

Big Cities Health Coalition Epidemiology Capacity Assessment, 2024



CSTE
COUNCIL OF STATE AND
TERRITORIAL EPIDEMIOLOGISTS





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Big Cities Health Coalition

The Big Cities Health Coalition (BCHC or the Coalition) is a forum for leaders of America's largest metropolitan health departments to exchange strategies and work together to promote and protect the health and safety of the 61 million people they serve. Together, these public health officials directly affect the health and well-being of one in five Americans. For more information about BCHC, please visit www.bigcitieshealth.org.

Council of State and Territorial Epidemiologists

The Council of State and Territorial Epidemiologists (CSTE) is the professional organization representing state and territorial public health epidemiologists. CSTE works to establish more effective relationships among state and other health agencies. It also provides technical advice and assistance to partner organizations and to federal public health agencies, such as the Centers for Disease Control and Prevention (CDC). CSTE members have surveillance and epidemiology expertise in a broad range of areas, including occupational health, infectious diseases, environmental health, chronic diseases, injury prevention, maternal and child health, data modernization, and more. CSTE supports effective public health surveillance and sound epidemiologic practice through training, capacity development, and peer consultation. For more information about CSTE, please visit www.cste.org.

Acknowledgements

This project was supported in part by the CDC cooperative agreement number 1 NU38OT000297-02. The contents are solely the responsibility of the authors and do not necessarily represent the official views of CDC. The authors would like to acknowledge and thank our colleagues for their support and guidance on the project: Janet Hamilton, Jennifer Lemmings, Amanda Masters, Emily Armstrong, Akila Simmons, Ania Kerr, Brenna Daly and epidemiologists in BCHC departments. BCHC also thanks its foundation funders and members for enabling and supporting our participation in this work.

This report should be cited as: Auer S, Armstrong E, Simmons A, Arrazola J, Masters A, Juliano C. (2024). Big Cities Health Coalition Epidemiology Capacity Assessment, 2024. Takoma Park, MD; Atlanta, GA: Big Cities Health Coalition; Council of State and Territorial Epidemiologists.

EXECUTIVE SUMMARY

Executive Summary



Background

Since 2001, the Council of State and Territorial Epidemiologists (CSTE) has conducted periodic Epidemiology Capacity Assessments (ECAs) to assess numeric and functional applied public health epidemiology capacity in the United States and its territories. CSTE first collaborated with the Big Cities Health Coalition (BCHC) in 2017 and again in 2021 to conduct an ECA in BCHC member departments. In 2024, the ECA instrument was again tailored for big city health department use and administered in collaboration with BCHC to its member health departments. The 2024 ECA was designed to achieve five goals:

1. Enumerate and describe the applied epidemiology workforce;
2. Describe the training needs of the applied epidemiology workforce;
3. Describe the funding that supports the applied epidemiology workforce;
4. Describe the level of epidemiology capacity in BCHC health departments; and
5. Assess the impact of the COVID-19 pandemic on epidemiologic capacity and staffing.

Methods

The state ECA was modified by CSTE and BCHC staff, as well as a small group of BCHC member health department staff, to tailor the instrument for large, local health departments. All 35 BCHC members were invited to participate. Data collection occurred from March to June 2024. Quantitative data were analyzed using R Studio statistical software and Excel 2008 and qualitative data were coded and grouped thematically. Where relevant, data were compared with those from the 2024 state ECA.

Key Findings

100% of the 35 eligible BCHC members participated in the assessment. The combined population served by the participating health departments was over 61 million or about one fifth of the total US population.

¹Social epidemiology is a “branch of epidemiology that focuses particularly on the effects of social-structural factors on states of health. Social epidemiology assumes that the distribution of advantages and disadvantages in a society reflects the distribution of health and disease.” (Honjo, 2004).

Health department structure and leadership

Nearly a third of BCHC departments (30%) do not have a dedicated lead who oversees epidemiology activities. Most of these departments (88%) have generalist epidemiologists who support several or all public health program areas.

Presence of programs and lead epidemiologists by program area

Nearly all of the 35 health departments have programs in infectious disease (94%), HIV (91%) and maternal and child health (91%). Fewer have programs in oral health (38%), social epidemiology (26%), tribal (6%) and occupational health (6%). The programs most likely to have a formal lead epidemiologist are general infectious disease (80% of respondents report having a program lead), COVID-19 (74%) and generalist (69%). In contrast, fewer than 10% of respondents have a lead epidemiologist for oral health, tribal or occupational health. In state health departments, 96% of respondents have lead epidemiologists for vector-borne/zoonotic diseases, pan-respiratory and healthcare-associated infections and antimicrobial resistance (HAI/AR) while fewer than 50% have leads for oral health (45%), genomics/advanced molecular detection (AMD) (41%), reproductive health (40%), generalist (37%), tribal (22%) and mental health (16%).

Staffing

There are 1,849 full time equivalent (FTE) epidemiologists working in BCHC departments (range 3 to 427; median 22). The median rate among the 35 BCHC departments is 1.89 epidemiologists per 100,000 people, with a range of 0.37 to 8.78. In comparison, the total number of epidemiologists in state health departments is 5,706, and the median rate is 2.5/100,000 people. Most BCHC epidemiologists work in infectious disease (914), COVID-19 (170) or as generalists (165). When all infectious disease categories are combined, 49% of the workforce is concentrated in infectious disease. Respondents indicated the need for

an additional 755 epidemiologists across program areas to achieve full epidemiology capacity, a 41% increase over current staffing levels.

Funding for epidemiological activities and personnel

On average, 39% of funding for epidemiology activities comes from local sources, with federal and state governments providing an additional 39% and 18%, respectively. Values were similar for epidemiology personnel, with 40% of funding coming from local sources, 39% from federal sources, and 17% from state sources. These findings are in sharp contrast to state health departments, where, on average, more than 80% of funds are provided by the federal government. Other non-governmental funding sources—such as private foundation or non-profit grants, donations, or corporate sponsorships—represented an average of 4% of funding for epidemiologic activities and 4% of funding for epidemiology personnel in BCHC departments.

Essential Public Health Services capacity

BCHC departments were asked to rate their capacity to conduct the three essential public health services (EPHS) most closely related to epidemiology. Virtually all BCHC departments reported having substantial to full capacity for EPHS 1 - monitoring health status (94%) and EPHS 2 - diagnosing and investigating health problems (89%). Only 46% of departments reported substantial to full capacity for EPHS 9 - research and evaluation. The corresponding levels of substantial to full capacity in the states closely aligned for EPHS 1 and 2, 84% and 90% respectively, but only 37% of states reported substantial to full capacity for EPHS 9.

Hiring

Fewer than half (43%) of the 35 BCHC departments use contractors to fill vacancies for epidemiology/surveillance positions, in contrast to 53% of state health departments that do so. There are an estimated 201 vacant positions in BCHC departments, including 165 civil service positions (82%) and 36 (18%) contractor positions. The greatest number of vacancies are within the program areas of generalist (31), sexually transmitted disease (STD) (25), and HIV (21).

Critical issues facing health departments

BCHC member departments reported major challenges with securing sustainable funding for epidemiologists, recruiting a diverse workforce, and ensuring that staff are adequately trained for new data systems and software.

Discussion

²At the time of fielding, only six BCHC jurisdictions were directly funded by ELC (New York City, Los Angeles, Chicago, Philadelphia, Washington, D.C., and Houston).

Big city epidemiologists are heavily concentrated in infectious disease. The 2024 ECA found that 94% of BCHC departments have program areas in general infectious disease, followed closely by HIV (91%). In contrast, fewer than half have program areas in oral health (38%), social epidemiology (26%), genomics/advanced molecular detection (26%), tribal (6%) and occupational health (6%). Similarly, the program areas with the fewest epidemiologists across BCHC departments are wastewater surveillance (19), genomics/AMD (16), violence prevention (15), injury (14), reproductive health (4) and oral health (3). At the time this was fielded, BCHC departments reported no epidemiologists in tribal or occupational health. These results may reflect the priorities and funding opportunities available to select program areas, as well as the needs of local communities versus states.

Big city health departments are already experiencing a need for additional epidemiologists in all program areas, and that is before nearly a quarter of the workforce is lost due to the end of pandemic funding. The 2024 ECA enumerated 1,849 epidemiologists across the 35 BCHC departments and the need for an additional 755 to effectively deliver the essential public health services, a 41% increase in staffing numbers. The program areas with the largest number of epidemiologists needed are general infectious disease (61), informatics (59) and STD (44). Though smaller program areas need fewer epidemiologists, the unmet need is profound, with injury needing 24 epidemiologists (a 171% increase), environmental health needing 28 epidemiologists (a 128% increase) and violence prevention needing 16 epidemiologists (a 106% increase). With the end of pandemic funding, BCHC departments anticipate losing 440 (24%) of the current workforce.

On average, big city departments receive a third of their funding each from federal and local sources. While the range of funding sources varies substantially across BCHC departments, on average, 39% of funding for epidemiology activities comes from federal sources and 39% from local, with less reliance on state funding. Nearly a fifth (17%) of epidemiologists are directly funded by the [Epidemiology and Laboratory Capacity \(ELC\)](#) grant², with an additional 11% funded through state ELC passthrough dollars.

BCHC departments have high capacity for monitoring health status and investigating problems, but far less capacity for research and evaluation. Nearly all departments reported substantial to full capacity for monitoring health status (EPHS 1) and diagnosing and investigating problems (EPHS 2), while fewer than half (46%) reported capacity for

research and evaluation (EPHS 9). Research and evaluation ensure public health services align with the needs of the community, remain evidence-based and continually strive for advancement and improvement (Public Health Accreditation Board, 2020).

More than half of BCHC departments lack capacity to deliver the EPHS in reproductive health, genomics/AMD, oral health, occupational health, and tribal. While capacity varied across departments, there are significant gaps in capacity to deliver the EPHS. BCHC departments require disease-agnostic funding to support the priorities of their communities.

Approximately 40% of BCHC departments lack access to open-access, peer-reviewed literature, which is detrimental to agencies, particularly during emergencies. It is critical for departments to deliver evidence-based practice but that is challenged by inaccessible peer-reviewed literature. The rates of access by BCHC departments are similar to 2021 rates and have not improved significantly. It is necessary to explore innovative strategies to access peer-reviewed literature to ensure evidence-based delivery of epidemiology services.

Similar to 2021, the highest training priority for BCHC departments remains data analytics. Additional training priorities include continuing education, software skills, leadership development and persuasive communication. As the field of applied epidemiology progresses, staff need continual training to be able to cross-collaborate and efficiently manage new data systems and emerging priorities. Few resources have trickled down to local health departments, even in the nation's largest cities, heightening this challenge.

Most BCHC departments do not have staff dedicated to forecasting and disease transmission models but agree forecasts would be useful during the next public health emergency. Only 11% of departments reported having staff focused on forecasting and disease transmission models, but 91% agree that outbreak forecasts would be useful during the next public health emergency. When asked about the lack of personnel, 57% of BCHC departments cited cost as a barrier, though 10% noted relying on private sector partners for advanced data analytics, modeling and forecasting.

Nearly half of BCHC departments receive direct federal funds for data modernization. More than half

(60%) of departments received federal dollars for data modernization, with 48% directly from federal sources and 12% through state pass through. When asked about challenges to implementing data modernization, 66% cited uncertain sustained funding as a challenge and 54% noted insufficient current funding

Recommendations

1. Provide flexible, sustainable funding that allows BCHC departments to prioritize non-infectious disease program areas and the needs of their communities.
2. Streamline hiring processes to allow for timely and equitable hiring of qualified personnel, especially during public health emergencies.
3. Provide pathways to make temporary pandemic positions permanent.
4. Enhance skills in data analytics and persuasive communication.
5. Enhance collaboration with academic institutions to facilitate internship opportunities and promote governmental public health as a career.
6. Facilitate mentorship and knowledge sharing opportunities to preserve institutional knowledge.
7. Ensure reliable access to peer-reviewed literature.

