NNPHI
National Network of Public Health Institutes

NNPHI PUBLIC HEALTH LEADS:

Exploratory Report on Public Health Data Science & Leadership

FOR RECENT GRADUATES

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HCC
Health Communications Consultants
Knowledge, Innovation, & Equity.

Prepared by Health Communications Consultants, Inc.

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Table of Contents

List of Figures and Tables

Executive Summary

In support of the efforts of NNPHI's PH LEADS program, Health Communications Consultants, Inc. (HCC, Inc.) conducted a series of inquiries aimed at better understanding the complicated relationship between data, leadership, and workforce development for public health professionals. The present report outlines work targeting the early-career aspects most relevant to this challenge. The following table summarizes the considerations raised within the listening sessions and analyses:

OBJECTIVE	HIGHLIGHTED FINDINGS
Identify recruitment and retention facilitators and barriers.	Early career participants reported that job postings demand years of experience for entry-level work and compensation. The lack of guidance and access to information on scholarships, fellowships, and jobs were also a barrier frequently mentioned. Furthermore, career directions appear to be strongly influenced bidirectionally by mentor/mentee experiences, with some participants having extremely helpful guidance and others' experiences being negatively impacted by the very people who were positioned to support them.
Identify gaps in academic curricula compared to skills needed on the job.	Academic preparation frequently lacks sufficient applied practice in the skills needed on the job. This issue is particularly applicable in areas identified in previous work in *The Essentials* framework (i.e., the essential skills required for public health work).
Identify current gaps in data science and leadership capacity, accessibility, training, and education needs of new public health workforce members.	New public health workforce members articulated a need for additional skills in data science such as specific software used in practice (e.g., GIS, Power BI, Tableau), data management (e.g., coding, cleaning data, storing data, sharing data, etc.), statistical analysis, and coaching on how to interpret and use the data. Participants also advised of the need for skill building in subjects which were never covered in school and that had to be acquired on the job. These included grant writing, workforce development, program management (e.g., budgeting, grants, etc.), leadership (e.g., how to be a supervisor/manager), community engagement, patient encounters, and case management.
Align workforce needs and current public health programs with data science and leadership curricula.	Again, participants emphasized the value of high-quality mentorship as a curricular and professional development requirement. Furthermore, they suggested that models for career-development could be gleaned from other disciplines (such as business schools) wherein skills such as job-searching, resume building, and networking are part of the standard academic journey.

Based on these findings summarized above, as well as additional findings and details presented in this report, the HCC, Inc. team provides the following actionable recommendations:

- **Implement person-centered recruitment and training practices.**
    - Training that maintains respectful, empathetic, and humane recruitment practices.
    - Examine causes for misalignment of entry level positions, their associated postings, and candidate hiring.
    - Establish a work group to examine existing ethical recruitment guidelines and develop needed ones.

    - Emphasize institutional responsibility to provide access to an effective and accessible career-specific advisor(s) or mentor(s) to assure student guidance needs are met by providing guidance through academic, career, professional development, & self-care pathways.
- **Improve alignment between academic curricula and the needs of non-research public health practice.**
    - Examine academic programs to prioritize boots on the ground skills versus theoretical applications.
    - Develop instructional interventions (micro courses, manuals, courses, etc.) to address gaps in knowledge and skills relevant to the recruitment process.
- **Develop integrated, inter-disciplinary, multi-sector workforce development paths, bridging academia, industry, and government.**
    - Establish a collaborative group to shape and refine paths (see concept graphics in Recommendation #3).
    - Disseminate path options across stakeholders.

Introduction

Health Communications Consultants, Inc. (HCC, Inc.) conducted an exploratory assessment with newly graduated students in data science and leadership who are within their first 6 months to 2 years of employment or who want to work in public health but have not found employment yet. The purpose of this exploratory work was to provide insights into the relationship between public health data science and leadership in student and early public health professional populations, as well as to understand the facilitators, barriers, needs, and gaps in those areas. Specifically, the information learned in these listening sessions was intended to inform these 4 objectives:

1) Identify recruitment and retention facilitators and barriers.
2) Identify gaps in academic curricula compared to skills needed on the job.
3) Identify current gaps in data science and the leadership capacity, accessibility, training, and education needs of new public health workforce members.
4) Align workforce needs and current public health programs with data science and leadership curricula.

Background

Public **H**ealth **L**eadership and **E**ducation, **A**dvancing Health Equity and **D**ata **S**cience (PH LEADS) is a program supported by the United States Centers for Disease Control and Prevention to strengthen population and public health workforce pathways. The program's strategies include strengthening data science and leadership training programs and assessing and designing recruitment approaches for a diverse public health workforce.[1] In August 2023, HCC, Inc. assisted the NNPHI's effort in examining the connections between data science and leadership in the public health workforce. HCC, Inc. provided its findings in an Exploratory Report on Public Health Data Science and Leadership with the key findings as follows:

1. Public health data science and leadership can best be conceptualized as a relationship between data science, data literacy, and data-informed leadership.
2. The report highlighted people, processes, and products (including tools and technologies) that enable these three areas as described in the listening sessions.

3. Current gaps in the public health data science and public health leadership needs vary by career pathways. As such, the report presented gaps as well as identified barriers articulated for junior personnel.
4. The report included strategic approaches for addressing the identified gaps.
5. Forward facing challenges and future considerations include acknowledging the dynamic relationships between the environment in which personnel are prepared and perform public health work, and the work itself, particularly to address obstacles to diversity and equitability.

Recognizing there might be a disconnect between reported data from the more senior personnel represented in the first listening sessions and the perceptions and needs of junior personnel, a second series of listening sessions geared toward early career personnel was initiated.

There were 3 areas of interest that served as additional inspiration to inform our evaluation instruments, in addition to the four stated objectives driving this evaluation. We wanted to further explore the following areas of interest: 1) a possible incongruence between the supply of trained candidates for public health roles and the unmet needs of the workforce, pathways for trainees to enter the workforce, and diversity within the workforce;[2] 2) the potential impact of accreditation on recruitment efforts as well as in academic institution selection; and 3) the implications of the University of Minnesota School of Public Health, Consortium for Workforce Research in Public Health's presentation on geospatial supply considerations of the PH workforce which addressed labor competition with a geospatial weighting system. In their evaluation they identified that the presence of multiple health departments within 50-mile radii of universities created a competitive landscape for graduate labor.

These 3 areas of interest served as additional inspiration to inform our evaluation instruments.

About this Report

The body of this report summarizes qualitative data collected in listening sessions with new and future public health professionals and is supplemented with quantitative and qualitative data collected in recruitment and post-listening session surveys.

The appendices provide full details of data used in this project.

Acknowledgements

The authors wish to acknowledge with gratitude the NNPHI for funding the listening sessions and the associated project. We also want to acknowledge Sabrianna Zoretsky-Longo of Sabyish Designs for their contribution.

This project is supported by the Centers for Disease Control and Prevention of the U.S. Department of Health and Human Services (HHS) as part of a financial assistance award (NU36OE000016-01-00, titled Strengthening Environmental Health – Building Capacity for a More Diverse and Representative Workforce) totaling $366,000 with 100 percent funded by CDC/HHS. The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement by, CDC/HHS, or the U.S. Government.

Procedure

We conducted an observational, cross-sectional evaluation from October 4, 2023, through November 7, 2023.

Methods

The evaluation methods included three sections for data collection: 1. Recruitment Survey, 2. Listening Sessions, and 3. Post Listening Session Survey.

The first section, the recruitment survey involved an online Qualtrics survey of members of the public health workforce (PHW) who self-identified as individuals from academia, state, tribal, local, and territorial health departments and national public health non-profits, and other related organizations. This activity was conducted through convenience sampling of our research team's public health (PH) networks and subsequent snowball sampling to broaden the participant pool. A recruitment email and flyers were sent to the participant pool with consent to participate assessed by their continuation through the recruitment process. Follow-up email communications were sent to individuals who responded to the initial contact. Participants were given the option of selecting one of three 90-minute listening sessions in which to participate. Once a session selection was made, an email invitation with a unique identifier was sent to the participant. A reminder email was sent one day prior to the scheduled date to improve the participation rate and ensure timely attendance. We communicated with people unable to make their initial selection to reschedule for their second selection or for a later listening session date.

We utilized a modified phenomenological method of qualitative research for the listening sessions to encourage open conversation on the topics to be explored. A semi-structured conversation tool was created to help guide the sessions. Prior to entering the Zoom platform, participants were renamed using the unique identifier assigned to them to ensure anonymity in the evaluation processes. Participants were encouraged to turn their cameras on during the session, but it was not required. A PowerPoint slide deck with welcome and thank you slides containing access to the post listening session survey were created to initiate and end the conversation. The post listening survey link was provided to participants at the conclusion of the listening session and provided again prior to the closure of the survey. To be eligible for the participant incentive, participants needed to complete the post listening session survey. The MPHI Institutional Review Board determined all research methods presented were exempt from further human subjects research review.

Supplemental to the evaluation methods, an informal poll on the social media platform LinkedIn was also used to understand the importance of the accreditation status of a college or university to hiring processes.

Analysis

Descriptive analysis was conducted on the recruitment survey and post listening survey data results. An a priori coding tool based on previous work was created for analysis of the listening session data. However, the data could not be appropriately studied with the existing tool due to the small number of participants in the listening sessions, so a sociological thematic exploration was initiated. The top themes selected using this method were further analyzed for this report with the remaining themes provided in the recommendations section.

The emerging themes were then used to inform the development of a conceptual model to represent the pathway from academic experience to practice success in public health.

Results

Synthesized data from the surveys and listening sessions can be found in the Appendices. The open-ended questions posed in the recruitment survey were also posed in the post listening session survey. Listening session transcripts and recordings were provided previously to NNPHI. Paraphrased or summarized statements are presented in the results section in the same format as phrases from the surveys while data directly from the listening session transcripts are formatted in quotation marks and italicized.

Recruitment Survey Response Description

The recruitment survey was comprised of 20 questions: 16 multiple choice questions, 3 open-ended, and 1 text limited. Utilizing the survey administration and analysis application Qualtrics, we identified 64 responses within the platform for the recruitment survey from October 4, 2023, through October 25, 2023.

There were 559 unique email invitations sent to persons in the public health workforce during the recruitment timeframe resulting in a 11.4% response rate (64/559). There were 31 surveys retained for analysis. Twenty-five (25) surveys had 100% completion, 6 were incomplete with completion rates of 23% (n=2), 64% (n=3), and 77% (n=1). The average duration for completion was 6.43 minutes.

Twenty-nine (29) respondents had an affirmative response to the screening questions "Are you a newly graduated student in data science and leadership who is within their first 6 months to 2 years of employment?" Thirteen (13) of the 29 respondents selected "I would like to be working in the public health field but have not gained employment yet."

Twenty-two (22) respondents affirmed that they were willing to participate in a virtual sharing, learning, and listening session, 2 respondents declined, 7 did not answer the question. Willingness to participate equates to a participation rate of 71% (22/31), with an actual participation rate of 59% (13/22). While there were fourteen (14) actual participants in the three listening sessions, 1 participant joined with an AI assistant, and another joined using someone else's participation link. After contact was made with the AI-assisted participant during the session and it was determined that the participant's use of the AI assistant was not due to accessibility issues, the AI assistant was disconnected from the session and the participant voluntarily disconnected from the Zoom call. The participant that joined with another participant's link was provided a recruitment survey to complete after the listening session but did not complete it. The participant completed a post listening session survey.

Recruitment Survey Respondent Description

Recruitment survey respondents represented sixteen (16) states within the United States and 3 countries outside the United States. The states represented were Arizona, California (2), Florida (2), Indiana, Kansas, Maryland, Missouri, Nevada (4), New Mexico, North Dakota, Pennsylvania, Texas (2), Virginia (4), Washington, Washington, DC, and Wisconsin. The countries represented were Lithuania, Saipan, and Pakistan (2). There were 18 organizations represented by the respondents. These work settings were identified as local health agencies (n=7), educational/academic institution (n=3), personal health service industry (n=3), private nonprofit organizations (n=2), state health agency

(n=1) and private for-profit organization (n=1). Ten (10) respondents advised that they were not currently employed.

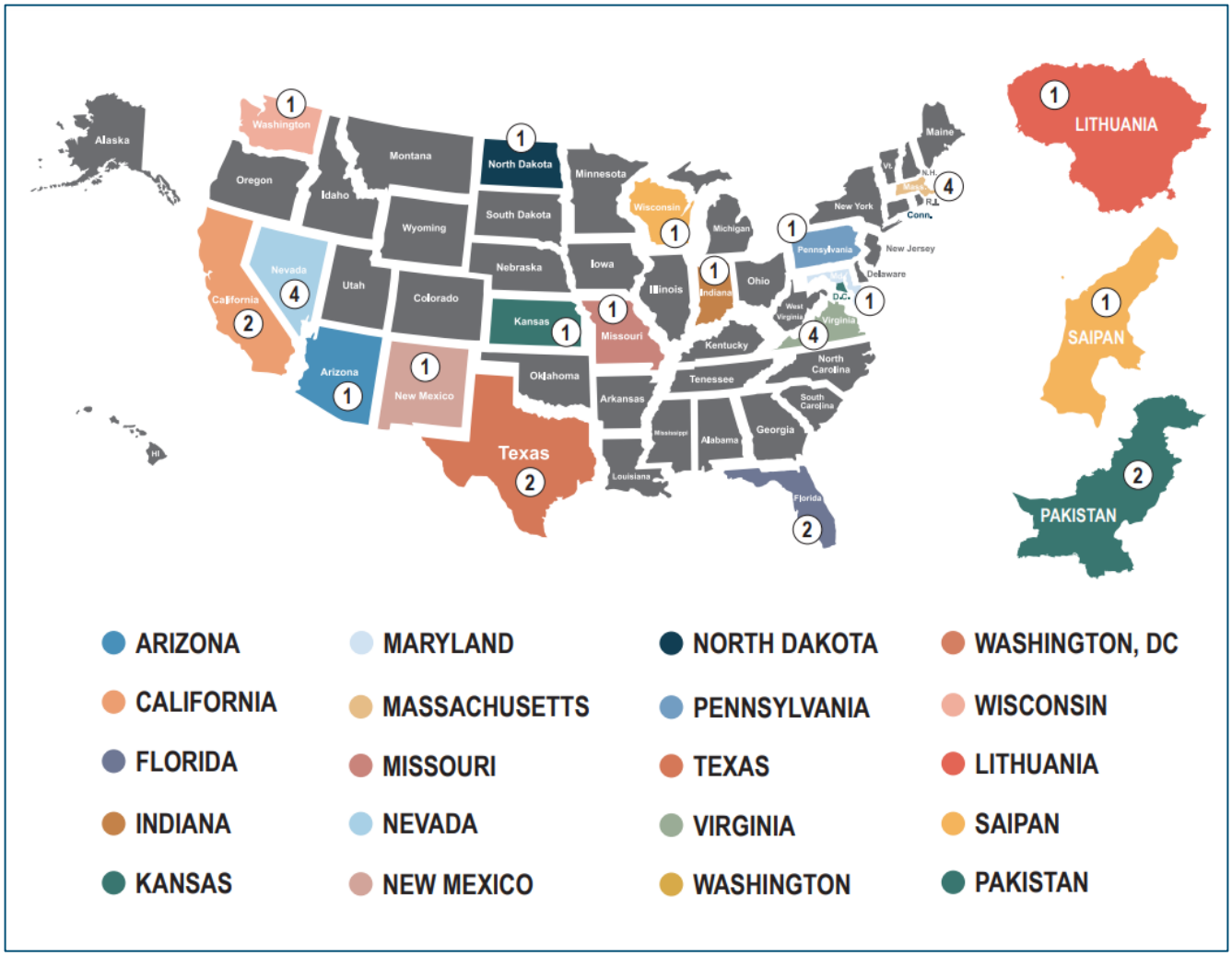


Figure 1: Geographical Representation of Recruitment Survey Respondents

Respondent demographics included gender (n=31) identified as 4 male, 26 female and 1 non-binary. The average age was 27.26 years with a range of 22 to 40 years. Respondents identified with a diversity of races and ethnicities with the descending frequency order of Black/African American (8), Asian (6), White (5), Hispanic, Latino, or Spanish origin of any race (3), American Indian or Alaskan Native (1), Asian, Hispanic, Latino or Spanish origin of any race (1), Asian, Native Hawaiian, or Other Pacific Islander (1), Asian, Non-Hispanic (1), Black/African American, Non-Hispanic (1), Hispanic, Latino or Spanish origin of any race, White (1), Some other race-Middle Eastern (1), and Decline to state (1).

