and implementing a health department strategic plan, including establishing the department's mission, vision, objectives, and strengths and weaknesses, as well as a community health improvement plan. These plans should include input from community partners, should identify and address causes of health inequity (ASTHO, 2018), and should demonstrate progress toward goal achievement.

Jurisdictions should develop an emergency response plan that must be tested regularly via drills or exercises. Jurisdictions should also incorporate the principle of Health in All Policies, which calls for public health and EPH to be considered in all the jurisdiction's policies, not just those policies implemented by the health department. Plans and policies should be regularly reviewed and revised as needed.

6 Enforce laws and regulations that protect public health.

EPH professionals should protect the public from environmental risks of exposure through enforcement of their jurisdiction's laws and regulations. Existing laws should be regularly reviewed, and jurisdictions should change or create new laws as necessary, incorporating community input wherever possible. It is also the responsibility of the EPH department to ensure that constituents understand the requirements and the importance of these regulations.

Laws should be applied consistently throughout the jurisdiction while considering any impacts the law could have on health equity, and standards should be maintained for licensing, fees, and inspections (ASTHO, 2018; NALBOH, 2013). Staff should also collect data on enforcement activities and share information with constituents and other jurisdictions.

7 Link people to needed EPH services and care.

EPH staff should ensure equitable access to EPH services. This work includes identifying populations that might face barriers to services and taking steps to mitigate these barriers, as well as ensuring that community members can take advantage of available EPH resources (ASTHO, 2018; NALBOH, 2013). To achieve this goal, EPH staff might need to work with partners who can help close gaps in the provision of services.

8 Build a competent and diverse EPH workforce.

Each EPH department should complete a workforce assessment to determine the number and types of positions to be included in the EPH program, as well as core competencies for each position. Staff should also identify and address current gaps in training and competence (NALBOH, 2013). Departments should offer continued training, leadership development, education, and mentoring, including annual performance reviews for all EPH employees. Additionally, a community's EPH workforce should reflect the unique demographics of that community, and staff should understand their community's cultural, political, and economic underpinnings (APHA, 2001; ASTHO, 2018).

9 Evaluate effectiveness, accessibility, and quality of EPH services.

EPH program staff should use a performance management system to monitor internal activities and achievement of objectives, as well as assess community satisfaction with EPH services. Existing assessments—such as NACCHO's National Public Health Performance Standards Local Assessment Instrument (NACCHO, 2013) and the CDC's Environmental Public Health Performance Standards (CDC, 2014)—can be used. Jurisdictions should develop a written quality improvement plan that involves all partner organizations. Staff should also monitor the best practices of other organizations and agencies. Any data collected should be used to modify services and allocate resources to achieve health equity and improve community health (ASTHO, 2018; NALBOH, 2013).

10 Research for new insights and innovative solutions to EPH problems.

EPH programs should have the capacity to participate in applied research and share findings with partners. Results of any research should be incorporated into health department policies and programs (NALBOH, 2013). Staff should also encourage community involvement in research.

Appendix B

Public Health Accreditation and Environmental Public Health

Public health accreditation is a voluntary process that health departments can undertake to demonstrate their capacity to deliver essential public health services effectively and efficiently. The Public Health Accreditation Board (PHAB, 2013) is the national accrediting body for public health departments, and it has established a set of standards and measures that health departments must meet to achieve accreditation status.

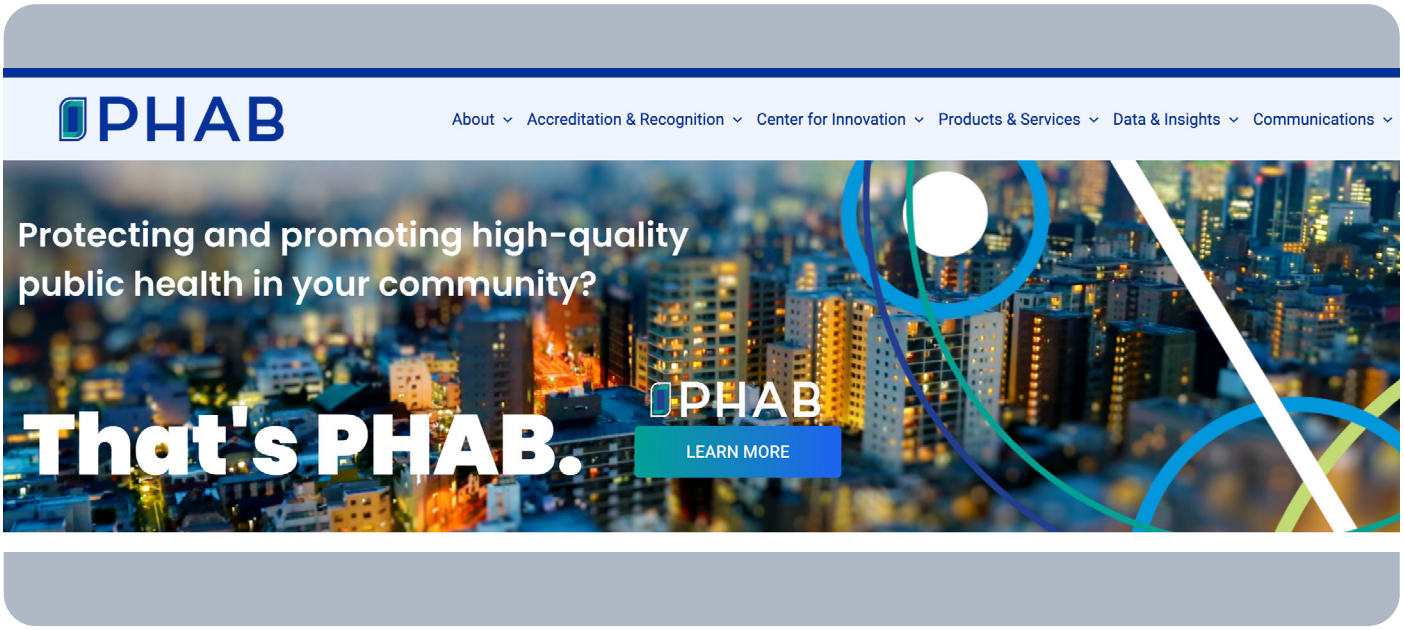
The accreditation process is important for EPH departments within health departments because it provides a framework for continuous quality improvement and ensures that EPH programs meet national standards for performance and effectiveness. By contributing to their health department's accreditation, EPH departments can demonstrate their commitment to protecting and promoting the health of their communities and can gain recognition for their efforts.

To be eligible for accreditation, health departments must demonstrate that their EPH programs are meeting the PHAB standards and measures, which are closely aligned with the 10 Essential Environmental Public Health Services described previously. These measures include having a strong infrastructure for assessment, investigation, and enforcement; effective communication and community engagement strategies; and a competent and diverse workforce.

Health departments must also demonstrate that their EPH programs are providing the core programs and services that are essential for protecting public health, such as food safety, water quality, and vector control. These core programs should be based on the unique needs and priorities of the community served by the health department, as identified through community health assessments and other data-driven processes.

In addition to meeting the PHAB standards and measures, health departments with EPH programs seeking accreditation must also demonstrate that they have a culture of quality improvement and performance management. These measures include having systems in place for monitoring and evaluating the effectiveness of EPH programs and services and using data to drive decision-making and resource allocation.

By participating in their health department's accreditation process, EPH departments can strengthen their capacity to provide high-quality, evidence-based services that are responsive to the needs of their communities. Accreditation can also help health departments and their EPH departments to build partnerships and collaborations with other agencies and organizations, and to secure funding and resources to support their programs and services.



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