BACKGROUND

Background



In 2001, the Council of State and Territorial Epidemiologists (CSTE) began periodic assessments of the numeric and functional applied public health epidemiology capacity in U.S. state and territorial health departments. So far, eight assessments—formally known as Epidemiology Capacity Assessments (ECAs)—have been conducted, in 2001, 2004, 2006, 2009, 2013, 2017, 2021 and 2024. In addition, in 2014 and 2017, CSTE and the National Association of County and City Health Officials (NACCHO) conducted a preliminary assessment of epidemiology capacity within local health departments. CSTE first assessed epidemiology capacity of Big Cities Health Coalition (BCHC) members in 2017 and did so again in 2021 (McGinty et al., 2019).

These ECAs serve several functions. They provide policymakers with information on current epidemiology workforce strength and capacity. They permit state and territorial epidemiologists (and their big city colleagues) to compare their departments with others with respect to staffing, salaries, performance on key epidemiology competencies, and the relative contribution of federal, state, and local funds to their budgets. And, by highlighting the skills and program area expertise that students need to respond to changing workforce priorities, the ECAs can inform public health training needs.

The 2024 BCHC ECA was launched in March 2024 and completed in June 2024 with responses from the 35 departments that were members of BCHC in Spring 2024. Building upon recommendations from the 2021 Big Cities ECA and the 2021 Public Health Workforce Interest and Needs Survey (known as PH WINS and conducted by the Association of State and Territorial Health Officials and the de Beaumont Foundation), the 2024 ECA was designed to achieve five goals:

1. Enumerate and describe the applied epidemiology workforce;
2. Describe the training needs of the applied epidemiology workforce;
3. Describe the funding supporting the applied epidemiology workforce.
4. Describe the level of epidemiology capacity in BCHC health departments; and
5. Assess the impact of the COVID-19 pandemic on epidemiologic capacity and staffing.

Although both the state and BCHC ECA provide critical data for BCHC local health departments, and for policymakers, they do not reflect total epidemiology capacity in the United States. As these data show, some large local health departments have more staff and greater epidemiology capacity than their state health department, while others do not. It is also very important to note that the data from these BCHC health departments are not representative of all local health departments. This report summarizes findings from the 35 BCHC member health departments that were eligible and participated in this assessment, including Washington D.C., which was included in both the state ECA and the BCHC ECA.

METHODS

Methods

Assessment Instrument

The 2024 ECA was modified for local health departments in Winter 2023. CSTE and BCHC solicited input from epidemiology staff within BCHC member health departments to ensure the instrument's relevance to their work. The final BCHC assessment was organized into four sections:

- Section 1: Health department structure and resources.
- Section 2: Health department epidemiology capacity.
- Section 3: Health department staffing capacity.
- Section 4: Leadership feedback.

Specifically, the assessment solicited information on big city health department epidemiology leadership, epidemiology staffing and funding sources; capacity to perform the three Essential Public Health Services (CDC, 2024) most closely linked to epidemiology, perceived training needs, and epidemiology vacancies and intended hires. Most questions were short answer, multiple choice, scales, or matrix tables such as the fraction of full-time equivalent positions (FTEs) by program area. Wherever possible, questions, response categories, and definitions were consistent with the state ECA to enable comparability. Four open-ended questions were included: (1) "With respect to epidemiologic staffing and capacity, what are the most critical issues your department faces?" (2) "How is your jurisdiction working to recruit a diverse workforce?" (3) "What are the barriers to recruiting a diverse workforce in your jurisdiction?" and (4) "What other thoughts, comments, concerns or questions would you like to share with BCHC and CSTE in regard to the epidemiology workforce and training?" A final section asked respondents to confirm that all information provided is accurate.

Study Population

BCHC is comprised of leaders of America's largest metropolitan health departments. At the time of the ECA, to be eligible for membership, a city must have a population of at least 500,000 and must be a locally controlled health department (not a state agency). Membership is extended to the health department with primary responsibility for the public of the city, whether it

is a city or county agency. As of March 2024, when the BCHC ECA began, there were 35 BCHC member health departments, all of which were invited to participate (Big Cities Health Coalition, 2024). Respondents are hereafter described as "BCHC departments" or "big city health departments."

Recruitment and Administration

The "lead official" (i.e., the local health officer, health director, or health commissioner) for each BCHC department approved the department's participation in this assessment and designated a single person to coordinate the department's response—35 of the 35 BCHC member departments (100%) participated. In 2024, the combined population served by the 35 BCHC departments was roughly 61 million or about 18% of the total U.S. population.

A hyperlink to the assessment instrument, which was administered on the Qualtrics platform (Qualtrics, Provo, UT), was emailed to the designated individual, who was asked to (1) coordinate with programmatic and human resources staff within their department as necessary to complete the questionnaire and (2) review all responses and certify their accuracy and completeness prior to submitting the assessment.

Data collection occurred from March to June 2024.

Definitions and Response Options

Epidemiology and epidemiologists within the health departments

Respondents were asked to enumerate the current epidemiology workforce within their health department and to describe their health department's epidemiology capacity. The discipline of epidemiology was defined as the "study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to control of health problems." An epidemiologist was defined as "an investigator who studies the occurrence of disease or other health-related conditions or events in defined populations" (Last, 2000). The assessment noted "the control of disease in populations is also considered to be a task for the epidemiologist" (Last, 2000).

Respondents enumerated epidemiologists by program area to the nearest tenth of an FTE. Respondents were instructed to count each epidemiologist only once and to include not only all epidemiologists employed by the health department, but also those epidemiologists working in the department as state or federal assignees or contract employees, including trainees. When considering who should be counted as an epidemiologist, respondents were asked to focus on job functions rather than job titles (i.e., employees did not need to have the title of epidemiologist to be enumerated but needed to serve the function of an epidemiologist). Respondents were provided a link to the CSTE Applied Epidemiology Competencies, which contain examples of epidemiology job functions.

A formal lead epidemiologist was defined as someone who leads activities and is a subject-matter expert within a designated program area within the health department.

Epidemiology Capacity

Respondents were asked to describe their health department's capacity to provide the three Essential Public Health Services (EPHS) most closely related to epidemiology:

EPHS 1. Monitor health status to identify and solve community health problems.

EPHS 2. Diagnose and investigate health problems and health hazards in the community.

EPHS 9. Improve and innovate public health functions through ongoing evaluation, research, and continuous quality improvement.

Epidemiology capacity was defined as “the ability of the health department to lead epidemiologic activities; provide subject matter expertise; and apply for, receive, and manage resources to conduct key epidemiologic activities.” Capacity for each of the three EPHS listed above was described according to the following scale:

- None: 0% adequate epidemiological capacity.
- Minimal: 1-24% adequate epidemiological capacity.
- Partial: 25-49% adequate epidemiological capacity.
- Substantial: 50-74% adequate epidemiological capacity.
- Almost full: 75-99% adequate epidemiological capacity.
- Full: 100% adequate epidemiological capacity.

For purposes of analysis and to enable comparability with data from the 2024 state ECA, responses were further grouped as *none to minimal*, *partial*, and *substantial to full*.

Program areas, generalists

Respondents were presented with a list of program areas and asked (1) whether the health department has each program area and (2) if so, whether it has epidemiology capacity within that area. Response options for both questions were “yes” and “no.” Respondents were further instructed that “generalists” are epidemiologists who support several or all program areas within the health department (i.e., they are not specialists in any single program area).

Employees

Respondents were asked to differentiate between civil service epidemiologists and contractors. Civil service employees were defined as FTE staff (either salaried or paid on an hourly basis) employed by the health department or federal or state assignees (such as Epidemic Intelligence Service officers or CDC public health associates). Non-civil service employees included contract employees and temporary employees (e.g., CSTE trainees or individuals contracted from schools of public health or from private companies to work at or for the health department). The use of the term civil service did not connote anything related to whether the employee was a member of a labor union or in a permanent or provisional civil service position.

Vacancies and intent to fill positions

A vacancy was defined as an unfilled health department position that (1) could start within 30 days and (2) had work available to carry out. Respondents were instructed not to include unfilled positions that must be left vacant because of hiring freezes or other requirements. Respondents were also asked how many of these vacancies their department intended to fill (i.e., those for which human resources was actively recruiting).

Analytic Techniques

Data were analyzed using R Studio software and Microsoft Excel 2008. Select analyses utilized city or county population size to calculate rates for each jurisdiction. Population size was based on 2023 U.S. Census figures for each city or county (U.S. Census Bureau, 2024). Where relevant, results have been compared with findings from the BCHC 2021 ECA and the 2024 state ECA, which contains data from the 50 U.S. states and D.C., hereafter collectively referred to as “the states” or “state health departments.”

Qualitative data from open-ended questions were coded and grouped thematically by CSTE staff. Quotations illustrative of key themes were selected for inclusion.

RESULTS

Results



All 35 BCHC member health departments (100%) responded to the assessment. In 2021, 26 of the 30 BCHC member health departments (90%) at the time participated in the ECA. However, some of the eligible departments have changed since 2021 and are not identical to previous ECAs, making comparisons to the previous BCHC ECA challenging. Participating departments in the 2024 BCHC ECA included:

BCHC Health Department Name (City, if Different)	State
Alameda County Public Health Department (Oakland)*	CA
Austin Public Health*	TX
Baltimore City Health Department*	MD
Boston Public Health Commission*	MA
Chicago Department of Public Health*	IL
Cleveland Department of Public Health	OH
Columbus Public Health*	OH
Dallas County Department of Health and Human Services	TX
Denver Department of Public Health and Environment*	CO
Detroit Health Department	MI
District of Columbia Department of Health*	DC
El Paso Department of Public Health	TX
Houston Health Department*	TX
Kansas City Health Department	MO
Long Beach Department of Health and Human Services*	CA
Los Angeles County Department of Public Health*	CA
Louisville Metro Department of Public Health and Wellness	KY
Maricopa County Department of Public Health (Phoenix)*	AZ
Marion County Public Health Department (Indianapolis)*	IL
Mecklenburg County Public Health (Charlotte)*	NC
Milwaukee Health Department	WI
Minneapolis Health Department*	MN
Multnomah County Public Health (Portland)	OR
New York City Department of Health and Mental Hygiene	NY
Oklahoma City–County Health Department	OK
Philadelphia Department of Public Health*	PA
Pima County Health Department (Tucson)	AZ

*Jurisdictions that participated in the 2021 BCHC ECA.

BCHC Health Department Name (City, if Different)	State
Public Health–Seattle & King County*	WA
San Antonio Metropolitan Health District*	TX
San Diego County Public Health*	CA
San Francisco Department of Public Health*	CA
Santa Clara County Public Health Department (San Jose)*	CA
Shelby County Health Department (Memphis)	TN
Southern Nevada Health District (Las Vegas)*	NV
Tarrant County Public Health	TX

*Jurisdictions that participated in the 2021 BCHC ECA.