Fifteen of the respondents reported their credentials as MPH (9), MPH/MS (1), PhD (1), MPA (1), CHW (1), Nursing (1), and BHS/MPH (1). When asked specifically about their degrees obtained, eighteen (18) respondents had obtained a master's degree, nine (9) a bachelor's degree, one (1) an associate degree or certificate, and 1 had earned a doctoral degree. All respondents (n=29) reported that their degrees were in the subject of public health. Additional degree subjects can be found in the appendices.

When respondents were asked about their most recent academic institution attended, 26 academic institutions were named. When asked if the academic institution was accredited, all respondents (n=29) said yes, it was an accredited organization. The accreditation status of the academic institution was reported as extremely important in the selection criteria for 82% (23/28) of survey respondents. The motivating factors that influenced the selection of their academic institution also included affordability (n=19), reputation of the institution (n=18), where they applied and were accepted (n=10), accessibility/location/proximity to home (n=9), reputation of the department/program of study (n=8), other (n=3), and friends and family members enrolled or alumni (n=2).

When asked what motivated them to work in public health, 72% (21/29) of respondents stated they had a desire to help. Other motivating reasons included an academic interest in health (6/29), it seems challenging and fun (1/29) and other (1/29) which included a change in career.

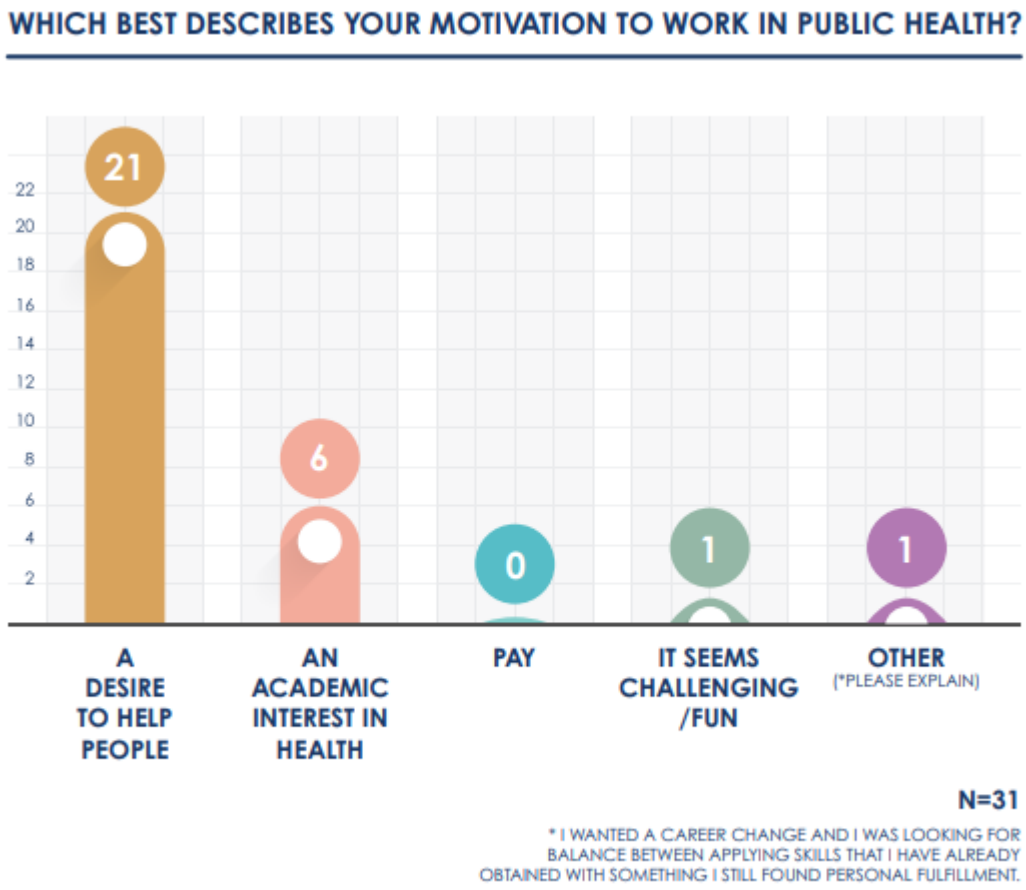


Figure 2: Recruitment Survey Respondents' responses when asked "Which best describes your motivation to work in public health?"

Drive time between current public health job and last academic institution was on average less than 1 hour drive for 38% (11/29) of respondents, more than 1 hour but less than a 5-hour drive for 21% (6/29), and 3% (1/29) reported greater than a 5-hour drive. Thirty-eight percent (38%; 11/29) did not know the distance.

When asked what they learned in or gained from their academic institution that has proven to be the most helpful in their current job there were six themes that emerged: leadership and communication (3), data science (5), research skills (2), topic-specific courses (2), social determinants of health and health equity (4), and public health impact and flexibility of having a public health degree (4). Three

respondents were placed in an unemployed category, as responses were “still applying to positions”, “I am currently not employed,” and “unemployed.”

When asked which academic course they wish they had taken or been offered to help with their current job role, four themes emerged: data science (7), leadership and program management (5), specific topics and application of skills (8). Three respondents reported within the fourth theme of no additional coursework needed.

Barriers faced when trying to find a job in public health were categorized into three themes: accessibility and pay (10), level of experience required for entry level positions and lack of respondent experience (9) and other (3) which included lack of credentials, lack of networking or network, and not being in the field yet.

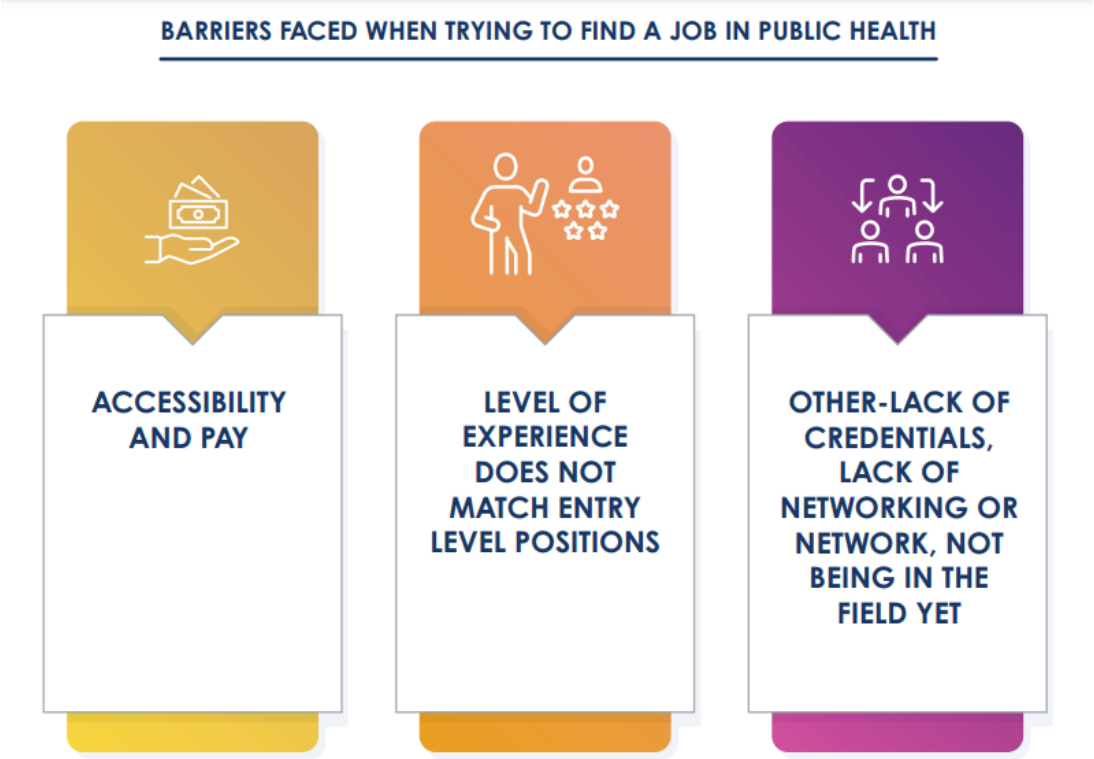


Figure 3: Recruitment Survey Respondents' Barriers to Finding a Job in Public Health

When asked about additional training that would help them be more effective and/or confident in their current job, the top choices fell within the categories of data science and leadership. This included topics such as: using data analysis tools, processes, and results to improve programs (14), communicating data results to diverse audiences (10), qualitative or quantitative research methods or study design (10), fundraising, grant writing, and resource development (10), project/program management (9) and budgeting, finance, allocating limited funds (9).

Figure 4: Recruitment Survey Respondents' Trainings that Would Help Them be More Effective and Confident in Current Job

Listening Sessions

Listening sessions were attended by 13 participants (LS1=5, LS2=6, LS3=2). Demographic distribution for each listening session can be found in the appendices. There was no significant difference between the descriptive characteristics of the recruitment survey respondents and listening session participants other than listening session participants were all located in the United States. The survey respondents located outside the United States did not participate in a listening session. One listening session participant did not complete a recruitment survey but did complete a post listening session survey.

Initial coding of the transcripts resulted in 10 themes: recruitment and retention barriers and facilitators, barriers and impediments to employment, verbalized frustration with all aspects of job search, rejection and resilience, alignment and misalignment between academics and practice, guidance and lack of guidance in curriculum at academic programs, flexibility of having a public health degree, post-academic training, need for public health to market the field of public health, and financial accessibility.

Figure 5: Listening Session Themes

Upon review of the themes and the data from the surveys, two themes were the most frequently experienced by respondents: barriers and impediments to employment, and alignment and misalignment between academics and practice. Six sub-themes arose within the descriptive theme of barriers and impediments to employment. They included: lack of experience, lack of guidance, the application process, competition, the role of a network, and personal safety in certain geographical areas. There were seven subthemes in the alignment and misalignment between academics and practice which included the following: essential skills, gaps in data science curriculum, gaps in leadership curriculum, gaps in communication curriculum, desire for more electives, variations on how schools run their programs, and differences in how students engage with their program.

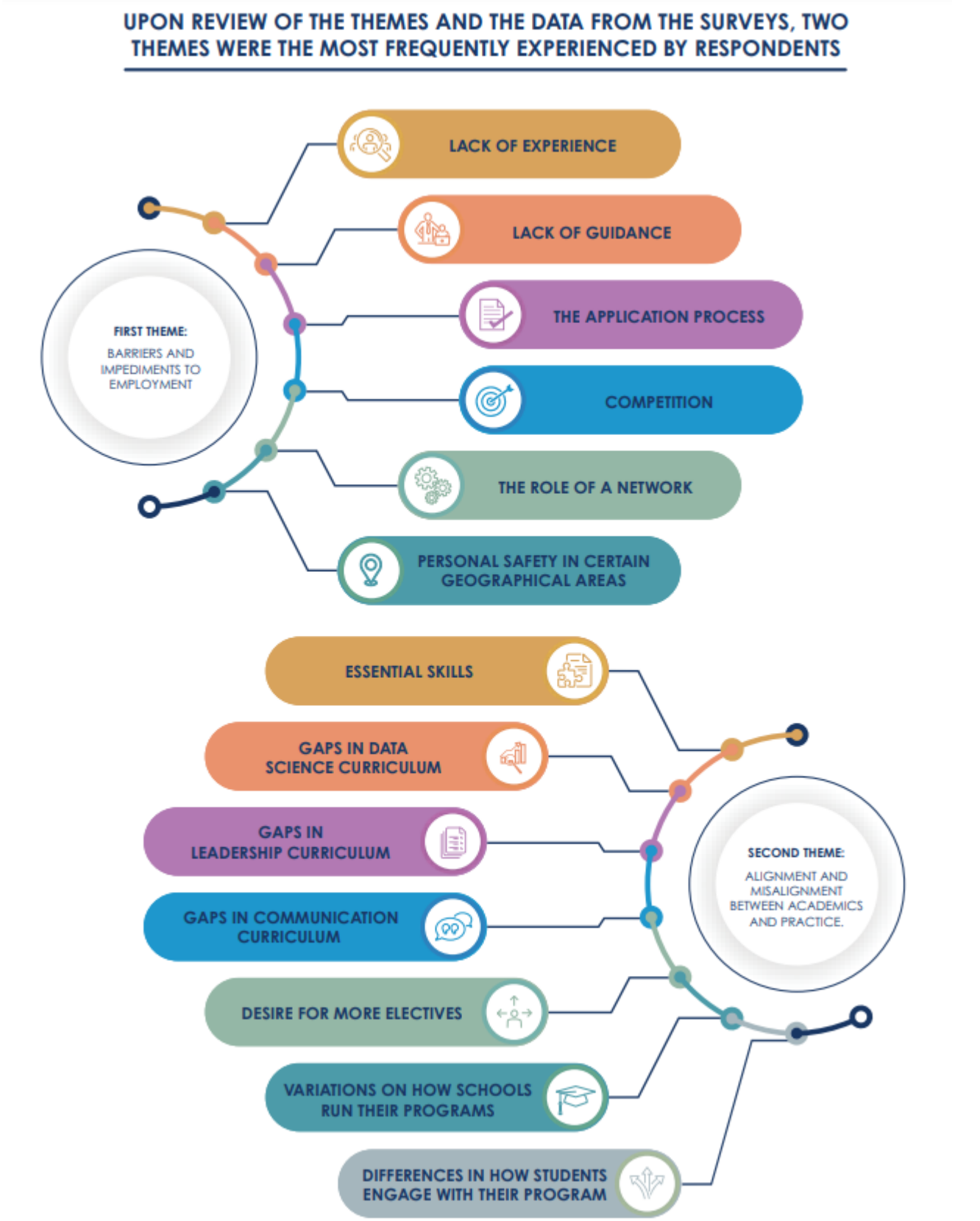


Figure 6: Two Most Frequent Themes Heard across Listening Sessions Categorized into Sub-themes.

Post Listening Session Survey

The post listening session survey was compromised of 11 questions: 1 informational, 4 multiple choices, 5 open-ended, and 1 demographics question. Of the active thirteen (13) listening session participants, ten (n=10) responded to the post listening session survey for a 77% response rate. The average time to complete the survey was 7.9 minutes. Response rates per listening session include 100% for LS1 (5/5), 50% LS2 (3/6) and 100% LS3 (2/2).

When asked about motivation to participate in a listening session 100% (10/10) had an altruistic motivation, 70% (7/10) had an intellectual motivation, 50% (5/10) saw it as an opportunity to learn from others or as individual professional development, 40% (4/10) participated for camaraderie or shared experience, 20% (2/10) were motivated to participate because the request came from a peer or someone they respected, 0 were motivated by the incentive offered.

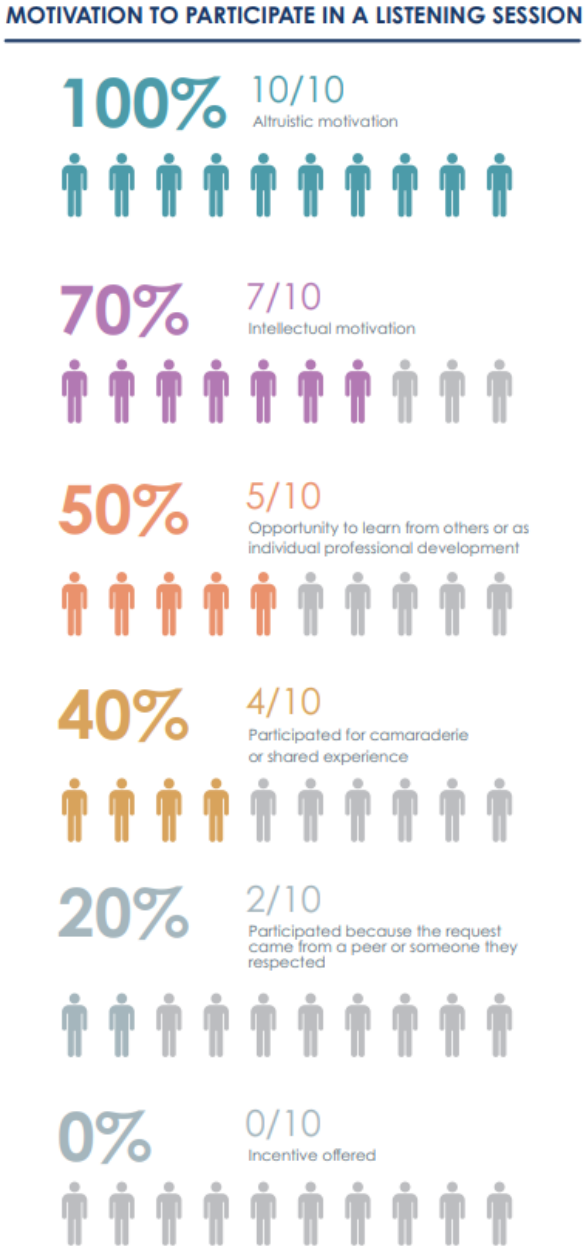


Figure 7: Post Listening Session Survey Respondents Motivation to Participate in a Listening Session

The post listening session survey repeated questions about what they had learned in their academic institution that had proven most helpful on the current job, what academic course(s) they wish had taken or been offered to help with their current job, what barriers they faced when trying to find a job in public health, and what additional training would help them be more effective and/or confident in their current job.

Participants indicated that the most useful learning was achieved across 3 topics: data science (3), research skills (3), and leadership and communication (3). One respondent stated, "honestly not much" useful learning had been achieved that was helpful with their current job. The academic courses respondents wished they had taken were categorized into 3 topics: data science (7), leadership and communication (4) and topic-specific (1) which was focused on microbiology and pathology. The barriers to finding a job in public health included accessibility and pay (3), alignment of entry level positions and lack of experience (8), and application process (1).

When asked about additional training that would help them be more effective and/or confident in their current job the top choices were within data science topics such as using data analysis tools, processes, and results to improve programs (9), understanding data, data sources, and data analysis results (8), communicating data results to diverse audiences (6), qualitative or quantitative research methods or study design (6).

LinkedIn Poll

An informal poll (Appendix N - LinkedIn Poll) was posted on the lead consultant's LinkedIn platform from September 29, 2023, to October 13, 2023. The poll asked, "When hiring a new employee is the accreditation status of the applicant's school considered in the selection?" There were 18 votes with a 53% (Yes) and 48% (No) response.

Other Analysis

Comparison of perceived accreditation status and actual accreditation status of the academic institute.

When asked about the accreditation status of their last academic institute, 100% (29/29) of respondents stated their academic institute was accredited (Q9 Institution Accreditation). When asked how important accreditation was in their selection process, 93% (27/29) responded with some level of importance (23 extremely important, 4 important). We wanted to understand if the academic institutes mentioned were actually accredited or if participants only perceived that their institution was accredited. CEPH accreditation assures quality in public health education and training in public health practice, research, and service. We used CEPH accreditation as our reference group, but it should be noted that the question that was posed in the recruitment survey did not specify CEPH accreditation. Of the 25 academic institutions listed by respondents as accredited, 21 (84%) were CEPH accredited. Of the non-accredited academic institutes, two were located outside of the United States (Health Services Academy Islamabad, Lithuanian University of Health Sciences).

Comparison of recruitment survey responses to post listening session responses.

The phenomenological process utilized in the listening sessions invites participants to share stories of their experiences rather than respond to direct questions. We conducted a comparison analysis to understand if there was a change in response between similar questions posed in the recruitment survey, which was administered prior to the listening session, and the post listening session survey. We compared shared questions, Q15 with Q6, Q16 with Q7, and Q18 with Q8 from the recruitment survey and post listening surveys, respectively. There were 10 total responses for each of the sets of questions. In the comparison of Q15 and Q6, of the 10 responses, 2 showed some deviation from their

original responses. In Q16 and Q7, 3 respondents deviated from their initial responses, and in Q18 and Q8, 2 respondents deviated from their initial responses. While the deviations varied within each participant's responses, they were still aligned with the themes throughout the analysis, and generally unremarkable.

Comparison of race/ethnicity, age and gender to employment status.
In the recruitment survey, 32% (10/31) of respondents reported that they were not currently employed. Two (2) respondents did not provide employment status. Correlation analysis is used to show the strength of a linear relationship between variables. In our dataset, the correlation matrix shows a positive correlation between being White, Black, Hispanic, and other and employment status, while being Asian has a negative correlation with employment status. Regression allows us to observe a relationship in the form of an equation (e.g., linear equation). The goodness of fit measures in the regression statistics show that the data does not fit the linear regression equation well. With multiple x variables, it is appropriate to use the Adjusted R-squared which demonstrated the linear relationship between race and employment status are not very strong with our dataset. The residual calculations further support that race does not have a linear relationship with employment status in our dataset. To compare age and employment status, marginal and conditional distributions were used. The marginal distribution of age given employment status was visualized in a stacked bar chart which demonstrated no relationship exists. In the conditional distribution, for age given employment status, there is an indication that being 22 persons in the dataset are twice as likely to be unemployed compared to other ages within the respondent population. Furthermore ages 25 (21%) and 30 (16%) have the highest percentage of being in the employed status.

Objectives

Data from the listening sessions, recruitment survey, and post listening session survey were reviewed, and responses were collated to address the four objectives posed for this project which were discussed in the Introduction section.

The list of responses provided in this section of the report are not exhaustive and are supplemented with the complete report of data results provided in Appendix K – Recruitment Survey Data, Appendix L – Listening Session Data, and Appendix M – Post Listening Session Survey Data.

Objective 1: Identify recruitment and retention facilitators and barriers.
The research shows that there is an incongruence between the supply of trained candidates for public health roles and the unmet needs of the workforce. From fall 2019 to 2020, there was a 23% increase in applications for public health degrees.[2] The early professionals represented in this evaluation stated that they were motivated to work in public health due to their desire to help people, and their academic interest in health (Q13).

Facilitators for recruitment were often self-initiated rather than other-guided, with personal initiative taken to network during and after academic programs, to research and apply for internships and fellowships, and to ensure understanding of and conformance with the perceived tedious and cumbersome nature of the application process. Success in navigating academic curricula and the job market was also attributed to finding a mentor or advisor. Access to an effective and accessible career specific advisor or mentor relationship seemed to be highly attributed to the academic institutions and related programs.

Furthermore, these barriers to employment and others were recurring themes vocalized in both the surveys (Q18 and Q8) and the listening sessions. Topics within this theme included the lack of experience alignment with entry level position requirements, low pay, lack of opportunities, lack of guidance (mentors, supervisors, advisors, peer networks, recruiting agencies), and the cumbersome application and hiring process. This suggests that the barriers are not just preparatory (i.e. occurring during academic preparation) but carry into career transition post-graduation.

Frustrations were verbalized when discussing entry level position advertisements requiring more experience than one would have out of graduate school. Participants reported many entry level jobs require 2+ years of experience and advanced technical skills (e.g., coding languages), but the participants also advised they did not have the required level of either, and therefore were not qualified for entry level positions. From the perspective of the participant, academic accolades (e.g., degrees, grades, recommendations), internship experiences, and other skills (e.g., work ethic, language skills, overcoming systemic barriers) play a less important role in recruiting efforts. The few positions that truly were entry level were low paying compared to other industries (e.g., retail workers) and did not offer compensation adequate to cover the cost-of-living expenses. There is also a highly competitive market with perceived saturation of the marketplace, limited job opportunities, and lack of remote work options. The participants stated the COVID-19 pandemic also had an impact on the number of applicants who learned about public health and moved into these fields of study only to find that the previous pre-pandemic graduates who were able to work in contract roles during the pandemic had more competitive applications due to that experience.

The lack of guidance and access to information on scholarships, fellowships and jobs were also a frequently mentioned barrier to education and employment. The lack of mentoring and advising on both academic and job-seeking pathways were also brought up in conversation during the listening sessions. There was a level of empathy expressed between listening session participants with these shared experiences and the listening sessions often became forums to share ideas and best practices in navigating the public health job market.

The application and recruitment processes were described as challenging and confusing. Often job seekers were left without any communication regarding the jobs for which they applied. Frequently there was no feedback from agencies on whether the application was received, what skills were lacking in the application or interview, how the application could have been improved, how to navigate the numerous platforms, or how to understand if job advertisements were legitimate or being used to sell a product or course.

Objective 2: Identify gaps in academic curricula compared to skills needed on the job.
To address this objective, data from the recruitment survey (Q15 and Q16), post listening session survey (Q6 and Q7) and the three (3) listening sessions was collated and analyzed.

Respondents in our evaluation population produced a variety of responses in the evaluation tools regarding their degree programs, academic experiences, and current jobs. However, while the experiences differed, one theme was woven through most of the responses: their academic experiences and exposures did not fully prepare them for the skills needed on the job. Gaining the skills necessary required personal initiative to determine the appropriate courses or skill application opportunity, find on-the-job training, or locate support, information, or guidance from other early career professionals.

Several participants stated that their academic courses prepared them to work in research, (e.g., writing papers, study design, or conducting literature reviews and research). One participant said their MPH program in epidemiology did train them for their current position in infection control, as they were applying their skills in study design, analyzing data, and data interpretation. However, this participant also stated that their academic training in data analytics utilized SAS, but since the SAS licensing cost was a barrier for their agency, they were currently having to learn R (i.e., free-open access) on the job.

Participants and respondents did acknowledge that the most useful learning in data science provided an understanding of statistics, some data analysis skills, and some data management, but it was not sufficient for their current position or for applying for open positions. As a result, most wished they had taken or were provided with courses on specific software used in practice (e.g., GIS, Power BI, Tableau), data management (e.g., coding, cleaning data, storing data, sharing data, etc.), statistical analysis, and coaching on how to interpret and use the data.

Participants and respondents also acknowledged that learning in academic leadership and communication, when it was provided, was also useful in their current job. Some had learned skills in advocating for people, community partner involvement, public health communication, and creating outreach and training materials. Lacking was skill building in grant writing, workforce development, program management (e.g., budgeting, grants, etc.), case management (e.g., motivational interviewing), and leadership (e.g., how to be a supervisor/manager). Participants in the listening sessions shared that there were significant job duties in community engagement, patient encounters, and case management that were never covered in school and that those skills had to be acquired on the job.

The social determinants of health (SDOH), health equity, and public health impact were all useful learning experiences that were being applied on the job. Understanding root causes of disparities, SDOH as predictors for health outcomes, the interconnectedness of each sector in the community's health, the varying fields of public health, and the importance of infusing health equity into planning, implementation, and evaluation were stated as useful. However, specific topics such as infectious diseases, pathology, microbiology, virology, medical terminology, health physics, lifestyle medicine, and global health courses were among the courses they wished they had taken.