Health Department Structure and Leadership

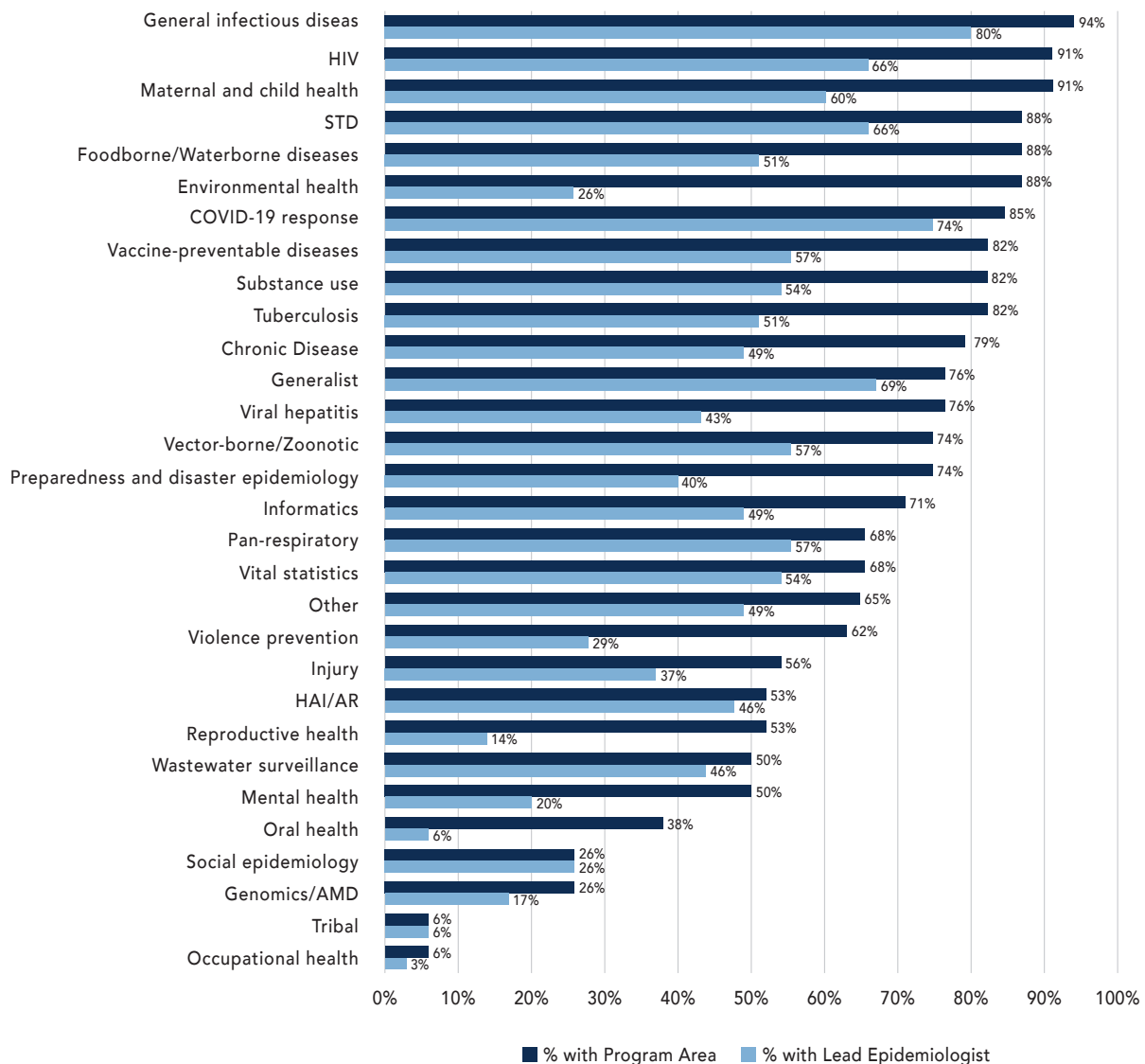
Structure and general organization

Respondents were asked to describe the structure of their epidemiology workforce. About a third of respondents (33%) reported having a single lead epidemiologist who oversees all program areas, while approximately 30% do not. The rest (36%) reported having multiple leads across program areas. A total of 88% of BCHC respondents reported that they have “generalist” epidemiologists who support several or all program areas in the health department.

Presence of programs and lead epidemiologists by program area

Nearly all respondents have programs in general infectious disease (94%), HIV (91%) and maternal and child health (91%) (Figure 1). In contrast, fewer have programs in oral health (38%), social epidemiology (26%), tribal (6%) and occupational health (6%). The programs most likely to be served by a formal lead epidemiologist are general infectious disease (80% of respondents report having a program lead), COVID-19 (74%), and generalist (69%).

Figure 1 Percentage of BCHC jurisdictions with specific program areas and formal lead epidemiologists in these areas, 35 jurisdictions, BCHC ECA 2024



Role of informatics in the department

Respondents were asked who conducts informatics activities in the department. They were able to select all response options that were relevant to their department. As indicated in Figure 2, there is a great deal of overlap between epidemiologists and informaticians with 62% of BCHC departments reportedly having generalist epidemiologists whose work includes informatics, and 56% have informaticians who are not part of the epidemiology workforce. Half (50%) rely on their IT department for informatics needs.

Staffing

Number of epidemiologists and rates per 100,000 population

There are 1,849 FTE epidemiologists working in BCHC departments. The number of epidemiologists per health department ranged from 3 to 427, with a median of 22. The median rate of epidemiologists per 100,000 people among the 35 BCHC departments is 1.89, with a range of 0.37 to 8.78. To calculate this metric, the rate per

100,000 is calculated for each department and then the median is taken of all department rates. Overall, the number of epidemiologists per 100,000 population was 2.98. In comparison, the total number of epidemiologists in state health departments is 5,706, with a rate of 1.70/100,000 population. While the sample is different, for context, in 2021, BCHC health departments had 2.64 per 100,000 and states had 1.26 per 100,000.

Numbers of epidemiologists by program area

As shown in Figure 3, most BCHC epidemiologists currently work in infectious disease (914), COVID-19 (170) and generalist (165). When all infectious disease program areas are combined, nearly half (49%) of the workforce is concentrated in infectious disease. Program areas supported by the fewest epidemiologists are wastewater surveillance (19), genomics/AMD (16), violence prevention (15), injury (14), reproductive health (4) and oral health (3), which together accounted for only 4% of the total number of BCHC epidemiologists. At the time of fielding, BCHC health departments reported minimal to no staffing capacity for tribal or occupational health.

Figure 2 Role of informatics in the department, BCHC ECA 2024 (n = 34)

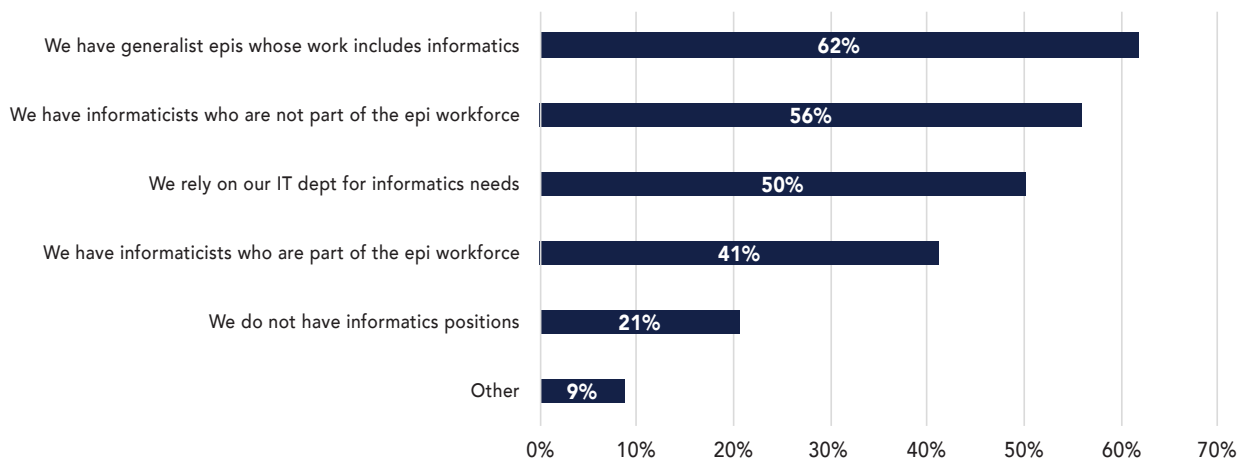
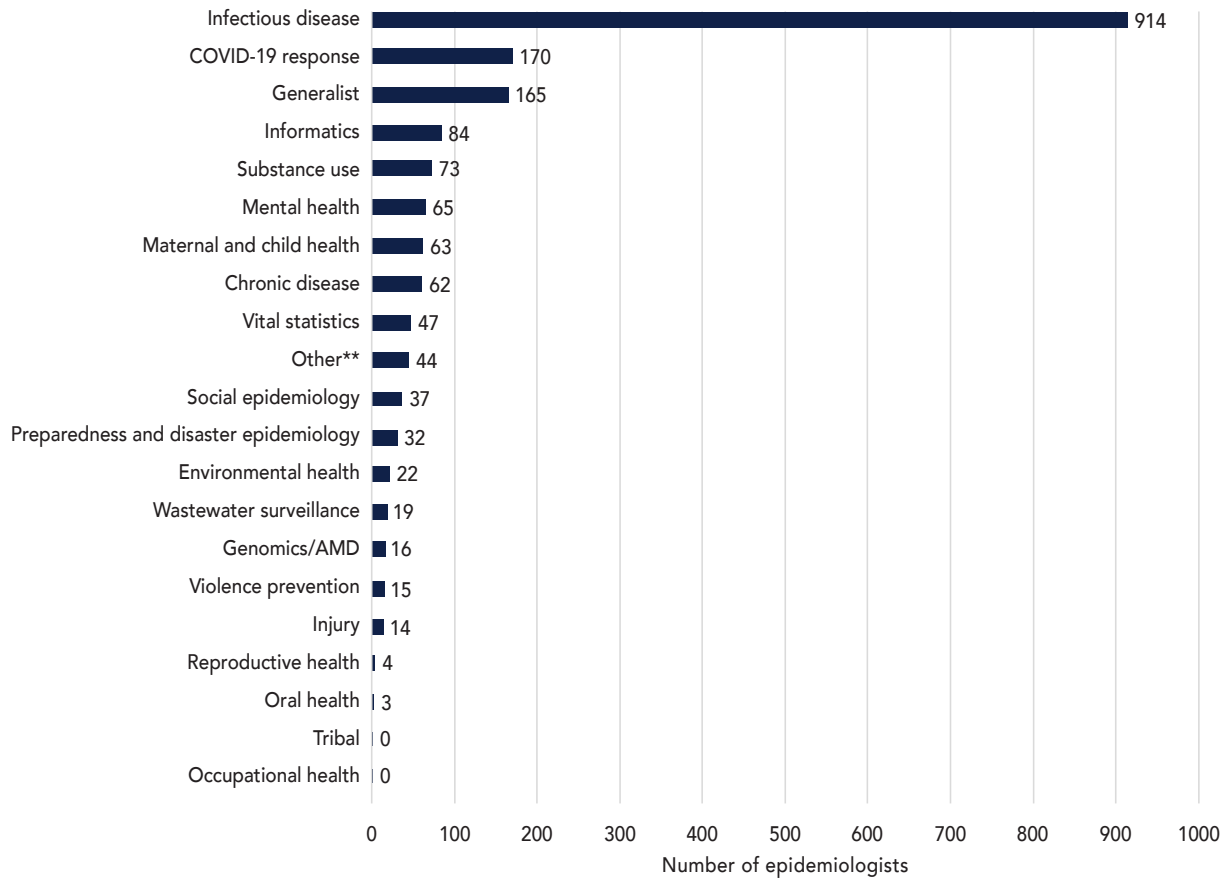


Figure 3 Number of epidemiologists by program area (condensed), 35 jurisdictions, BCHC ECA 2024*



*Condensed infectious disease category includes foodborne/waterborne diseases, general infectious disease, HAI/AR, HIV, pan-respiratory, STD, tuberculosis, vaccine preventable diseases, vector-borne/zoonotic diseases, and viral hepatitis.

**Other includes program areas not listed, including but not limited to: medical examiner/coroner, houselessness, OneHealth, EMS, health equity, and others

Numbers of epidemiologists needed to achieve full capacity

Overall, respondents reported the need for an additional 755 epidemiologists across all the program areas to achieve full epidemiology capacity. The ideal number of epidemiologists, defined as the sum of current and additional, was 2,605. Approximately 29% of the current perceived need is unmet. To effectively deliver the EPHS, BCHC departments would collectively need at least a 41% increase in epidemiologists (Table 1).

Additional and ideal positions by program area

To achieve full capacity, participating BCHC departments reported that they need the greatest number of epidemiologists in general infectious disease (61), followed by informatics (59), and STD (44) (Table 1). Among program areas currently served by more than five epidemiologists, the greatest percentage increase needed to achieve ideal levels of staffing are injury (171%), environmental health (128%) and violence prevention (106%). Further, BCHC departments noted the anticipated loss of 440 epidemiologists with the end of pandemic revenue streams.

Table 1 Current, additional, and ideal numbers of epidemiologists overall and by program area, 35 jurisdictions, BCHC ECA 2024

Program area	Current	Additional	Ideal (current + additional)	Unmet need (%)*	Increase needed to reach ideal (%)^
Chronic disease	62	40	102	39%	65%
COVID-19 response	170	23	193	12%	13%
Environmental health	22	28	50	56%	128%
Foodborne/Waterborne disease	51	18	69	26%	36%
General infectious disease	218	61	278	22%	28%
Generalist	165	32	197	16%	19%
Genomics/AMD	16	9	25	36%	56%
HAI/AR	67	27	94	28%	40%
HIV	176	32	208	15%	18%
Informatics	84	59	143	41%	70%
Injury	14	24	37	63%	171%
Maternal and child health	63	25	87	28%	39%
Mental health	65	36	101	36%	55%
Occupational health	0	5	5	–	–
Oral health	3	7	10	–	–
Other	44	9	53	17%	20%
Pan-respiratory	33	22	55	39%	65%
Preparedness and disaster epidemiology	32	25	57	44%	78%
Reproductive health	4	13	17	--	--
Social epidemiology	37	18	55	33%	49%
STD	107	44	151	29%	41%
Substance use	73	36	110	33%	50%
Tribal	0	4	5	--	--
Tuberculosis	95	36	131	27%	37%
Vaccine-preventable diseases	84	22	106	21%	26%
Vector-borne/Zoonotic diseases	48	23	70	32%	47%
Violence prevention	15	16	31	51%	106%
Viral hepatitis	35	34	69	49%	97%
Vital statistics	47	20	68	30%	43%
Wastewater surveillance	19	11	30	37%	60%
TOTAL	1849	755	2605	29%	41%

*Additional/ideal*100; Percent unmet is calculated only for program areas with >5 FTE epidemiologists

^Additional/current*100; Percent increase in FTEs needed to reach ideal is calculated only for program areas with >5 epidemiologists.

Funding for Epidemiologic Activities and Personnel

Table 2 shows the mean percentage of federal, state, and local sources for epidemiology activities and for personnel. On average, 39% of funding for epidemiology activities comes from local sources, with the federal and state governments providing an additional 39% and 18%, respectively. Values were similar for epidemiology personnel, with 40% of funding coming from local

sources, 39% from federal sources, and 17% from state sources. These findings are in sharp contrast to state health departments, where, on average, more than 80% of funds are provided by the federal government. Other non-governmental funding sources—such as private foundation or non-profit grants, donations, or corporate sponsorships—represented an average of 4% of funding for epidemiologic activities and 4% of funding for epidemiology personnel in BCHC departments. For all sources, however, the ranges were wide, from 0% to 100%.

Table 2 Mean Percentage of Funding Sources for Epidemiology Activities and Personnel*, BCHC ECA 2024 (n=34)

Funding Source	Epidemiology Activities	Epidemiology Personnel
	Mean	Mean
Federal	39%	39%
State	18%	17%
Local	39%	40%
Other	4%	4%

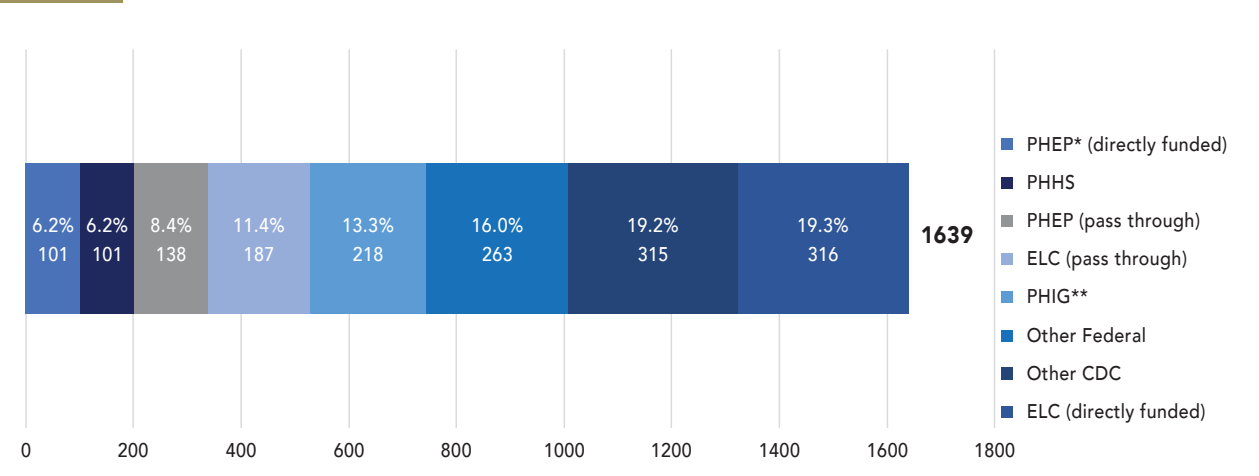
*Activities may include but are not limited to assessing and monitoring population health, ongoing research, and evaluation and use of surveillance systems. Personnel includes all those employed by the health department, as well as epidemiologists working at the health department who are federal assignees, state assignees, contract employees or fellows.

Federally funded positions in departments

Respondents were asked to enumerate the number of epidemiologists funded by federal sources (Figure 4). Of the 1,639 positions provided by federal funds, 316 were directly funded by ELC, followed by 315 funded through

other CDC funds, 263 through other federal funds and 101 from the Public Health Emergency Preparedness (PHEP) funds. Fewer positions were funded by state pass through, including the Preventive Health and Health Services grant (PHHS) (101).

Figure 4 Number of epidemiologists funded by federal sources, 35 jurisdictions, BCHC ECA 2024



*Public Health Emergency Preparedness Program (PHEP)

**Public Health Infrastructure Grant (PHIG)

Access to Peer-reviewed Literature

Having ready access to peer-reviewed literature that is not published in open-access journals is important to inform the response to emerging and ongoing health issues and to identify evidence-based practices. Forty percent of BCHC departments do not have access to peer-reviewed literature, with an additional 29% requiring more than 24 hours to obtain access. These rates of access to the peer-reviewed literature are similar to the rates reported in the 2021 BCHC ECA. In comparison, 86% of state health departments have access, though 43% required at least 24 hours prior to access.

Health Department Epidemiology Capacity

Overall health department capacity to conduct Essential Public Health Services

In 1994, the American Public Health Association first published the 10 EPHS (CDC, 2024), which were updated in 2020. Respondents were asked to assess their department's overall capacity to conduct each of the following three EPHS:

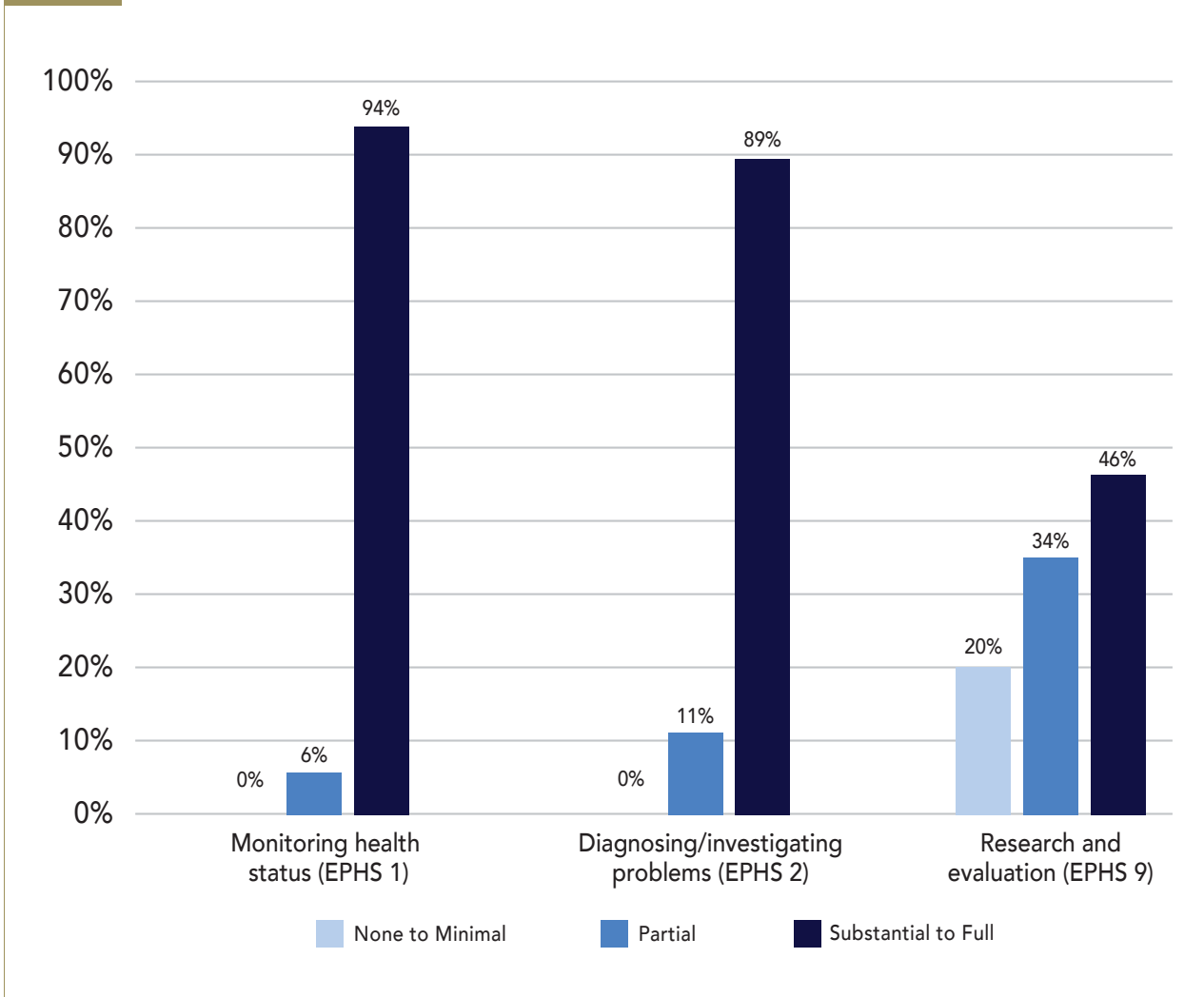
- **EPHS #1:** Assess and monitor population health status, factors that influence health, and community needs and assets.
- **EPHS #2:** Investigate, diagnose, and address health problems and hazards affecting the population .
- **EPHS #9:** Improve and innovate public health functions through ongoing evaluation, research, and continuous quality improvement.