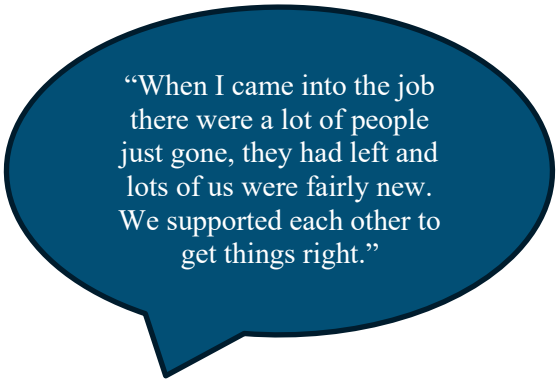
Another gap identified was that public health needed to do a better job of marketing itself, as many academic advisors (if they were available) did not know how to align students with professional development routes, and when students presented themselves as public health professionals at multi-sector job fairs, prospective employers were not clear on what the public health field was or what was included within it.

Respondents stated that they wished they had courses that taught the basics of resume writing, how to use LinkedIn, and how and where to apply for jobs. Respondents also wanted more opportunities to practice or apply skills as well as education or information on how to best utilize their degree.

Objective 3: Identify current gaps in data science and leadership capacity, accessibility, training, and education needs of new public health workforce members.

Data Science and Leadership Capacity

As previously indicated in Objective 2 above, the gaps in academic curricula and skills on the job were evaluated and gaps in data science and leadership capacity were among the initial gaps identified. Also previously indicated in Objective 2, respondents/participants identified the need for additional skills in data science such as specific software used in practice (e.g., GIS, Power BI, Tableau), data management (e.g., coding, cleaning data, storing data, sharing data, etc.), statistical analysis, and coaching on how to interpret and use the data. They also advised other leadership-level skills such as, workforce development, program management, general leadership (including how to be a supervisor/manager), and community engagement, were never covered in school and that those skills had to be acquired on the job.



Participants advised that during their academic experience there was a lack of mentorship, support or guidance on how to navigate their programs, career paths, skill acquisition, and application of their degree in the real world. This absence of experience was exacerbated when entering practice, as it was perceived the workforce had been depleted post-COVID and there was a clear lack of institutional knowledge and mentors. As one participant stated, "*When I came into the job there were a lot of people just gone, they had left and lots of us were fairly new. We supported each other to get things right*."

Accessibility

Respondents and participants noted several gaps related to accessibility. One respondent mentioned their disability and lack of accommodations in seeking a job. Several discussed the need to train themselves for the skills they wanted or needed to respond to a job posting. Accessibility was hindered by the difficulty accessing courses after graduation. There was no access to software, significant out-of-pocket expenses to access training, software, or other professional development opportunities, and limited discounts offered. Financial accessibility was also a barrier described by other participants. One participant stated they had to attend school close to where they lived so that they could afford their master's degree. Another participant stated they selected their school based on affordability, as they were juggling the reality of working as a single mom while completing their degree online. Participants shared that their jobs had paid for a portion of their degree; if it had not, they would not have been able to afford the program.

Training and Education Needs

To assess gaps in training and educational needs, the recruitment survey (Q17)and post listening session survey (Q9) were reviewed and summarized. The post-academic training theme from the listening sessions was also reviewed.

We provided respondents with a list of 16 training topics and asked them what additional training would help them be more effective and confident in their current job. The topics in descending choice order and their related response frequencies include:

1. Using data analysis tools, processes, and results to improve programs (14)
2. Qualitative or quantitative research methods or study design (10)
3. Communicating data results to diverse audiences. (10)
4. Fundraising, grant writing, resource development (10)
5. Project/Program Management (9)
6. Budgeting, finance, allocating limited funds (9)
7. Understanding data, data sources, and data analysis results (8)
8. Community engagement and collaboration (8)
9. Project/Program Leadership (7)
10. Interdisciplinary, multi-sector, and systems approaches to public health (7)
11. Health equity, social justice in health, health disparities (6)
12. General communication, listening, and interpersonal skills (6)
13. Science or technical writing (5)
14. Public health ethics and decision making (5)
15. Public health advocacy, policy, politics (5)
16. Other (1): data management

Figure 8: Topics for Additional Training

These choices align with Q16 and Q7 pertaining to the courses in the areas of data science and leadership they wish they had taken.

The listening session data related to training and education needs also included discussion regarding on-the-job training, on the job mentoring (including motivations for mentoring), lack of access to training, and the need for training (due to lack of knowledge, availability, and finances). Participants identified the need for a mini course or courses to help with transitioning from a student into the workforce. The courses could include guidance on resume building, networking, job seeking, and related topics. Participants stated that most of their training for the state health department was provided on the job and included topics such as an orientation to the public health training in teamwork, how to work within the different systems, and job-specific skills. One participant shared an example of the health department bringing in a representative from a GIS software system application to train the entire team on creating and using dashboards, while another participant discussed a five-week intensive course on R and STATA (that participant did not find STATA to be useful in their current public health job). Participants also discussed the need for a dedicated person to answer data questions. They identified a lack of qualified mentors which frequently leads to Googling for answers to their questions or querying their peers and peer-level personal networks.

Comparison to Exploratory Report of August 2023
Objective 3 of this exploratory analysis is the same as Objective 3 of the August 2023 exploratory analysis report referenced in the Introduction. The topics and ideas expressed in this evaluation were compared with those expressed in the August 2023 report, and they are aligned with those indicated in the previous evaluation.

Objective 4: Align workforce needs and current public health programs with data science and leadership curricula.
To address this objective, listening session data and survey data were reviewed.

The data reflected there was a lack of alignment between what is taught in the academic curricula and what is needed in workforce preparedness, performance, and practice when working in a public health role. Participants and respondents identified the need for workforce development, data science, and leadership courses. Skills and knowledge were often self-sought due to the lack of guidance from qualified formal and informal mentors, supervisors, and advisors. The ability to apply newly acquired skills was also a gap discussed by participants in this evaluation. Participants who were employed at the time of this evaluation noted that much of their skills training was on-the-job and that while they did learn useful skills in their academic curricula, much was lacking in the areas of data science, leadership, communication, and program management.

Comparison to Exploratory Report of August 2023
Objective 4 of this exploratory analysis is the same as Objective 5 of the August 2023 exploratory analysis report. In the August 2023 analysis, participants presented the challenges as: curricula being outdated, and lack of alignment between curricula provided and workforce knowledge and skills needed. The lack of training opportunities, lack of consistency in software and approaches to public health practice, lack of faculty time to help students, and limits of teaching knowledge with corresponding skills were all topics that were reiterated in this analysis and report.

Limitations

The report authors acknowledge some limitations in this project:

The method utilized for selecting participants for inclusion in the project (sampling) creates limitations in the ability to generalize the reported results to the larger population. HCC, Inc. leveraged their professional networks to increase participation, potentially skewing the sample representation. To clarify the skew that may have occurred, we include demographic information for the participants, which provides an important context for the results.

The small resulting sample size also introduces interpretation limitations. In an effort to mitigate the limits of interpretation, we compared results from this project with results from our prior, related NNPHI PH LEADS evaluation. This comparison revealed similar results between the current and prior work. Even with that comparison, conclusions and confirmations still cannot be made. However, similarities and consistencies in results contribute additional evidence toward the common objectives and can be used to justify additional exploration and inquiry into those topics. To reiterate, the results provided in this report are fundamentally exploratory and should be interpreted accordingly.
The final sampling limitation, that relates to the limitation around sample size, is the possible barrier is lack of access. The first possible issue related to access pertains to the age and experience levels of the participants. The demographic focus of the listening sessions is on early-career public health professionals, which generally means a younger age demographic and the potential for less experience expressing their professional opinion to others. Within this group there may have been hesitation or reticence to participate that could be attributed to professional maturity related issues such as unfamiliarity with this type of group process, discomfort in voicing their opinions or sharing feelings and information with a group of professionals, and lack of known social support within the group (in one listening session co-workers joined together and visibly relied on each other for assistance and support throughout the session). The second possible issue related to access was unavailability due to timing and schedules. The dates and times of the listening sessions were based on: the timeframe available for completing the project, HCC, Inc. evaluation team availability during that timeframe, and the evaluation team's experiences with scheduling recent listening sessions with the more established public health workforce. To address potential barriers to attendance and to facilitate participation, the sessions were held mid-workday in the eastern time zone and early morning for pacific time zone. This timing may have improved access for some participants but negatively impacted the ability to participate for others. To address both types of access issues, three optional participation incentives were offered to participants, and included a certificate of participation, a personalized letter to their supervisor commending them for their contributions to the field of public health, and a 3-month subscription to the "Calm" meditation and mindfulness application, valued at $39.

The key data collection method, a qualitative, group phenomenological interview, also introduces limitations. Phenomenological methods are inherently about listening to the articulation of personal experiences and adjusting subsequent discussion questioning and probing according to participants' responses. Consequentially, no two sessions have identical inquiries. By design, this optimizes the time-in-interview to focus solely on the participants' experiences rather than imposing the interviewer's agenda. However, it is an acknowledged limitation because the prompts are not replicated across sessions. To mitigate this limitation, our opening questions for each listening session focused on encouraging the participants to speak about their current work activities. This approach allows all listening session discussions to begin with the same or a similar prompt, and ensures the ensuing conversations are anchored in the common thread of present experiences.

An additional methodological limitation warranting acknowledgement is the use of online tools for conducting the listening sessions. Individuals who are uncomfortable with technology, did not have access to a secure, private computer with the needed technology, who do not like to speak in a video conferencing forum, and/ or are speech or hearing impaired may have excluded themselves from participating. For accessibility with speech and hearing impairments, captions in the online platform were used, though the team acknowledges that the lack of a language interpreter may have posed additional limitations on participation. Related to technology, the sessions did have some temporary and intermittent technology failures for both the participants and the moderator (e.g., loss of audio, loss of bandwidth or internet causing disruption in ability to hear discussion or respond, etc.), which could have affected the session results. The skilled facilitator was able to keep the discussion focused or refocus the discussion in these cases.

Qualitative methods inherently introduce potential interpretive limitations. To reduce bias in these interpretations, robust demographic data was collected, and results are presented in full in the appendices of this report.

Finally, survey fatigue may have been a factor in limiting participation. Efforts were made by HCC, Inc. and NNPHI to review survey items to improve brevity, the sponsors provided meaningful incentives, and the listening sessions reinforced the value of full participation to improving public health, all to support thoughtful participation throughout the survey.

Discussion

The first part of this discussion section describes and interprets our findings as they apply to the four objectives previously outlined. The current series of listening sessions was aimed at recognizing whether there was a disconnect between data reported from manager and supervisor participants in the previous evaluation project and the data reported by early career personnel in the current evaluation project. The NNPHI and HCC, Inc. teams were specifically interested in the supervisor comments regarding lack of alignment between public health student academic curricula and the knowledge and skills needed from early career personnel in public health practice. The data from the current evaluation project supports that there is no disconnect between the reported data of the managers and supervisors from the previous evaluation project and the needs of early career personnel captured in the current project. The needs of both populations hinge on the alignment of academic, professional, and skill development pathways. There must be alignment of the curriculum with the needs of the workforce with an emphasis on applied skills. Most important to the early career professionals is the reduction of mismatch between the supply of trained candidates in early career professionals, and agency demand for entry level candidates with experience qualifications that exceed entry level. Clear pathways for early career professionals, as discussed below, begin to address this challenge. Pathways for early career professionals to enter the workforce, reduction in slow and cumbersome hiring processes, reassessment of low compensation in government position versus private sector, accessibility to mentors during their studies, while finding employment opportunities and on-the job.

The perception of importance of accreditation status of the candidate's academic institution was shared equally between managers/ supervisors when hiring and students when choosing an academic home. Accreditation status of a candidate's academic institution may be a personal preference of hiring personnel, and 100% of early career professionals said that accreditation status was important to them when selecting an academic institution to attend. Early career professionals' perception of the

accreditation status of their academic institution aligned with the actual CEPH accreditation of that academic institution for 84% of respondents.

The distance between the last academic institute and current public health position was under 1 hour drive for 35% of respondents, and 35% of respondents did not know the distance. While direct correlation between distance from academic institute and public health jobs could not support or refute the 50-mile radii correlation that inspired the analysis, we did record themes within the issue of accessibility (e.g., financial, disability, training opportunities, etc.) that could warrant additional evaluation.

Recommendations

Recommendation #1: Implement person-centered recruitment & training practices.

Participants reported core failures in recruitment and training of new public health professionals as discussed throughout this report. It is recommended that greater attention be paid to developing roles intended for novice workers with little experience, and whenever possible, instituting experience and education maximums in applicant pools. Participants perceived that the current public health labor supply results in higher level professionals applying to and being selected for entry-level roles, thus limiting access to new professionals. This dynamic also leads to greater retention issues as new professionals are pressured to take on jobs that they may not intend to hold long-term in order to get their foot in the door.

Participants expressed that current recruitment practices invalidate the needs of new professionals and additional work must be done to explore how to maintain respectful, empathetic, and humane recruitment practices. Some examples included holding live interviews instead of video-based interviews, limiting reliance on automated/electronic application and resume screening technology, consistently providing feedback for applicants who are not selected for a role, and considering a new professional's additional needs (e.g., workplace accessibility, higher pay levels, and the physical location’s acceptance of their identities). Additionally, training must be a core benefit for new professionals.

Training practices for recruiters must include skills to align appropriate experience levels to the job descriptions being authored. When reviewing application materials and interviewing practices, ethical considerations should be employed. This leads to the need for **ethical guidelines** for recruitment processes. An additional recommendation includes the formation of a workgroup dedicated to ethics and hiring processes for the public health workforce.

As stated above in Objective 1, access to an effective and accessible career-specific advisor or mentor relationship was highly desirable. But the onus must be shifted from the students to institutions to assure that students are matched to advisors who are able to competently guide them through academic, career, professional development, and self-care paths.

This is not to suggest that one advisor or mentor must be assigned to all of these support areas (that is, the official "advisor" need not be individually responsible for guidance in all areas). Rather, the listening sessions' results suggest that guidance in all four aspects (academic, career, professional development, & self-care) must be present to set the conditions for long-term career success, and institutions can meet these needs in a variety of ways.

Figure 9. Academic guidance is a necessary part of PH advising, but institutional responsibility also includes providing guidance in career, professional development, and self-care. Prioritizing each of these areas may mean using advising teams, rather than depending on individuals to assure student needs are met.

The participants emphasized that their experiences with their academic institution's advising, and mentorship directly impacted their entrance into the workforce.

Recommendation #2: Improve alignment between academic curricula and needs of non-research public health work.

A thorough examination of the many academic programs that educate our public health professionals is necessary. It is recommended that academic institutions prioritize boots-on-the-ground skills over theoretical application of public health models or research-oriented skills or provide different tracks for students who wish to pursue public health academics or public health practice. It is recommended that as demand for data science coursework grows, academic institutions focus on training new professionals on how to navigate the rapidly and ever-changing world of new data science technology, as well as on providing technical skills that can transfer across software/programs and training to focus on or adapt to the technologies of tomorrow. Finally, dramatic improvements to in-school mentorship programs and/or expand paid faculty time dedicated to activities that support students career transition are necessary to promote entry into the workforce job retention and long-term career growth.

Based on participant feedback it is recommended that a series of standardized instructional interventions (micro courses, manuals, courses, etc.) be developed to address gaps in knowledge and skills relevant to the recruitment process. A course offered to all academic public health students and new public health graduates to address institutional gaps could provide much needed guidance, information, and training throughout varying phases of their curriculum.

Candidate instructional intervention topics:
Early Academic Themes:

- The value of the importance of initiating and starting to build a professional network.
- How to represent different academic activities as experiential.
- Establishing and building their profiles on LinkedIn and other social media.
- Understanding their academic needs and advocating for themselves in their academic program.
- Taking self-initiative when formal guidance or direction is not available.
- How to begin participating in public health practice professional organizations.
- Building a peer-level professional support network.

Mid-Academic Themes:

- Identifying areas of career interest and specific roles and agencies in those areas of interest.
- Determining knowledge, skills, and attitudes (KSAs) needed for employment in those areas and with those agencies.
- Assessing/ inventorying personal strengths and gaps in needed KSAs.
- Methods for amplifying strengths and addressing gaps.
- Available professional certifications and the possible benefits.
- How to initiate and establish collaborative partnerships with public health practice agencies to co-develop an exceptional field experience.

Recent Graduate Themes:

- Developing a strong, Applicant Tracking System (ATS)-effective resume.
- Methods for communicating varying types and levels of experience to prospective employers.
- Conducting a systematic, organized job search.
- Understanding rights and responsibilities in job seeking.
- Leveraging existing career education and resources platforms.
- Preparing and maintaining a LinkedIn profile for a job search.
- The benefits of applying for internships and fellowships.
- How to interview effectively.
- Job search resilience and how to deal with rejection.
- Resources for upskilling and continuing education, post-graduation.
- Mentorship - how to find career mentors, on-the-job mentors, how to be a mentor.
- Growing and nurturing a professional network after graduation.
- The importance of certifications, memberships and involvement in public health professional organizations.

Should these interventions be developed, they should include input from the target audiences, academic institutions, and public health practice agencies.

Recommendation #3 Develop integrated workforce development paths, bridging academia, industry, and government.

While career paths focus on an individual's movement within an organization or field, a workforce development path includes individuals' movements as part of the larger system, wherein academic institutions, employers, professional organizations, and even government stakeholders are included to improve and strengthen all stakeholders and the system itself.

The following is offered as a concept model to demonstrate at a very high-level how these integrated workforce development paths could work. While this model uses examples that are relevant to the present project (as well as prior efforts in support of NNPHI), it is not to be interpreted as a functional product to be immediately applied. The following graphics should act as discussion prompts and conversational launching points, to help facilitate a shared understanding of possible answers to the following questions:

1. What could a Public Health integrated workforce development path provide that isn't currently available?
2. What might a Public Health integrated workforce development path look like?
3. How would such a path be developed?

What could a public health integrated workforce development path provide that isn't currently available?

The first item presents the challenge to explicitly identify the goal of such an endeavor. Based on the results from the listening sessions reported within this document, there is a disconnect between novice public health professionals' skills at the end of their academic programs and the skills needed in the jobs they are applying for and (sometimes) getting. This suggests that a visualization of these moving pieces could help in three distinct ways: First, it provides novice professionals with a better understanding of the interconnectedness of specialties and their applications in the workforce. Second, it helps recruiters better understand realistic experiential requirements for entry-level positions. Third, a clearly articulated workforce development path supports organizations by providing insight into their roles in developing more advanced expertise throughout a professional's career.

What might a Public Health integrated workforce development path look like?

To address item #2, the following concept graphics are offered. The style is not significant, rather, the point is to observe that it is possible to map common points in career trajectories, aligned with the contexts in which they occur (such as school or work).

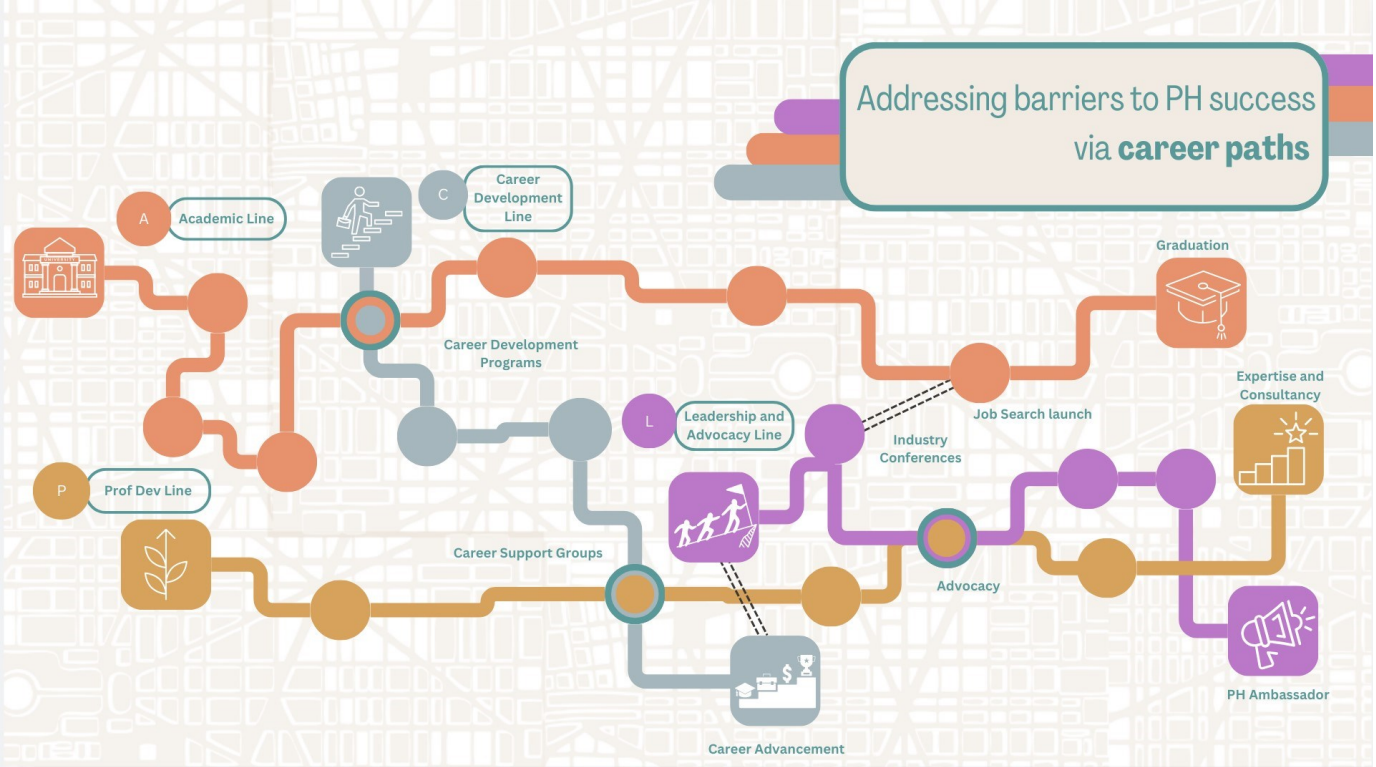


Figure 10. Concept sketch, showing how paths move and often intersect to optimize career development.

The paths developed should strike a balance between common public health experiences, ideal progression paths, and realistic needs to "switch lines" so that people can pivot within the public health field rather than exit altogether as their goals evolve.

The following lists provide examples of these paths, with intersections bolded:

Academic Line

Start: University Entrance
Station 1: Introductory Courses - Basic public health concepts.
Station 2: Technical Skills Workshops - Introduce GIS, statistical software, data visualization tools.
Station 3: Advanced Courses - In-depth public health studies with a focus on practical applications.
Station 4: **Career Development Programs** - Career boot camps, resume workshops, mock interviews.
Station 5: Practicums/Internships - Hands-on experience in real-world settings.
Station 6: Capstone Projects - Collaborative projects with industry partners. **(Connection to Industry Conferences)**
Station 7: **Job Search Launch**
End: Graduation

Career Entry Line

Start: Career Development in Academic institution
Job Search Launch
Station 1: Tailored Job Listings - Entry-level positions with clear experience requirements.
Station 2: Fair Hiring Processes - Blind recruitment, appropriate screening for entry-level.
Station 3: First Job Placement - Securing an initial position in public health.
Station 4: **Career Support Groups** - Peer networking, mentorship connections.

End: Career Advancement

Professional Development Line

Start: Continuing development (cross over to Career Development Station)
Station 1: On-the-Job Training - Learning new skills relevant to current and emergent public health issues and techniques.
Station 2: **Career Support Groups** - Peer networking, mentorship connections.
Station 3: Certifications and Specializations - Gaining additional qualifications.
Station 4: **Leadership Development** - Training for advocacy, management and supervisory roles.
Station 5: Cross-Sector Collaboration - Involvement in interdisciplinary projects.
End: Expertise and Consultancy

Leadership and Advocacy Line

Start: Professional Identity Formation
Station 1: Public Health Campaigns - Participating in or leading advocacy initiatives bridging public health organizations and communities.
Station 2: **Industry Conferences** - Presenting work, networking with a broader community.
Station 3: Policy Development - Contributing to public health policy discussions.
Station 4: **Leadership Development** - Advocacy; Becoming a voice for the profession in various forums, connection with **Career Support Groups**/mentorship.
End: Public Health Ambassador

A larger visualization is provided in Appendix Q - Visualization of Model Career Paths.

How would such a path be developed?

The third question that should be addressed related to development of integrated workforce paths is, "how should they be developed"? The "how" reflects both the methods employed and the people to employ them. The selected methodological approach should be based on rapid design thinking principles taken from engineering [3], so that the developers can collaborate and iterate with stakeholders as they develop the final product. To that end, the people overseeing the process should include an interdisciplinary team to manage the engineering and a work group of public health professionals who would guide from industry and academic perspectives. This work group should represent PH stakeholders, so that the efforts to improve across the entire workforce are informed by the participants within that workforce. Further, the work group members in participation would help disseminate efforts. It becomes evident, even at this conceptual level of the path development, that while essential skills are necessary within the academic phases of workforce progression, they must be matured *after* their academic experience to develop into leadership positions. This means that employers and organizations must continue the development of essential skills deliberately and systematically to assure a reliable, competent workforce. Consequently, their participation in the integrated workforce development path is essential.

Appendices

Appendix A – Initial Email to Potential Participants

Recruitment Survey Email
Public Health LEADS Listening Sessions

Survey link https://healthcc.qualtrics.com/jfe/form/SV_2bZvOKdGJccNMzA

https://healthcc.qualtrics.com/jfe/form/SV_2bZvOKdGJccNMzA

Subject: Recent Public Health Graduates, help shape public health data science and public health leadership. We want to hear from you!

Dear Public Health Professionals:

We need the voice of **recent public health graduates** for a series of upcoming virtual sharing, learning, and listening sessions to understand the facilitators, barriers, needs and gaps of newly graduated students in data science and leadership who are within their first 6 months to 2 years of employment or who want to work in public health but have not found employment yet.

The National Network of Public Health Institutes, as part of CDC's Public Health LEADS has partnered with Health Communications Consultants, Inc. to 1) Identify recruitment and retention facilitators and barriers, 2) Identify gaps in academic curricula compared to skills needed on the job,3) Identify current gaps in data science and leadership capacity, accessibility, training, and education needs of new public health workforce members, and 4) Align workforce needs and current public health programs with data science and leadership curricula.

These virtual sharing, learning and listening sessions are scheduled to take place between October 24, 2023, to October 26, 2023.

Eligibility to participate includes being a **newly graduated student in public health, public health data science, and/ or public health leadership** who are within their first 6 months to 2 years of employment or who want to work in public health but have not found employment yet.

To determine your eligibility to participate, please tell us more about your experience via this Survey Link.

All participants of the virtual sharing, learning, and listening sessions will receive a certificate of participation and a letter to provide to their employer showing they made a contribution to the advancement of public health.

Please help us with our recruitment efforts by distributing the attached recruitment flyer or forwarding this email to any colleagues you think may be valuable participants in these virtual sharing, learning, and listening sessions.

If you have any questions or comments, please feel free to contact me.

Sarah D. Matthews, PhD (she/her)
Health Communications Consultants, Inc.
Sarah.Matthews@healthcommunicationsconsultants.com

Appendix B – Recruitment Flyer

WHY PARTICIPATE?

You are a valued member of the Public Health Workforce.

Within the past 2 years you have recent experience in academic programs in public health, public health data science, or leadership.

You want to contribute to a National Network of Public Health Institutes (NNPHI) and CDC Public Health LEADS project to inform and transform curricula and training of the public health workforce.

You want to contribute your voice to improving the diversity of the public health workforce.

You want to contribute your knowledge to helping understand the facilitators and barriers to recruitment and retention, gaps in academic curricula compared to skills needed on the job, gaps in data science, leadership capacity, accessibility, training and education in the new public health workforce.

RECENT PUBLIC HEALTH GRADUATES HELP US BUILD THE PUBLIC HEALTH WORKFORCE OF TOMORROW!

WHO CAN PARTICIPATE?

Adults 18 years or older with access to the Internet and a device with video conferencing capability.

Newly graduated students in public health, public health data science, or leadership who are within their first 6 months to 2 years of employment or who want to work in public health but have not found employment yet.

If you are interested in participating, you will first complete a brief survey to determine your eligibility for inclusion in a 1.5 hour virtual sharing, learning and listening session.

WE WANT TO HEAR FROM YOU!

The NNPHI and CDC'S Public Health LEADS have partnered with Health Communications Consultants, Inc. to conduct virtual sharing, learning and listening sessions.

Sessions will take place on October 24, 25, or 26 and will focus on recruitment and retention facilitators and barriers, gaps in academic curricula compared with skills needed on the job, gaps in data science and leadership capacity, accessibility, training and education.

INTERESTED?

Please fill out the brief eligibility survey at this Survey Link.