As seen in Figure 5, nearly all BCHC departments reported having substantial to full capacity for EPHS 1 - monitoring health status (94%) and EPHS 2 - diagnosing and investigating health problems (89%). No departments reported minimal to no capacity for EPHS 1 or EPHS 2.

In contrast to the high capacity for EPHS 1 and 2, only 46% reported substantial to full capacity for EPHS 9 - research and evaluation, while 34% reported partial capacity, and 20% reported minimal to no capacity. In 2021, 60% of BCHC departments reported minimal to no capacity for EPHS 9.

The corresponding levels of substantial to full capacity for the state 2024 ECA were 84% for monitoring health status, 90% for diagnosing and investigating problems, and 37% for research and evaluation.

Figure 5 Capacity in the Essential Public Health Services, 35 jurisdictions, BCHC ECA 2024

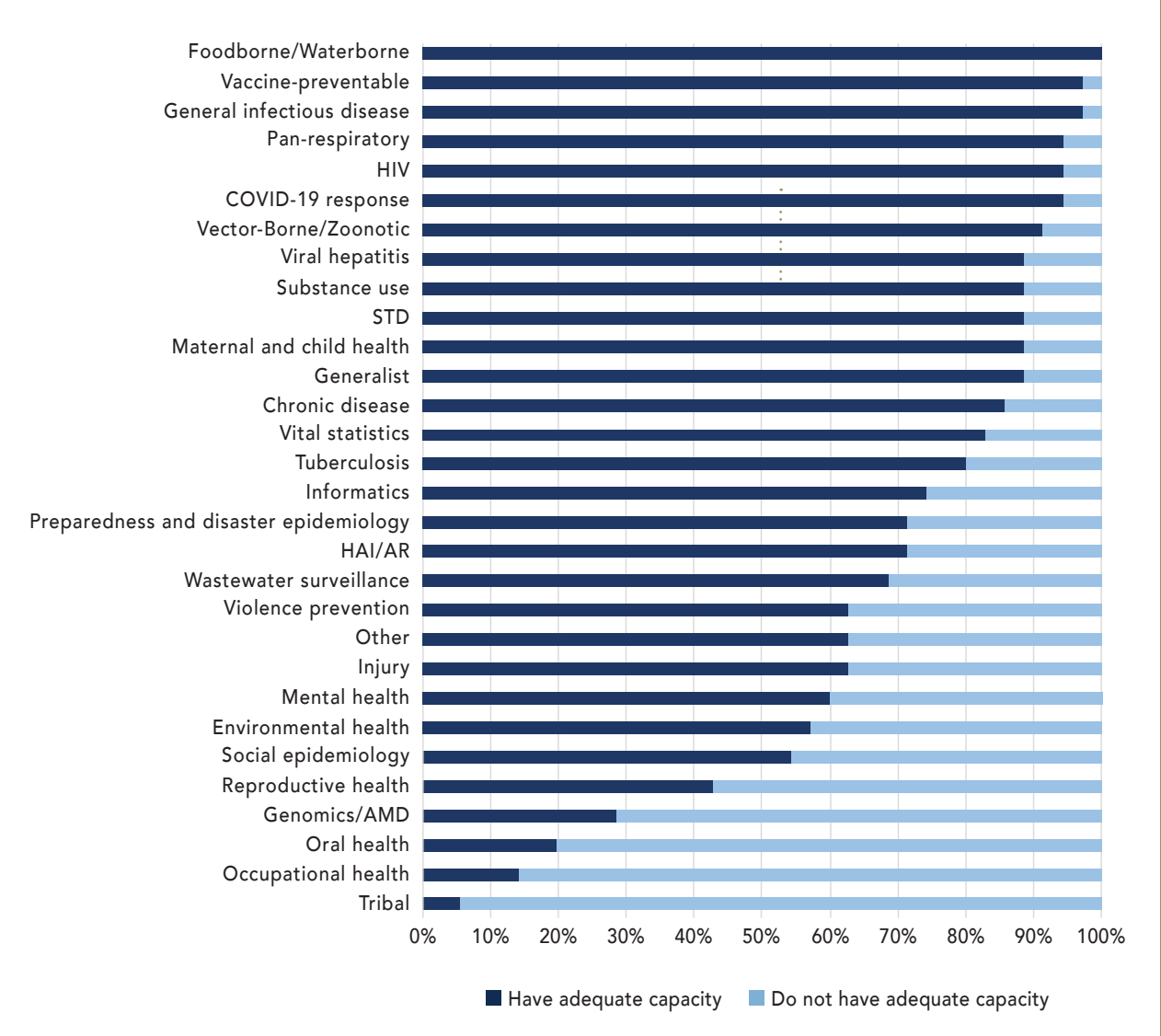


Program-level capacity

At least 90% of the BCHC departments reported having adequate capacity to conduct the three essential public health services in the areas of foodborne/waterborne, vaccine-preventable, general infectious disease, pan-respiratory, HIV, COVID-19, and vector-borne/

zoonotic (Figure 6). Capacity was defined as the ability to lead epidemiologic activities, provide subject-matter expertise, and apply for, receive, and manage resources to conduct key epidemiologic activities. Fewer than 30% reported having capacity in genomics/AMD, oral health, occupational health and tribal.

Figure 6 Current capacity in the Essential Public Health Services by program area, 35 jurisdictions, BCHC ECA 2024



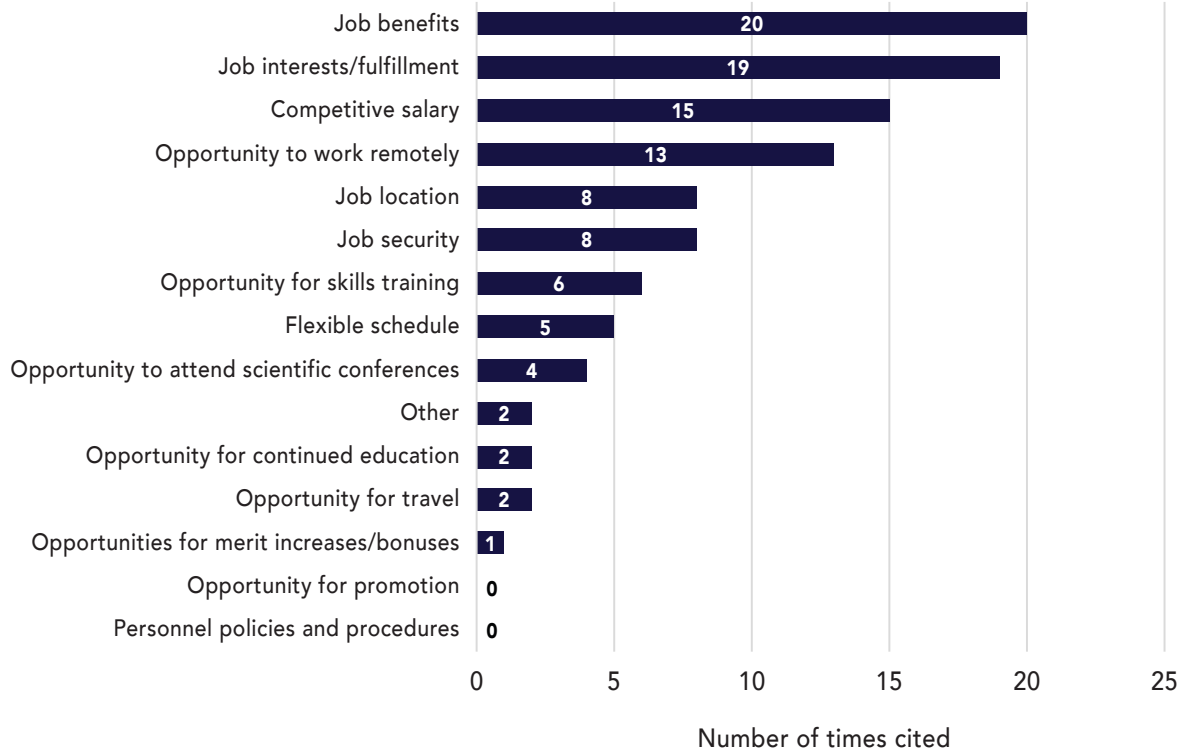
Hiring, Recruitment and Retention

Assets for recruiting epidemiologists

BCHC departments were asked to identify the top assets for recruiting epidemiologists to the department

(Figure 7). The most cited assets were job benefits, job interests/fulfillment and competitive salary. The most cited assets for states were job interests/fulfillment, opportunity to work remotely and job benefits.

Figure 7 Assets for recruiting epidemiologists at BCHC departments, 35 jurisdictions, BCHC ECA 2024

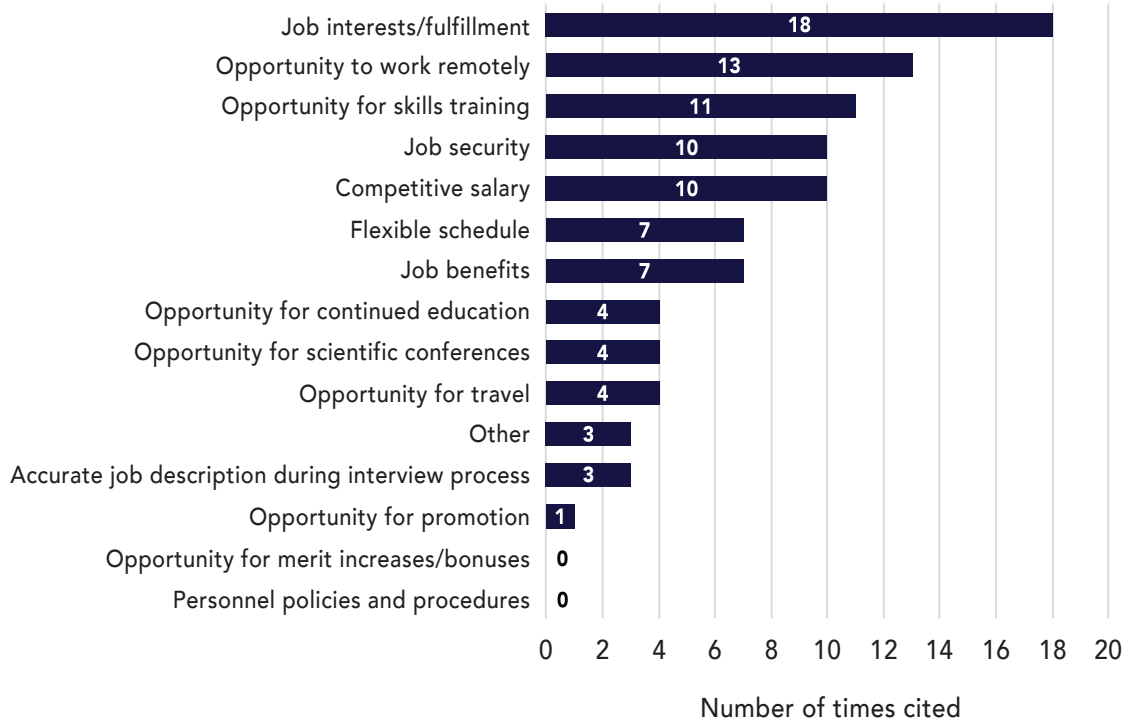


Assets for retaining epidemiologists

BCHC departments were asked to identify the top assets for retaining epidemiologists at the department

(Figure 8). Participants cited job interests/fulfillment, opportunity to work remotely and opportunities for skills training as top assets.