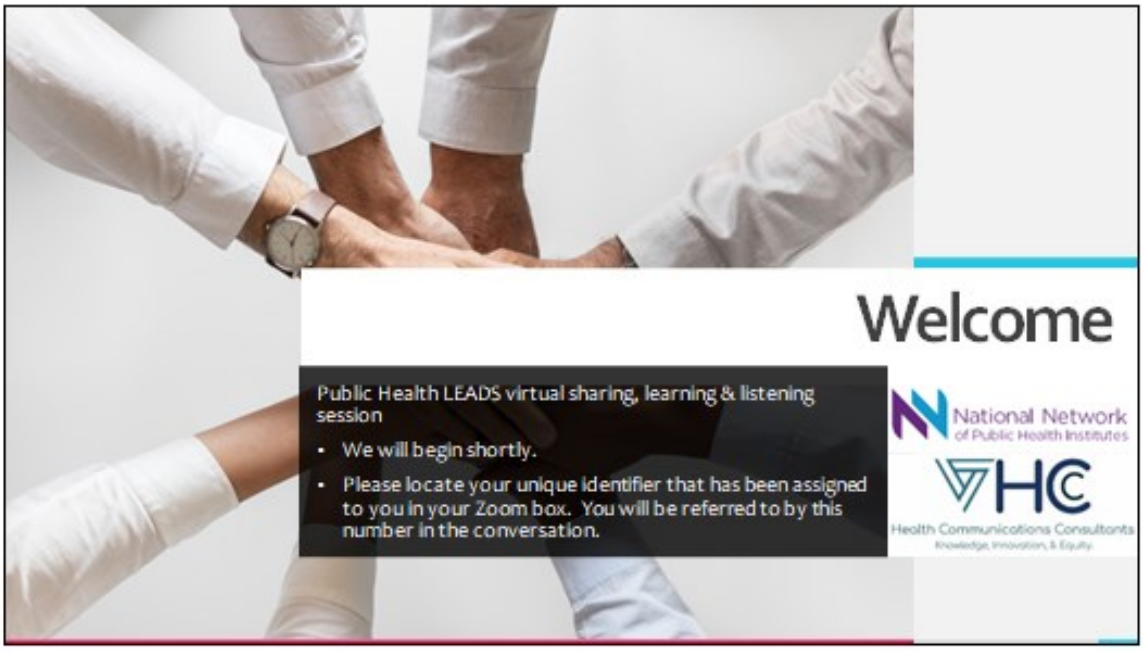
QUESTIONS ABOUT THE STUDY

Please contact the Principal Investigator:
Sarah D. Matthews, PhD at Sarah.Matthews@healthcommunicationsconsultants.com

This project is supported by the Centers for Disease Control and Prevention of the U.S. Department of Health and Human Services (HHS) as part of a financial assistance award (NU360E000016-01-00, titled Strengthening Environmental Health – Building Capacity for a More Diverse and Representative Workforce) totaling $366,000 with 100 percent funded by CDC/HHS. The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement by, CDC/HHS or the U.S. Government.

National Network of Public Health Institutes | HCC Health Communications Consultants

Appendix C – Welcome and Thank You Slides



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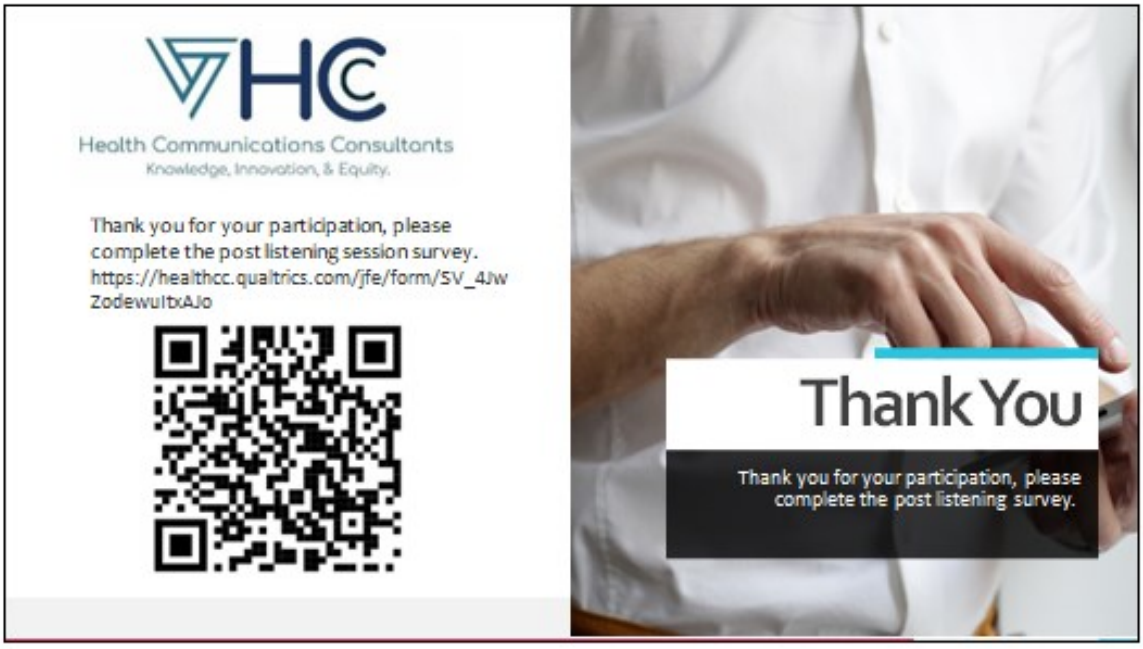

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Appendix D – Recruitment Survey

Recruitment Survey (delivered via Qualtrics)

Public Health LEADS Listening Sessions_Students

Draft 2.0

1. Thank you for your interest in participating in our virtual sharing, learning, and listening sessions! **By continuing in the survey, you acknowledge that your participation is voluntary.** Your responses will be kept confidential and will be used to determine your eligibility for the listening sessions. You may choose to terminate your participation at any time and can skip any question you choose.

   By submitting this survey, you consent to participation and affirm you are 18 years or older. If you have any questions about this evaluation, please contact Sarah Matthews, PhD, via email at sarah.matthews@healthcommunicationsconsultants.com.

The **purpose** of this listening session is to understand the facilitators, barriers, needs, and gaps of newly graduated students in data science and leadership who are within their first 6 months to 2 years of employment or who want to work in public health but have not found employment yet. The information learned in this listening session will help to:

1) Identify recruitment and retention facilitators and barriers.
2) Identify gaps in academic curricula compared to skills needed on the job.
3) Identify current gaps in data science and leadership capacity, accessibility, training, and education needs of new public health workforce members.
4) Align workforce needs and current public health programs with data science and leadership curricula.

This project is supported by the Centers for Disease Control and Prevention of the U.S. Department of Health and Human Services (HHS) as part of a financial assistance award (NU36OE000016-01-00, titled Strengthening Environmental Health – Building Capacity for a More Diverse and Representative Workforce) totaling $366,000 with 100 percent funded by CDC/HHS. The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement by, CDC/HHS, or the U.S. Government.

2. (Demographics-Text Box) Please provide the following information:

   Name
   Organization Name (Please do not use abbreviations)
   County
   State
   Email
   Phone number
   Certifications, Credentials
   Name of the most recent academic institute you attended (Please do not use abbreviations):

3. How would you best describe your Race/Ethnicity (select all that apply)
    a. Asian
    b. American Indian or Alaskan Native
    c. Black/African American
    d. Native Hawaiian or other Pacific Islander
    e. Hispanic, Latino or Spanish origin of any race
    f. Non-Hispanic
    g. White
    h. Two or more
    i. Some other race (please specify)
    j. Decline to state

4. What is your age? (Text two space limit)

5. How do you best identify in terms of gender?
    a. Male
    b. Female
    c. Non-Binary
    d. Prefer not to say
    e. Other (please specify) (Text Box)

6. Are you a newly graduated student in data science and leadership who is within their first 6 months to 2 years of employment?

    a. Yes

    b. No

    c. I would like to be working in the public health field but have not gained employment yet.

Criteria question: "No" Branch to Q18: Do not fit the criteria

7. What degrees have you attained? select the highest degree (select one)
    a. Some high school
    b. High school degree or equivalent (e.g., GED)
    c. High school technical, please specify (Text box)
    d. Some college but no degree
    e. Associate degree or certificate
    f. Bachelor's degree
    g. Master's degree
    h. Doctoral degree (MD, DO, PhD, DDS, JD, etc.)
    i. Other (please specify): __

8. (Multiple select) What is/are the subject of your degree(s) in? After your selection please write in the text box which degree the subject applies to.

a. Business (Text box)
b. Communications (Text box)
c. Dental (Text box)
d. Education (Text box)
e. Engineering (Text box)
f. Environmental Health (Text box)
g. Epidemiology (Text box)
h. Health Promotion (Text box)
i. Health Services/Administration (Text box)
j. Hospitality (Text box)
k. Human Resources (Text box)
l. Laboratory Science (Text box)
m. Liberal Arts/Humanities (please specify) (Text box)
n. Mathematics/Economics (Text box)
o. Medicine (Text box)
p. Nursing (Text box)
q. Nutrition (Text box)
r. Occupational Health and Industrial Hygiene (Text box)
s. Public Health (Text box)
t. Science (please specify) (Text box)
u. Social Work (Text box)
v. Technology (Text box)
w. Other (please specify) (Text box)

9. Is the school, college, or university that you attended accredited?
(An accredited school has gone through a rigorous, formal check by an authorizing body in education to make sure the school meets their standards and is qualified to teach students the programs they are offering.)

a. Yes, it is/was an accredited organization.

b. No, it is/was not accredited.

c. I do not know the accreditation status of the school, college, or university I attended.

10. How important was the accreditation status of the academic institution in your selection process?

a. Extremely Important; the academic institution that I selected must be accredited for me to even consider attending it.

b. Important; the academic institution that I selected should be accredited but I would consider an unaccredited institution.

c. Unimportant; the accreditation status of the academic institution that I attended did not influence my decision to attend there.

d. I am unaware of the accreditation status of the academic institute, and it was not a criterion for me when selecting a school.

11. Which best describes your motivation for selecting your academic institution? (select all that apply)
    a. Affordability/scholarship offers
    b. Reputation of the institution overall
    c. Reputation of the department/program of study
    d. Friends or family members are enrolled or alumni
    e. Accessibility/location/proximity to home
    f. Where I applied and was accepted
    g. Other (please explain) (Text box)

12. (Multiple Choice) Which **best** describes the work setting in which you **currently** work:

    a. Local health agency
    b. State health agency
    c. Territorial health agency
    d. Federal health agency
    e. Tribal health agency
    f. Educational/academic institution
    g. Private nonprofit organization
    h. Private foundation
    i. Personal health service industry (Hospital, Rehabilitation Center, Assisted Living Facility, Dental Facility, Pharmacy, Outpatient facility, Physicians Office)
    j. Other (Please specify) (Text Box)
    k. I am not currently employed.

13. Which best describes your motivation to work in Public Health?
    a. A desire to help people
    b. An academic interest in health
    c. Pay
    d. It seems challenging/fun
    e. Other (please explain)
14. What is the driving time on average between your current Public Health job and your last academic institution?
    a. Less than 1 hour drive
    b. More than 1 hour but less than 5-hour drive
    c. Greater than 5-hour drive.
    d. I do not know the distance of my current public health job and my last academic institution.

15. What did you learn in your academic program that has proven to be the most helpful to you (useful, most vital) in your current job? (open text)

16. What academic course or courses do you wish you had taken or been offered that would have helped you in your current job? (open text)

17. What additional training would help you be more effective and/ or confident in your current job? (select all that apply)

a. Budgeting, finance, allocating limited funds
b. Communicating data results to diverse audiences
c. Community engagement and collaboration
d. Fundraising, grant writing, resource development
e. General communication, listening, and interpersonal skills
f. Health equity, social justice in health, health disparities
g. Interdisciplinary, multi-sector, and systems approaches to public health
h. Project/ program leadership
i. Project/ program management
j. Public health advocacy, policy, politics
k. Public health ethics and decision-making
l. Qualitative or quantitative research methods or study design
m. Science or technical writing
n. Using data analysis tools, processes, and results to improve programs
o. Understanding data, data sources, and data analysis results
p. Other (please specify) (Open text)

18. What were the barriers that you faced when trying to find a job in public health? (Open Text)

19. I am willing to participate in a virtual focus group to provide information about the facilitators, barriers, needs and gaps of newly graduated students in data science and leadership who are within their first 6 months to 2 years of employment:

    a. Yes, I am willing to participate in a virtual focus group.
    b. No, I am not willing to participate in a virtual focus group.

Branch "Yes" response to Question 16 to Question 16a.
Branch "No" response to Question 16 to Question 17.

16a. (Multiple Select) As we work on the scheduling of the group Listening Session (Virtual Focus Group) which of these Date and Time would work with your schedule? Please select your top 2 choices.

a. Tuesday, October 24, 2023, from 12:00PM-1:30PM EST (9:00AM-10:30AM PST)
b. Wednesday, October 25, 2023, from 3:00PM-4:30PM EST (12:00PM-1:30PM PST)

c. Thursday, October 26, 2023, from 3:00PM-4:30PM EST (12:00PM-1:30PM PST)

20. Do you have any additional thoughts or comments to share? (Text Box)
End Block

21. At this time, you do not meet the recruitment requirements for this project. We thank you for your time.

End Block

We thank you for your time spent taking this survey. Your responses have been recorded and we will be in contact with you via email within 7 days regarding your participation in the focus group session. Please be sure to check your spam folder or add us to your safe sender list.

Appendix E – Listening Session Invitation

October 24th
SUBJECT LINE: Listening Session Invitation

Hello,

Thank you for agreeing to participate in the sharing, learning and listening session on public health leadership, workforce development, data science, recruitment and retention, and/or leadership development for the Public Health Leadership and Education, Advancing Health Equity and Data Science (PH LEADS) project. We are excited to learn more about your perspective and experiences as a recent public health graduate. You are scheduled to attend the Listening Session on Tuesday, October 24th at 12-1:30PM EST (9-10:30AM PST).

On the day of your scheduled Listening Session, please use the link below to access the Session and immediately change your Zoom Name to your unique anonymous identifier following the steps below. **Your unique identifier is ___.** This identifier will be used to protect the privacy of all participants. The transcripts for these recording sessions will capture that name when you are speaking.

Reminders for participation:

- Listening Sessions will be recorded and *your participation is entirely voluntary*, you may stop at any time throughout the course of the session.
- If you are not actively speaking or preparing to speak, please keep muted.
- Keep the background noise to a minimum when you are unmuted.
- Speak clearly into the microphone on your computer or on the phone line.
- Refrain from shuffling papers, typing loudly, or talking amongst each other.
- Please take a moment and check where you placed your microphone. If you are in a room with other people sharing the same dial-in, place the microphone near the participants who are talking.
- If you have an external microphone this might be a better option than a built-in one for better sound quality.
- **Participants should not record the Listening Sessions.**

What to expect:
This Listening Session is one of four sessions. You have been placed in a group of less than 20 individuals. A facilitator will be posing questions to you for discussion. The listening sessions will be recorded, a written transcript will be produced and there are note-takers present on the zoom platform. Your responses will remain confidential, and no names will be included in the final external report. All data and analyses from these Sessions will inform the Centers for Disease Control and Prevention's PH LEADS and training opportunities related to PH LEADS from the National Network of Public Health Institutes (NNPHI) and partners.

Please contact Sarah Matthews (sarah.matthews@healthcommunicationsconsultants.com) with any questions or concerns.

Sincerely,

The Health Communications Consultants, Inc. (HCC, Inc.) Team

Topic: PH LEADS Listening Session
Time: Oct 24, 2023 12:00 PM Eastern Time (US and Canada)

Join Zoom Meeting
https://us06web.zoom.us/j/86046893757?pwd=z8ULa6Ur8Pfz8ryKboVlXbVSDnABQQ.1

Meeting ID: 860 4689 3757
Passcode: 929189

October 25th

SUBJECT LINE: Listening Session Invitation

Hello,

Thank you for agreeing to participate in the sharing, learning and listening session on public health leadership, workforce development, data science, recruitment and retention, and/or leadership development for the Public Health Leadership and Education, Advancing Health Equity and Data Science (PH LEADS) project. We are excited to learn more about your perspective and experiences as a recent public health graduate. You are scheduled to attend the Listening Session on Wednesday, October 25th at 3-4:30PM EST (12-1:30PM PST).

On the day of your scheduled Listening Session, please use the link below to access the Session and immediately change your Zoom Name to your unique anonymous identifier following the steps below. **Your unique identifier is ___.** This identifier will be used to protect the privacy of all participants. The transcripts for these recording sessions will capture that name when you are speaking.

Reminders for participation:

- Listening Sessions will be recorded and *your participation is entirely voluntary*, you may stop at any time throughout the course of the session.
- If you are not actively speaking or preparing to speak, please keep muted.
- Keep the background noise to a minimum when you are unmuted.
- Speak clearly into the microphone on your computer or on the phone line.
- Refrain from shuffling papers, typing loudly, or talking amongst each other.
- Please take a moment and check where you placed your microphone. If you are in a room with other people sharing the same dial-in, place the microphone near the participants who are talking.
- If you have an external microphone this might be a better option than a built-in one for better sound quality.
- **Participants should not record the Listening Sessions.**

What to expect:

This Listening Session is one of four sessions. You have been placed in a group of less than 20 individuals. A facilitator will be posing questions to you for discussion. The listening sessions will be recorded, a written transcript will be produced and there are note-takers present on the zoom platform. Your responses will remain confidential, and no names will be included in the final external report. All data and analyses from these Sessions will inform the Centers for Disease Control and Prevention's PH LEADS and training opportunities related to PH LEADS from the National Network of Public Health Institutes (NNPHI) and partners.

Please contact Sarah Matthews (sarah.matthews@healthcommunicationsconsultants.com) with any questions or concerns.

Sincerely,

The Health Communications Consultants, Inc. (HCC, Inc.) Team

Topic: PH LEADS Listening Session
Time: Oct 25, 2023 03:00 PM Eastern Time (US and Canada)

Join Zoom Meeting
https://us06web.zoom.us/j/89779672926?pwd=ZakoD0DPoOBxSCLHxfa10oKQr5oo5C.1

October 26th

SUBJECT LINE: Listening Session Invitation

Hello,

Thank you for agreeing to participate in the sharing, learning and listening session on public health leadership, workforce development, data science, recruitment and retention, and/or leadership development for the Public Health Leadership and Education, Advancing Health Equity and Data Science (PH LEADS) project. We are excited to learn more about your perspective and experiences as a recent public health graduate. You are scheduled to attend the Listening Session on Thursday, October 26th at 3-4:30PM EST (12-1:30PM PST).

On the day of your scheduled Listening Session, please use the link below to access the Session and immediately change your Zoom Name to your unique anonymous identifier following the steps below. **Your unique identifier is ___.** This identifier will be used to protect the privacy of all participants. The transcripts for these recording sessions will capture that name when you are speaking.

Reminders for participation:

- Listening Sessions will be recorded and *your participation is entirely voluntary*, you may stop at any time throughout the course of the session.
- If you are not actively speaking or preparing to speak, please keep muted.
- Keep the background noise to a minimum when you are unmuted.
- Speak clearly into the microphone on your computer or on the phone line.
- Refrain from shuffling papers, typing loudly, or talking amongst each other.
- Please take a moment and check where you placed your microphone. If you are in a room with other people sharing the same dial-in, place the microphone near the participants who are talking.
- If you have an external microphone this might be a better option than a built-in one for better sound quality.
- **Participants should not record the Listening Sessions.**

What to expect:

This Listening Session is one of four sessions. You have been placed in a group of less than 20 individuals. A facilitator will be posing questions to you for discussion. The listening sessions will be recorded, a written transcript will be produced and there are note-takers present on the zoom platform. Your responses will remain confidential, and no names will be included in the final external

report. All data and analyses from these Sessions will inform the Centers for Disease Control and Prevention's PH LEADS and training opportunities related to PH LEADS from the National Network of Public Health Institutes (NNPHI) and partners.

Please contact Sarah Matthews (sarah.matthews@healthcommunicationsconsultants.com) with any questions or concerns.

Sincerely,

The Health Communications Consultants, Inc. (HCC, Inc.) Team

Topic: PH LEADS Listening Session
Time: Oct 26, 2023 03:00 PM Eastern Time (US and Canada)

Join Zoom Meeting
https://us06web.zoom.us/j/89694428977?pwd=mGOLuMdf3oHhJnbXCIXp8VaqqaoaAb.1

Meeting ID: 896 9442 8977
Passcode: 646083

Appendix F – Listening Session Reminder Email

SUBJECT LINE: Reminder: Upcoming Listening Session

Hello,

Thank you, again, for agreeing to participate in the sharing, learning and listening session on public health leadership, workforce development, data science, recruitment and retention, and/or leadership development for the Public Health Leadership and Education, Advancing Health Equity and Data Science (PH LEADS) project.

This is a friendly reminder that you are scheduled to share your experiences and perspectives with us on _____ at _____. We look forward to this discussion and are available to answer any questions ahead of the Session. ***If you are unable to attend this session*** for any reason, please let us know in advance by responding to this email directly.

Please contact Sarah Matthews (sarah.matthews@healthcommunicationsconsultants.com) with any questions or concerns.

Sincerely,

The Health Communications Consultants, Inc. (HCC, Inc.) Team

Appendix G – Post Listening Session Reminder Email

SUBJECT LINE: Listening Session Post-survey Reminder

Hello,

Thank you for your recent participation in our Listening Session on public health leadership, workforce development, data science, recruitment and retention, and/or leadership development for the Public Health Leadership and Education, Advancing Health Equity and Data Science (PH LEADS) project.

Your contribution to building the future of the public health workforce is critical. We would greatly appreciate it if you could take 5-10 minutes to fill out our brief post-listening session survey to get a better understanding of the current governmental public health workforce perception of public health data science and public health leadership and understand gaps in workforce capacity, training, and education. **This survey will close at the close of business on _____.**

Sincerely,

The Health Communications Consultants (HCC), Inc. Team

https://healthcc.qualtrics.com/jfe/form/SV_9MtIONTIx8U0htY

Appendix H – Conversational Tool

Protocol reminders:
Make note if a participant drops.
Assign participant numbers.
During conversation, encourage multiple people to answer the same question, but with their unique stories; the goal is to find similarities and contrasts.
With each story, make note of phrases that indicate:

Emotion (e.g., “I felt frustrated.” or “We were so happy that worked out!”). Follow up on emotive statements with clarifying what happened after the event that triggered that emotion (was it sustained or replaced with a different event).

Process (e.g., “It was easy because…” or “We have a requirement to do XYZ”). Clarify how they came to learn that process.

Context complexity (e.g., “We couldn’t do X because Y” or “We were told to do A but that never works because of B”). Ask about contingency plans and how they have been prepared for unanticipated challenges.

Conversation Segment	Interviewer prompt/question	Notes
Welcome	We want to start with thanking you for participation. Please remember that your participation is entirely voluntary. In the invitation, you were assigned a participant identification number. Please use this number as your identifier in the name field on Zoom. (Allow participants to rename themselves, then start the recording.) We are recording these listening sessions. If you do not wish to be recorded, please leave the zoom platform now. If you are not actively speaking or preparing to speak, please keep muted. ● Keep the background noise to a minimum when you are unmuted. ● Speak clearly into the microphone on your computer or on the phone line. ● Refrain from shuffling papers, typing loudly, or talking amongst each other. ● Please take a moment and check where you placed your microphone. If you are in a room with other people sharing the same dial-in, place the microphone near the participants who are talking.	*Note: this should be delivered conversationally, to help participants feel comfortable. It does not need to be read verbatim.* *Portions that refer to informed consent details may be abbreviated, with a gentle reminder to review the consent and contact information, with an invitation to ask any questions.*

	● If you have an external microphone this might be a better option than a built-in one for better sound quality. ● Please take a moment and accurately put your zoom name into the name section. The transcripts for these recording sessions will capture that name when you are speaking. ● Contributions added in the Chat Box function will be repeated out loud in order to ensure that they are captured by the transcript and to allow all participants and the facilitator to consider new perspectives/ You have been invited to participate in this listening session hosted by the National Network of Public Health Institutes (NNPHI) and under the research direction of Health Communications Consultants, Inc. The **purpose** of this listening session is to understand the facilitators, barriers, needs and gaps of newly graduated students in data science and leadership who are within their first 6 months to 2 years of employment or who want to work in public health but have not found employment yet. The information learned in this listening session will help to: 1) Identify recruitment and retention facilitators and barriers. 2) Identify gaps in academic curricula compared to skills needed on the job. 3) Identify current gaps in data science and leadership capacity, accessibility, training, and education needs of new public health workforce members. 4) Align workforce needs and current public health programs with data science and leadership curricula. This listening session is one of three sessions. A facilitator will be posing questions to you for discussion. The listening sessions will be recorded, a written transcript will be produced and there are note-takes present on the zoom platform. Your responses will remain confidential, and no names will be included in the final external report. Participants should not record the listening sessions. You can choose whether or not to participate in the listening session and you may stop at any time during the course of the session. Please note that there are no right or wrong answers to the posed questions. We want to hear many varying	

	viewpoints and would like everyone to contribute their thoughts. Please feel free to be honest even when your responses counter those of other group members. Your participation benefits the public health workforce by improving the ability to meet the public health workforce's needs. No risks are anticipated beyond those experienced during an average conversation. Should you choose to participate, you are asked to respect the privacy of other listening session group members by not disclosing any content discussed during the session. Health Communications Consultants, Inc. will analyze the data and your responses will remain confidential. If you have any questions or concerns about the listening sessions, please contact Dr. Sarah Matthews at sarah.matthews@healthcommunicationsconsultants.com. Does anyone have any questions about the listening session before we begin? *Answer any questions.* One more reminder before we begin: Your participation is entirely voluntary. There is no penalty for dropping at any time. At this time, by continuing to be logged on to the Zoom platform, you indicate that you understand the information presented and agree to participate fully under the conditions stated above.	
Conversation	OK, we'd like to start the listening session by explaining a bit about the process for this conversation. Our priority today is to listen to you tell your stories. This means, I don't want to assume that I know what is in your head, so I will frequently be asking you to clarify things that may feel pretty obvious to you. So, don't be surprised when you hear me say something like, "what do you mean by ____(and use your own phrase)?" or "Could you describe what that was like?" *If there are terms to define that will be used throughout the conversation, now is the time to do so.*	The general pattern for these questions is: 1) "tell me about a specific time when you _____." 2) listen for examples of skills and follow up with "tell me more about _____". 3) listen for indicators of sub-skills and related skills, gaps, trends, etc. 4) ask for any similar experiences. 5)ask for

	So, let's begin with thinking about your recent use of data in your public health work. **I want you to think about when you were coming into your public health job after graduation. Can anyone tell me about a time when you used a skill that you did not learn in school?** *Note, allow for pauses and for participants to take time…especially with these icebreaking conversations.* **if no one answers the initial question, ask if anyone has received valuable training at the job or in their academic institution.* *Once someone gives that answer, follow on with questions:* **Does anyone have similar experiences?** **Let's talk about your recruitment process in your public health job.** **Let's talk about how data science impacts the public facing aspects of your job.** **Can anyone provide an example of training or education you have received that prepared you for your job?** **Can anyone describe a time when you did not have the skills needed for the work being asked? (i.e., when they were a novice or new to their job in public health)** **Did you receive that training as part of your onboarding process?** **Would anyone be willing to share a story about a time you struggled to communicate data?** **Can anyone describe how leaders support a team's use of data?**	different/contrasting experiences. Then, we can loop through these questions with similar phrasings but focusing on variations, such as by context, access to resources, organizational differences, and outcomes. While there may be some questions that are speculative (such as asking what skills would be helpful), most of the questions must be focused on what *has worked or has failed to work,* so that it can be grounded in experience. .

	Can anyone describe an experience where a lack of data skills on a team impacted outcomes? **Can anyone describe an experience where lack of leadership skills on a team impacted outcomes?** **What are the reasons/factors to choosing a career in ph/academic home?**	
Closing	Well, I hate to cut the conversation, because you have provided us with important insight–and I am certain there is much more! So in our last few minutes, I want to give you all a chance to tell me what you think is the most important thing we should know when it comes to preparing others in respect to data science and or leadership in this field? *Be sure to follow on with questions like, "are there learning delivery methods you think need to be used more?" and "are there training practices that need to be stopped?"* Thank you so much for participating. If you'd like to see the results of our study, the contact information is on the communications we've provided. We anticipate having initial results available by Spring 2024. We have an exit survey we'd like you to complete; at the end of the survey you'll enter your preferred method for receiving your participation incentive. *Provide link to exit survey.*	

Appendix I – Post Listening Session Survey

Post Listening Session Survey

Draft 2.0

1. (Text-Informational) Thank you for participating in the virtual sharing, learning and listening sessions, for understanding the facilitators, barriers, needs and gaps of newly graduated students in public health, public health data science, and/ or public health leadership who are within their first 6 months to 2 years of employment.