Figure 8 Assets for retaining epidemiologists at BCHC departments, 35 jurisdictions, BCHC ECA 2024

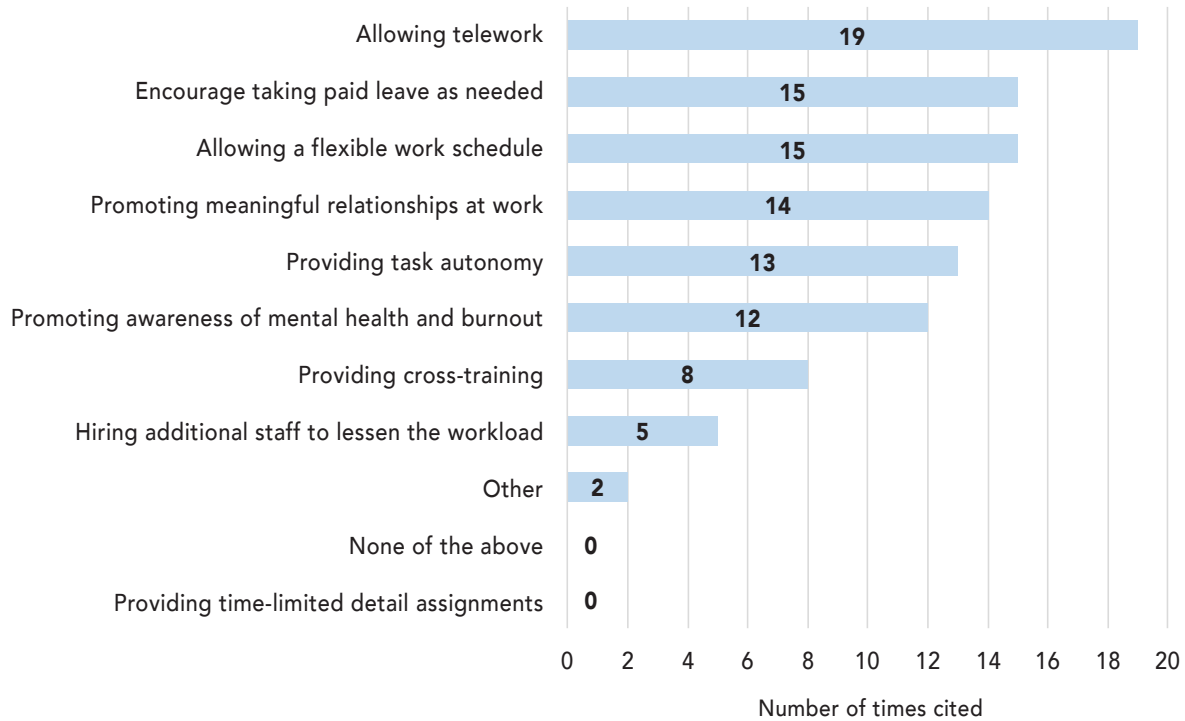


Minimizing burnout in the workplace

The 2024 BCHC ECA included a question about top strategies for minimizing burnout in the health

department (Figure 9). The most cited strategies were allowing telework, encouraging taking paid leave and allowing a flexible work schedule.

Figure 9 Top strategies for minimizing burnout, 35 jurisdictions, BCHC ECA 2024

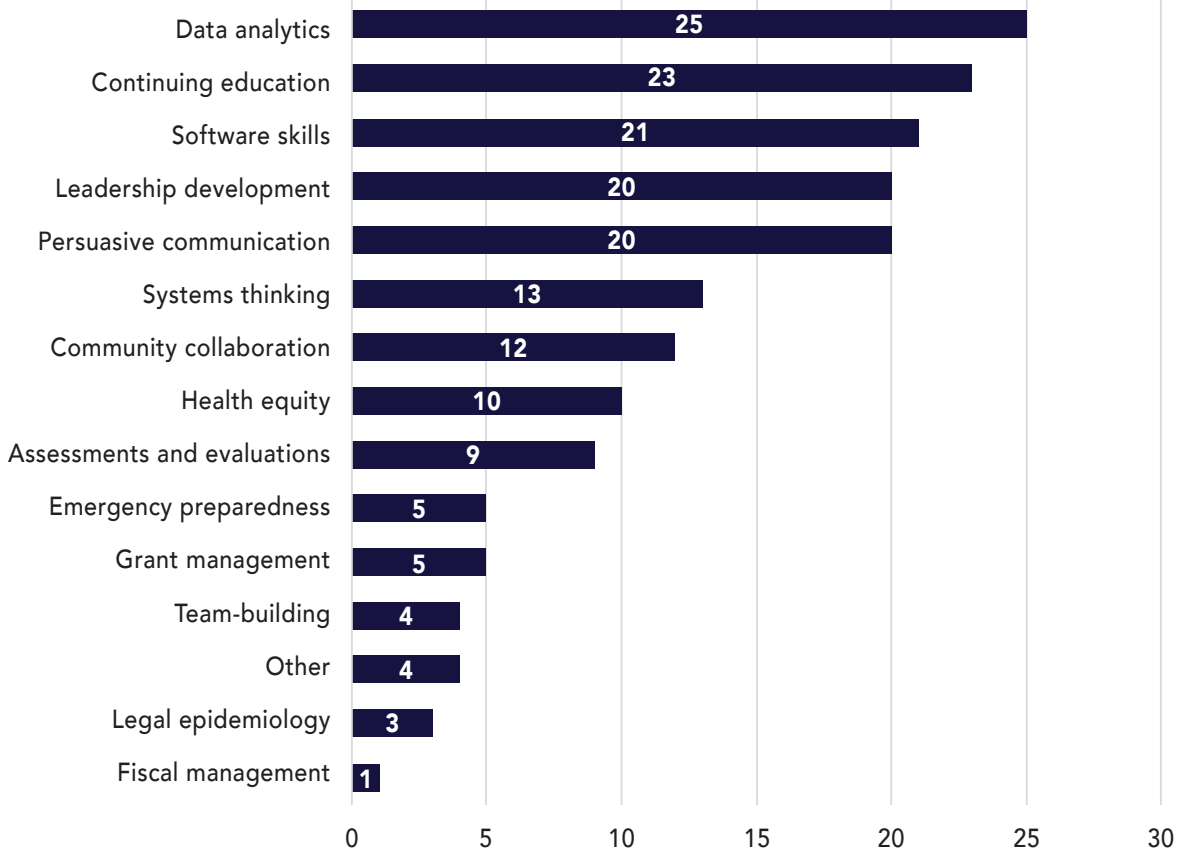


Training priorities

Each participating BCHC department selected its two most pressing staff training needs from a list of 15 broad training areas. The highest priority was data analytics (e.g., informatics, translating and applying public health data) (Figure 10). Other training priorities included continuing education (e.g., basic epi

refreshers, novel methodologies, updates to the field/literature, etc.), software skills (e.g., Epi Info, SAS, SPSS, R, etc.), leadership development and persuasive communication. Notably, only one department reported fiscal management—including planning, budgeting, or monitoring resources—as a pressing training need for epidemiologists despite the large influx of funding for the field of public health.

Figure 10 Top training needs, 35 jurisdictions, BCHC ECA 2024



Outbreak forecasting and disease transmission models

The 2024 BCHC ECA explored the presence of epidemiologists in the department focused on forecasting and disease transmission models. Only 11% of BCHC departments have a person dedicated to forecasting and disease transmission models, compared to 21% of states and territories (Figure 11). Across all departments,

5 FTEs were enumerated as serving in these roles, primarily filled by agency employees. When asked why they did not have personnel dedicated to disease forecasting, 57% cited cost and relying on academic partners, though 53% also cited their agency has not prioritized advanced analytics, modeling and forecasting (Figure 12). However, 91% of BCHC departments agreed that outbreak forecasts would be useful during the next public health emergency.

Figure 11 Percentage of health departments with a dedicated forecaster, 35 jurisdictions, BCHC ECA 2024

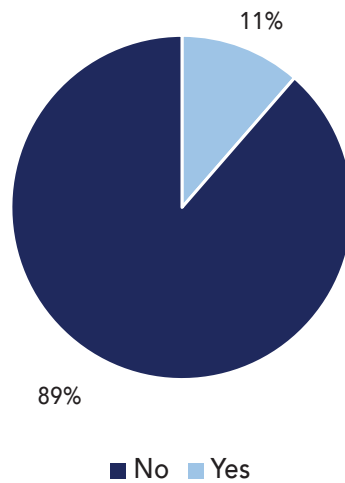
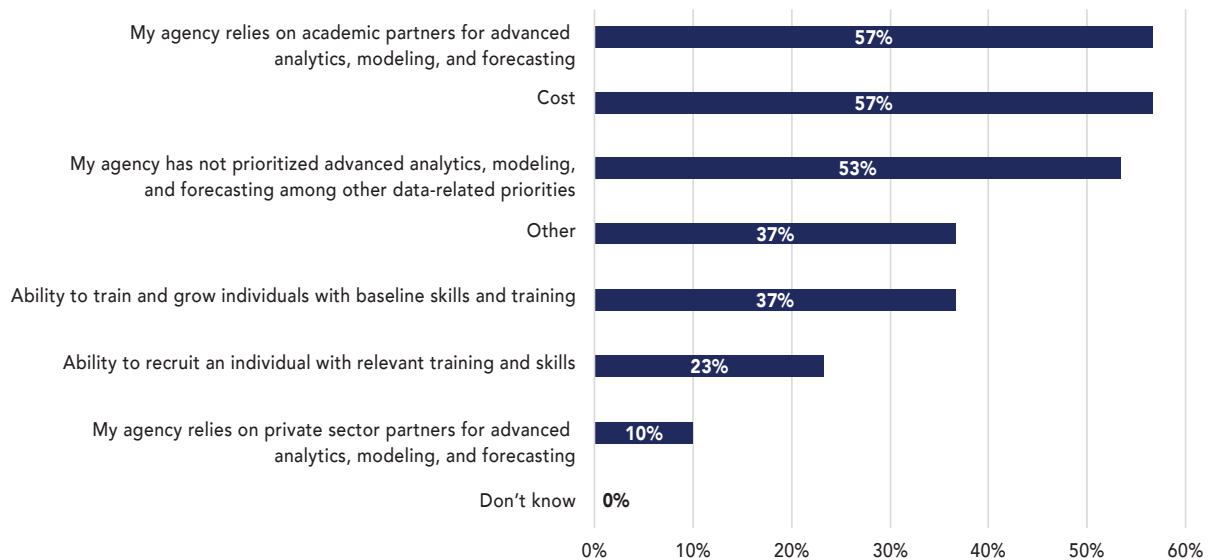


Figure 12 Reasons that jurisdictions do not have staff dedicated to disease transmission models and/or outbreak forecasts, BCHC ECA 2024 (n=30)



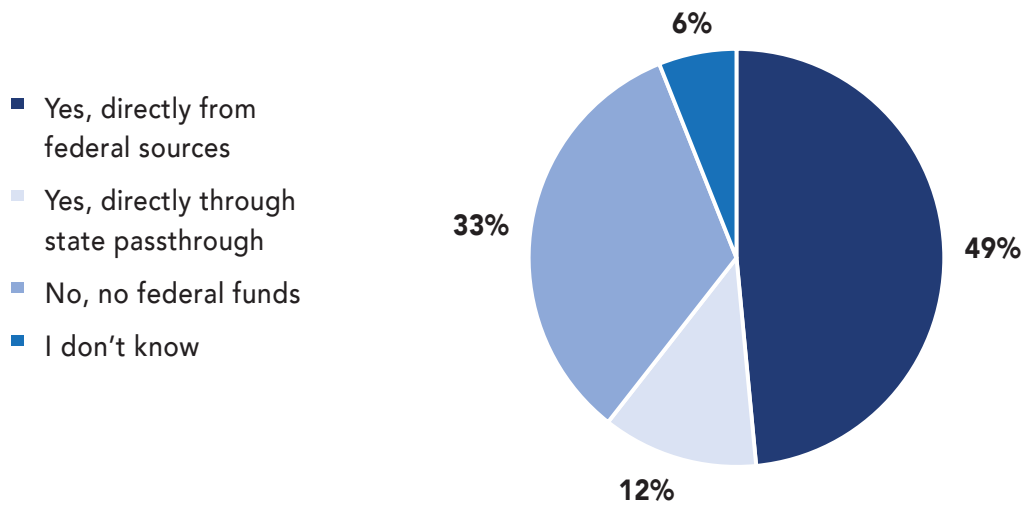
Data Modernization

The 2024 BCHC ECA included questions about funds available to support data modernization and challenges to this work. More than half (60%) of departments have used federal dollars to support data modernization, with 48% directly from federal sources and 12% through state passthrough (Figure 13). Respondents were not

asked to identify which federal funding stream(s) were used for these purposes, and it is likely that it is mix of programmatic dollars. CDC has distributed specific funds for data modernization through two primary means: the Epidemiology and Lab Capacity and Public Health Infrastructure grant mechanisms, which by and large have only gone to six local jurisdictions.³

³Chicago, Houston, Los Angeles County, Philadelphia, New York City, and Washington, D.C.

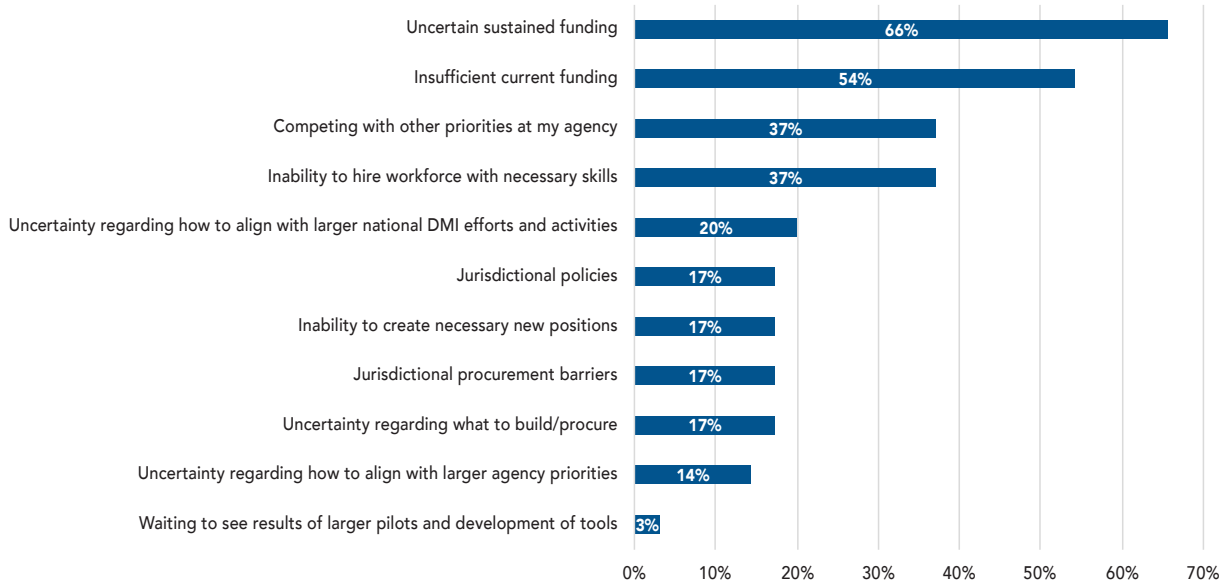
Figure 13 Percentage of jurisdictions that receive federal funds for DMI, BCHC ECA 2024 (n=33)



When asked about challenges to implementing data modernization, departments were asked to choose all responses that apply, with 66% citing uncertain sustained funding as a challenge and 54% noting

insufficient current funding. Over a third (37%) noted challenges of competing priorities at the agency and an inability to hire personnel with the necessary skills (Figure 14).

Figure 14 Top challenges faced by jurisdictions for DMI, 35 jurisdictions, BCHC ECA 2024



Current civil service and contractor vacancies and intent to fill by program area

Fewer than half (43%) of the 35 participating BCHC departments use contractors to fill vacancies for epidemiology/surveillance positions, in contrast to the 53% of state health departments that do so. There are an

estimated 201 vacant positions in BCHC departments, including 165 civil service positions (82%) and 36 (18%) contractor positions (Table 3). The greatest number of vacancies are in the program areas of generalist (31), STD (25), and HIV (21). BCHC departments reported that they intend to fill 184 positions, 83% of which are civil service positions.

Table 3 Vacant and intent-to-fill civil service and contractor positions, 50 states and DC, ECA 2024

Program Area	Civil Service		Contractor		Total vacant	Total intent to fill	% vacant with intent to fill
	Vacant (Civil)	Intent to fill (Civil)	Vacant (Contractor)	Intent to fill (Contractor)			
Chronic disease	4	3	0	1	4	4	100
COVID-19 response	1	0	0	0	1	0	0
Environmental health	4	2	1	0	5	2	33
Foodborne/Waterborne diseases	2	1	0	0	2	1	70
Generalist	24	18	7	6	31	24	77
Genomics/AMD	1	1	0	0	1	1	100
General infectious disease	10	10	0	0	10	10	104
HAI/AR	6	4	0	0	6	4	67
HIV	16	19	5	5	21	24	114
Informatics	9	5	3	0	12	5	42
Injury	0	0	0	0	0	0	0
Maternal and child health	8	8	2	2	10	10	100
Mental health	10	10	5	5	15	15	100
Occupational health	0	0	0	0	0	0	0
Oral health	0	0	0	0	0	0	0
Pan-respiratory	1	1	0	0	1	1	180
Preparedness and disaster epidemiology	5	4	0	0	5	4	80
Reproductive health	1	1	0	0	1	1	100
STD	19	23	6	6	25	29	116
Social epidemiology	2	2	0	0	2	2	100
Substance use	13	12	2	2	15	14	93
Tuberculosis	16	16	0	0	16	16	100
Tribal	0	0	0	0	0	0	0
Vaccine-preventable diseases	1	1	0	0	1	1	140
Vector-borne/Zoonotic	3	3	0	0	3	3	100
Viral hepatitis	4	4	2	1	6	5	84
Violence prevention	1	1	0	0	1	1	100
Vital statistics	1	1	3	3	4	4	100
Wastewater surveillance	1	0	0	0	1	0	0
Other	4	3	0	0	4	3	75
Total	165	153	36	31	201	184	91

Remarks from Respondents on Critical Issues

The 2024 BHC ECA included 3 open-ended questions: “With respect to epidemiologic staffing and capacity, what are the most critical issues you face?”, “How is your jurisdiction working to recruit a diverse workforce?”, and “What are the barriers to recruiting a diverse workforce in your jurisdiction?” Several themes emerged from each represented question including recruiting and retaining the workforce, challenges with funding capacity, training priorities, and data modernization efforts. Below, we summarize themes from respondents’ comments and provide illustrative quotes that reinforce the quantitative findings in this report.

Workforce

BHC health departments are experiencing challenges in retaining their current workforce due to high demands on staff. These challenges are not unique to just the epidemiology workforce, or to BHC jurisdictions. Emergency response and preparedness have strained the existing workforce and contributed to staff turnover. BHC departments note that staff continue to feel the burnout caused by the COVID-19 response, thus affecting staff morale. Staff continue to be tasked with balancing regular activities, fulfilling requests from outside entities and managing emerging public health issues.

“We also see staff leave because of the emergency response role and requirements for 24/7 response.”

“One of the most critical issues is burnout following COVID-19.”

BHC health departments struggle to provide clear paths of career advancement for epidemiologists, a challenge that exists in many areas across health departments. Opportunities for advancement are limited, leading to many vacant supervisory positions. Many current staff lack the years of experience needed for promotion. Big city health departments are also competing with other sectors as many often leave for opportunities in medical and academic institutions.

“We have limited opportunities for advancement, especially for those who want to step into supervisory or leadership roles.”

“Having trouble finding experienced epis that can also serve [as] a direct program supervisor or administrator.”

BHC health departments note that the availability of candidates with the requisite skills is a barrier to recruiting a diverse epidemiology workforce. Many applicants do not meet the minimum qualifications set forth in the job description and new graduates tend to lack the practical experience to be considered for hiring. The lack of diverse applicants in some regions compounds this issue. Additionally, institutional policies can deter applicants from applying due to not allowing fully remote positions and location requirements.

“Few candidates with the experience and skills that we’re seeking.”

“The primary barriers to recruiting a diverse workforce in our jurisdiction is the tension between the levels of education, skills and competencies required for certain positions against the availability of professionals within race and/or ethnic groups.”

Many BCHC health departments do not have competitive salaries to adequately recruit and retain a diverse epidemiology workforce. The salaries offered for epidemiologists at many departments are not always competitive with the private sector, and health departments are competing with one another for epidemiology staff. As nongovernmental entities can also amend benefits and work from home options as hiring incentives, even where salaries are competitive, there are still hiring barriers. BCHC departments also note that the dependence on grant funding – which is specific in nature and often time-limited—makes it difficult to both sustain and create new positions. Adequate salaries are needed to also keep up with the current cost of living in many places.

“One prominent challenge has been our current pay grades, which may not always be competitive with those other employers offer.”

“[One of the most critical issues we face is]...hiring well qualified candidates who will accept our (lower) salary offers.”

Big city health departments note that civil service procedures can deter potential applicants. The length, lack of clarity, and inflexibility of hiring procedures can discourage applicants from engaging in the recruitment process, particularly among those from marginalized communities. Some candidates may need more resources or support to navigate the system.

“While we have a civil service title under which epidemiologists may be hired and promoted relatively efficiently compared to other titles, it is not flexible enough to accommodate the full range of skills and experiences we need to attract many candidates.”

“Uncertainty or lack of understanding about civil service procedures can discourage potential applicants, particularly those from underrepresented backgrounds, from engaging in the recruitment process.”

Big city health departments report using a variety of outlets to recruit a diverse workforce. They note sharing job listings beyond their department’s job board and utilizing non-traditional platforms like social media, professional associations, community organizations, and culturally targeted media. Job descriptions are tailored to encourage applications from the communities being served and groups underrepresented in the workforce.

“[Our jurisdiction is working to recruit a diverse workforce by] sharing vacancy postings on external sites (beyond the City’s site) in order to reach a broader audience.”

“Advertising positions on a variety of job posting sites and email networks.”

“We acknowledge that diverse candidates may only sometimes be reached through traditional recruitment channels. We have actively sought partnerships with organizations serving underrepresented populations to bridge this gap.”

There is a need for specialized skills and on-the-job training for epidemiologists in both reportable and non-reportable disease areas. Big city health departments note expanding case investigation training for reportable disease areas and having funds dedicated to professional development opportunities that address the ongoing training needs of staff.

“Lack of money for professional development opportunities like conferences and workshops.”

“Relatively new staff have sound epi skills but need seasoning in making connections and tying it all together through report writing and storytelling. Need affordable and accessible strong hands-on epi and epi related training opportunities related to public health.”

BCHC health departments value academic partnerships to provide training, internships, and job opportunities for students. BCHC departments note wanting to establish stronger pipelines between universities, work programs, high schools, and non-traditional education and programs into public health. Specifically, departments report outreach to local historically Black colleges and universities (HBCUs) to increase opportunities for minority students.

“We work actively with our workforce development team within public health. Part of our work entails tapping into and presenting to community colleges, state colleges, and private and public universities.”

“We have partnerships with several academic institutions including an HBCU that facilitate internships, practicums, trainings, and other exposure.”

Funding capacity

The availability and reliability of federal and state funds vary by health departments due to shrinking budgets and limited, siloed grant funding. Health departments across the country, including BCHC departments, received surge capacity during the COVID-19 pandemic but have lost and will lose supplemental funds needed to continue work. Limited, and often inflexible, funds make it difficult for health departments to fill and create new FTEs. In addition, there is a need to hire additional personnel to bolster epidemiological capacity in non-infectious disease areas.

“The most critical issue is funding. Department does not have enough funds to maintain epidemiologic staff needed.”

“Not having enough epidemiologists to focus on other areas of urgency such as mental health, occupational health, substance use and abuse surveillance.”

Data modernization

As new technologies and systems emerge, BCHC departments are struggling with the challenges of data modernization. Epidemiologists are finding it difficult to keep up with rapid advancements in data science that impact their ability to effectively collect, analyze, and report data. A crucial skill includes translating data into public health action. However, BCHC departments note having limited resources to provide training to epidemiologists in this area. In addition, they report facing limited access to datasets needed to conduct analyses.

“... Training for data science and engineering and corresponding investment for epidemiologists are lacking, negatively impacting efforts to build critical data science & engineering capacity in public health institutions.”

“One of the critical issues our organization faces is keeping up to date with technology and systems that will allow our epi teams to provide cutting edge data collection, analysis and reporting that is in line with industry standards.”

“Need for personnel, skills, and funding to build informatics capacity.”

DISCUSSION

Discussion



- **Big city epidemiologists are heavily concentrated in infectious disease.** The 2024 ECA found that 94% of BCHC departments have program areas in general infectious disease, followed closely by HIV (91%). In contrast, fewer than half have program areas in oral health (38%), social epidemiology (26%), genomics/AMD (26%), tribal (6%) and occupational health (6%). Similarly, the program areas with the least number of epidemiologists across departments are wastewater surveillance (19), genomics/AMD (16), violence prevention (15), injury (14), reproductive health (4) and oral health (3). These results may reflect the priorities and funding opportunities available to certain program areas, it could also reflect local needs and priorities of leadership, or it could be a combination of both.
- **There remains a need for additional epidemiologists in all program areas, but nearly a quarter of the BCHC workforce will be lost with the end of pandemic funding.** The 2024 ECA enumerated 1,849 epidemiologists across the 35 BCHC departments and the need for an additional 755 to effectively deliver the essential public health services, a 41% increase over current staffing numbers. The program areas with the largest number of epidemiologists needed are general infectious disease (61), informatics (59) and STD (44). Though smaller program areas need fewer epidemiologists, the unmet need is profound, with injury needing 24 epidemiologists (a 171% increase), environmental health needing 28 epidemiologists (a 128% increase) and violence prevention needing 16 epidemiologists (a 106% increase). With the end of pandemic funding, BCHC departments anticipate losing 440 epidemiologists or 24% of the current workforce.
- **On average, big city health departments receive a third of their funding each from federal and local sources.** While the range of funding sources varies substantially across BCHC agencies, on average, 38% of funding for epidemiology activities comes from federal sources and 37% from local, with less reliance on state funding. Nearly a fifth (17%) of epidemiologists are directly funded by the Epidemiology and Laboratory Capacity (ELC) grant,

with an additional 10% funded through ELC dollars passed through by the state.⁴

- **BCHC departments have high capacity for monitoring health status and investigating problems, but far less capacity for research and evaluation.** Nearly all departments reported substantial to full capacity for monitoring health status (EPHS 1) and diagnosing and investigating problems (EPHS 2), while only 46% reported capacity for research and evaluation (EPHS 9). Research and evaluation ensure public health services align with the needs of the community, remain evidence-based and continually strive for advancement and improvement (Public Health Accreditation Board, 2020).
- **Approximately 40% of BCHC departments do not have access to peer-reviewed literature that is not open access, which is a detriment to agencies particularly during emergencies.** It is critical for departments to deliver evidence-based practice but that is challenged by inaccessible peer-reviewed literature. The rates of access by BCHC departments are similar to 2021 rates and have not improved significantly. It is necessary to explore innovative strategies to access peer-reviewed literature to ensure evidence-based delivery of epidemiology services.
- **Like 2021, the highest training priority for BCHC departments remains data analytics.** Additional training priorities include continuing education, software skills, leadership development and persuasive communication. As the field of applied epidemiology progresses, staff need continual training to be able to cross-collaborate and efficiently manage new data systems and emerging priorities.
- **Like 2021, the highest training priority for BCHC departments remains data analytics.** Additional training priorities include continuing education, software skills, leadership development and persuasive communication. As the field of applied epidemiology progresses, staff need continual training to be able to cross-collaborate and efficiently manage new data systems and emerging priorities.

⁴At the time of fielding, only six BCHC jurisdictions received direct ELC funding (New York City, Los Angeles, Chicago, Washington, D.C., Philadelphia and Houston).

- **Most BCHC departments do not have staff dedicated to forecasting and disease transmission models but agree forecasts would be useful during the next public health emergency.** Only 11% of departments reported having staff focused on forecasting and disease transmission models, but 91% agree that outbreak forecasts would be useful during the next public health emergency. When asked about the lack of personnel, 57% of departments cited cost as a barrier.
- **Nearly half of BCHC departments receive direct federal funds for data modernization.** More than half (60%) of departments have used federal dollars to support data modernization, with 48% directly from federal sources and 12% through state passthrough (Figure 14). Respondents were not asked to identify which federal funding stream(s) were used for these purposes, and it is likely that it is mix of programmatic dollars. When asked about challenges to implementing data modernization, 66% cited uncertain sustained funding as a challenge and 54% noted insufficient current funding.

Limitations

The 2024 BCHC ECA has several limitations:

- The results described in this report reflect the responses of the 35 BCHC member departments in 2024 and may not be comparable to previous ECA data as participating (and eligible) departments have changed. Additionally, the District of Columbia's health department staffing numbers were included in both the state and BCHC ECA estimates.
- The results represent the perspective of the 35 BCHC departments but do not represent capacity in all local jurisdictions nationwide.
- Although the ECA defines an epidemiologist for purposes of the assessment, it does not necessarily align with job titles and has a subjective component to it, which may affect comparisons among health departments.
- The data also should be considered a "snapshot" in time given the unique needs of BCHC departments and the anticipated funding changes in public health.

RECOMMENDATIONS

Recommendations



A number of recommendations were identified based on the results of the 2024 BCHC Epidemiology Capacity Assessment.

Funding

Sustainable, flexible funding is necessary to ensure that BCHC departments can recruit and retain qualified staff, prioritize the specific needs of their communities, and respond to emerging public health issues. In the wake of the pandemic, funding for non-infectious disease areas, including occupational health and mental health, are particularly necessary due to long-term impacts on the epidemiology workforce, including PTSD and burnout (Czeisler et al., 2020; de Beaumont Foundation & ASTHO, 2021).

Recommendations

- Provide flexible, predictable and sustained funding that allows BCHC departments to prioritize non-infectious disease program areas and the needs of their communities.
- Provide mechanisms to turn temporary roles created during the pandemic into sustained, long-term positions at the department.

Hiring, Recruitment and Retention

The workforce continues to grow but capacity needs remain unmet and more epidemiologists are needed. BCHC departments, like their colleagues across the field, struggle with archaic hiring processes, non-competitive salaries and limited pathways for advancement, which impede their ability to attract and hire the right people for the job.

Recommendations

- Work with local government systems to streamline hiring processes to allow for timely and equitable hiring of qualified personnel, especially during public health emergencies.
- Update salary scales to be competitive with other industries and recruit a diverse workforce.
- Institute policies that support retention of the workforce (e.g., teleworking options).

Training

Training efforts are essential for ensuring the epidemiology workforce is equipped to respond to future outbreaks. Staff require on-the-job training in data analytics to ensure the ability to keep up with ongoing data modernization efforts, both in systems and methodologies. Additionally, the pandemic highlighted the importance of having the skills to communicate effectively with partners and communities.

Recommendations

- Provide training in data analytics and communication.
- Facilitate mentorship and knowledge sharing opportunities to preserve institutional knowledge.

Academic Relationships

Academic institutions are important collaborators for ensuring a qualified candidate pool, bolstering the pipeline into applied epidemiology and diversifying the workforce. BCHC departments can utilize these relationships to provide exposure to the field and ensure that emerging epidemiologists have the necessary training for the role. Academic institutions can also be important access points for peer-reviewed literature which is particularly necessary during public health emergencies.

Recommendations

- Enhance collaboration with academic institutions to facilitate internship opportunities and promote governmental public health as a career.
- Ensure reliable access to peer-reviewed literature.

Conclusion

Local health departments in the nation's largest urban areas are critical for serving communities nationwide and continue to rely heavily on federal and state funding. Big city health departments serve large and diverse populations and require additional personnel to adequately deliver the Essential Public Health Services and be prepared for the next public health emergency.

REFERENCES

References



Big Cities Health Coalition. (2024). Members. <https://www.bigcitieshealth.org/members/>

Centers for Disease Control and Prevention. (2024). 10 Essential Public Health Services. https://www.cdc.gov/public-health-gateway/php/about/?CDC_AAref_Val=https://www.cdc.gov/publichealthgateway/publichealthservices/essentialhealthservices.html

Czeisler, M. É., Lane, R. I., Petrosky, E., Wiley, J. F., Christensen, A., Njai, R., Weaver, M. D., Robbins, R., Facer-Childs, E. R., Barger, L. K., Czeisler, C. A., Howard, M. E., & Rajaratnam, S. M. W. (2020). Mental Health, Substance Use, and Suicidal Ideation During the COVID-19 Pandemic—United States, June 24-30, 2020. *MMWR. Morbidity and Mortality Weekly Report*, 69(32), 1049–1057. <https://doi.org/10.15585/mmwr.mm6932a1>.

de Beaumont Foundation, & Association of State and Territorial Health Officials. (2021). 2021 Summary Report: National Governmental Public Health Workforce. https://debeaumont.org/wp-content/uploads/2023/08/National_2021_PH-WINS_Summary_Report_08012023.pdf

Honjo, K. (2004). Social epidemiology: Definition, history, and research examples. *Environmental Health and Preventive Medicine*, 9(5), 193–199. <https://doi.org/10.1007/BF02898100>

Last, J. M. (2000). *A Dictionary of Epidemiology* (4th ed.). Oxford University Press

McGinty, M. D., Binkin, N., Arrazola, J., Israel, M. N., & Juliano, C. (2019). Epidemiology Workforce Capacity in 27 Large Urban Health Departments in the United States, 2017. *Public Health Reports*, 134(4), 386–394. <https://doi.org/10.1177/0033354919856935>

Public Health Accreditation Board. (2020). The 10 Essential Public Health Services. <https://phaboard.org/wp-content/uploads/EPHS-English.pdf>

U.S. Census Bureau. (2024). QuickFacts. <https://www.census.gov/quickfacts/fact/table/US/PST045223>