   Please complete this closeout survey for our evaluation

   If you have any questions about this evaluation, please contact Sarah Matthews, PhD, via email at sarah.matthews@healthcommunicationsconsultants.com

2. (Demographics-Text Box) Please provide the following information.
   a. Name
   b. Organization
   c. State
   d. Unique Identifier

3. (Drop Down Selection) In which Listening Session did you participate?

   a. Tuesday, October 24, 2023, from 12:00PM-1:30PM EST (9:00AM-10:30AM PST)
   b. Wednesday, October 25, 2023, from 3:00PM-4:30PM EST (12:00PM-1:30PM PST)
   c. Thursday, October 26, 2023, from 3:00PM-4:30PM EST (12:00PM-1:30PM PST)

4. (Text Box) Reflecting on your listening session conversation, do you have any additional information or clarifications to share?

5. What was your motivation for participating in the listening session? (Select all that apply)

   a. Willingness to help; Provide better support in the field and community (Altruistic Motivation).
   b. Interesting evaluation; Curiosity (Intellectual Motivation).
   c. Incentive offered.
   d. Opportunity to learn from others. Individual professional development.
   e. The request to participate came from a peer or someone I respect.
   f. Camaraderie or to have a shared experience.
   g. Other. (please specify) (Text box)

6. What did you learn in your academic program that has proven to be the **most helpful** to you (useful, most vital) in your current job? (open text)

7. What academic course or courses do you wish you had taken or been offered that would have helped you in your current job? (open text)

8. What were the barriers that you faced when trying to find a job in public health? (Open Text)

9. What additional training would help you be more effective and/ or confident in your current job? (select all that apply)

    - Budgeting, finance, allocating limited funds
    - Communicating data results to diverse audiences
    - Community engagement and collaboration
    - Fundraising, grant writing, resource development
    - General communication, listening, and interpersonal skills
    - Health equity, social justice in health, health disparities
    - Interdisciplinary, multi-sector, and systems approaches to public health
    - Project/ program leadership
    - Project/ program management
    - Public health advocacy, policy, politics
    - Public health ethics and decision-making
    - Qualitative or quantitative research methods or study design
    - Science or technical writing
    - Using data analysis tools, processes, and results to improve programs
    - Understanding data, data sources, and data analysis results
    - Other (please specify) text box

10. Would you be willing to participate in similar work in the future with the National Networks of Public Health Institutes (NNPHI)?
    a. Yes
    b. No
    c. Maybe

11. (Text Box) Do you have any additional thoughts or comments to share?

Appendix J – MPHI Institutional Review

FWA00000277
FWA valid thru: 2/05/2024

MPHI Institutional Review Board (IRB)
Notification of Review Decisions

Date: 06.05.2023

From: Sally J. Hiner, Director of Research Integrity and Compliance
To: Diana Hamer; Chris Kinabrew
CC: Emily Costello
RE: **Project Name:** PH LEADS Listening Sessions
Reference: **ORIC Log #** NNPHI-009-N

Review approval: New
Date of IRB determination: ***06.01.2023***

Determination: Not Research Involving Human Subjects.

As presented, activities are concerned with collecting information to inform training, education, and strategies to address gaps in workforce capacity. As such, activities do not meet the definition of research found at 45CFR46, specifically 'designed to contribute to generalizable knowledge'.

While the information collected may serve as a means of identifying and disseminating best practices and help to build an evidence base to test and support improvement, this project is not designed to contribute to generalizable knowledge.

Continuing Review and Modifications: IRB oversight and further review is not warranted unless there are additions or changes to activities included in this submission that would re-classify the project as research involving human subjects. Such changes must be submitted for IRB review prior to implementation.

Determination is based on:

- IRB Research Determination for PH LEADS Listening Sessions_05.26.2023.docx
- IRB Application for PH Leads5.26.23.docx
- Draft 1.1 NNPHI_PHLEADS_ConversationTool and Method.docx
- Draft 1.1 Recruitment Survey Tool_NNPHI PH Leads.docx
- Draft 1.1 Recruitment Email.docx
- Draft 1.1 Post Listening Session Survey PH LEADS.docx

NOTE: A determination of 'not research involving human subjects' does not constitute IRB approval.

Changes in protocols required: none
Recommendations: none

Page **1** of **2**

Next Steps: Projects that the IRB has deemed 'Not Research Involving Human Subjects' do not need further IRB attention or review for the remainder of the project's approval period, unless there are changes to project protocols that would classify the project as human subjects' research. The IRB should be notified and a modification form submitted under these conditions.

In future communication, please reference the MPHI Log number listed above. Please feel free to contact me with any questions about the review process or approval. Thank you.

Appendix K – Recruitment Survey Data

The recruitment survey was comprised of 20 questions: 16 multiple choice questions, 3 open-ended, and 1 text limited. Utilizing Qualtrics, we identified 64 responses within the platform for the recruitment survey from October 4, 2023, through October 25, 2023.

There were 559 unique email invitations sent to persons in the public health workforce during the recruitment timeframe resulting in a 11.4% response rate (64/559). There were 31 surveys retained for analysis. Twenty-five (25) surveys had 100% completion, 6 were incomplete with completion rates of 23% (n=2), 64% (n=3) and 77% (n=1). The average duration for completion was 6.43 minutes.

Twenty-nine (29) respondents had an affirmative response to the screening questions "Are you a newly graduated student in data science and leadership who is within their first 6 months to 2 years of employment." Thirteen (13) of the 29 respondents selected "I would like to be working in the public health field but have not gained employment yet."

Twenty-two (22) respondents affirmed that they were willing to participate in a virtual sharing, learning, and listening session, 2 respondents declined, 7 did not answer the question. Willingness to participate equates to a participation rate of 71% (22/31), with an actual participation rate of 59% (13/22). While there were fourteen (14) actual participants in the three listening sessions, 1 participant joined with an AI assistant, and another joined using someone else's link. After the AI assistant was not due to accessibility issues and contact was made with the actual person, the AI assistant was disconnected from the session. The participant that joined with another participant's link was given the recruitment survey to complete after the listening session but did not complete it. The participant completed a post listening session survey.

Q2 Demographics

Organizations

There were 18 organizations represented by survey respondents. Four organizations were out of the country: Commonwealth Healthcare Corporation, Dow University of Health Sciences, Indus Hospital and Lithuanian University of Health Sciences.

Table 1: List of Organizations Represented in Recruitment Survey Respondents

American Society of Addiction Medicine
Commonwealth Healthcare Corporation
CSTE/Fairfax County Health Department
Dow University of Health Sciences
Fairfax County Health Department
Fairfax County Health Department
Indiana Department of Homeland Security
Indus hospital
Kansas Association of Local Health Departments
LifeWise
Lithuanaian University of Health Sciences
NACCHO
Public Health Association North Dakota State University
Talbot County Health Department
University of Florida Shands Hospital
University of Nevada Las Vegas
UNIVERSITY OF NEVADA LAS VEGAS
University of Nevada Las Vegas
University of Washington
Wiliamson county and cities health district
Williamson County and Cities Health District Emergency Preparedness and Response

Listening Session Participants Organizations

LS1 (5)

- Fairfax County Health Department (2)
- CSTE/Fairfax County Health Department (1)
- University of Nevada Las Vegas (1)
- No Response (1)

LS2 (6)

- University of Florida Shands Hospital (1)
- Indiana Department of Homeland Security (1)
- Williamson County and Cities Health District (1)
- Talbot County Health Department (1)
- University of Nevada Las Vegas (1)
- No Response (1)

LS3 (2)

- University of Washington
- No Response (1)

States and Countries

There were 16 United States or territories and 3 countries outside the United States represented in the responded population.

Arizona
California (2)
Florida (2)
Indiana
Kansas
Maryland
Missouri
Nevada (4)
New Mexico
North Dakota
Pennsylvania
Texas (2)
Virginia (4)
Washington
Washington, DC
Wisconsin

Lithuania
Saipan
Pakistan (2)

Listening Session Participants States

LS1

- Nevada (1)
- Virgina (3)
- No Response (1)

LS2

- Florida (1)
- Indiana (1)
- Maryland (1)
- Nevada (1)
- Texas (1)

LS3

- California (1)
- Washington (1)

Credentials
N=15

- No response (16)
- BHS, MPH (1)
- CHW
- Nursing
- MPA
- MPH, MPH Graduation March (9)
- MPH, MS
- PhD

Listening Session Participants Credentials
LS1

- MPH (3)
- Pursing MPH finish in March 2024 (1)
- No Response (1)

LS2

- MPH (1)
- MPH, MS (1)
- PHD (1)
- No Response (2)

LS3

- MPH (2)

Recent Academic Institute Attended
There were 26 academic institutes that respondents last attended from the survey population.

2 No Response
Concordia University Nebraska
Emory University
George Mason University
Hawaii Pacific University
Health services academy Islamabad
Indiana University
Lithuanaian University of Health Sciences
Massachusetts College of Pharmacy and Health Science
North Dakota State University
Northwestern University
Penn State College of Medicine
Saint louis university
Texas A&M University
The George Washington University

The University of New Mexico
University of California, Berkeley
University of Florida
University of Indianapolis
University of Kansas
University of Nevada Las
University of Nevada Las Vegas
University of Nevada Las Vegas
University of Nevada Las Vegas
University of New England
University of North Carolina at Chapel Hill
University of Texas at El Paso
University of Texas at San Antonio
University of Washington
Utah State University

Figure 11: List of Academic Institutes attended by Recruitment Survey Respondents

Listening Session Participants Recent Academic Institute Attended

LS1

- George Mason University
- Concordia University Nebraska
- University of Texas at El Paso
- University of Nevada Las Vegas
- Penn State College of Medicine

LS2

- University of Florida
- Indiana University
- Texas A&M University
- University of New England
- University of Nevada Las Vegas
- No Response

LS3

- Emory University
- University of Washington

Q3 Race/Ethnicity

How would you best describe your Race/Ethnicity (select all that apply)

N=31

- American Indian or Alaskan Native (1)
- Asian (6)
- Asian, Hispanic, Latino or Spanish origin of any race (1)
- Asian, Native Hawaiian or Other Pacific Islander (1)
- Asian, Non-Hispanic (1)
- Black/African American (8)
- Black/African American, Non-Hispanic (1)
- Decline to state (1)
- Hispanic, Latino or Spanish origin of any race (3)
- Hispanic, Latino or Spanish origin of any race, White (1)
- Some other race (1) Middle Eastern
- White (5)

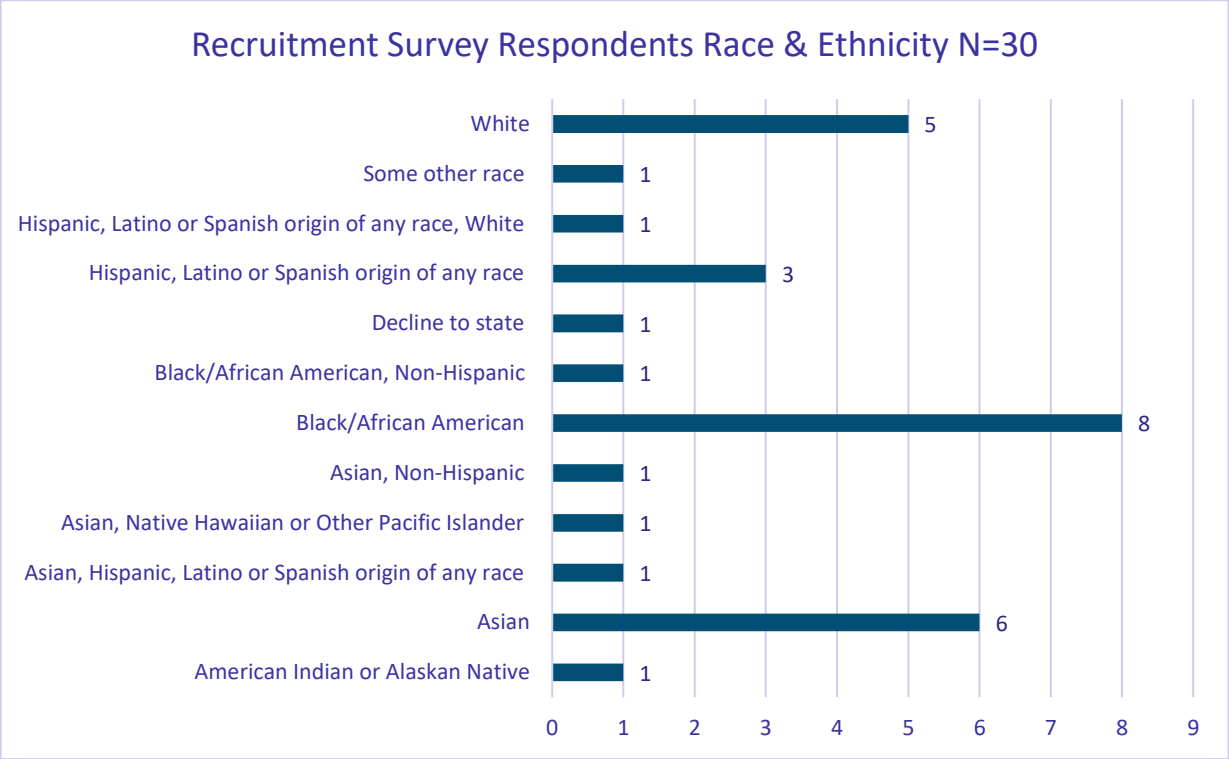


Figure 12: Race & Ethnicity of Recruitment Survey Respondents

Q4 Age

What is your age? (Please record with two digits.)

All Survey Respondents N=31

- Average Age 27.26
- Mode 30
- Median 26
- Range 22-40

Listening Session (n=13)

- Average Age: 27.75
- Mode 25
- Median 27
- Range 22-40

Table 2: Listening Session Participants stratified by Age

Age (2 digits)	LS1	LS2	LS3	Blank	Total
Blank		1			
22		1		3	4
23	1			1	3
24				3	3
25	2			2	4
26				2	2
27		2	1	0	3
28			1	2	3
30	1	1		2	4
31		1		1	2
37				1	1
40	1			1	2
Total	**5**	**6**	**2**	**18**	**31**

Q5 Gender

How do you best identify in terms of gender?

N=31

- Male (4)
- Female (26)
- Non-binary (1)

Listening Session Participants Gender

N=13

- Male (2)
- Female (10)
- Unknown (1)

Q6 Screening Question

Are you a newly graduated student in data science and leadership who is within their first 6 months to 2 years of employment?

a. Yes (16)
b. No (0)
c. I would like to be working in the public health field but have not gained employment yet. (13)
d. No Response (2)

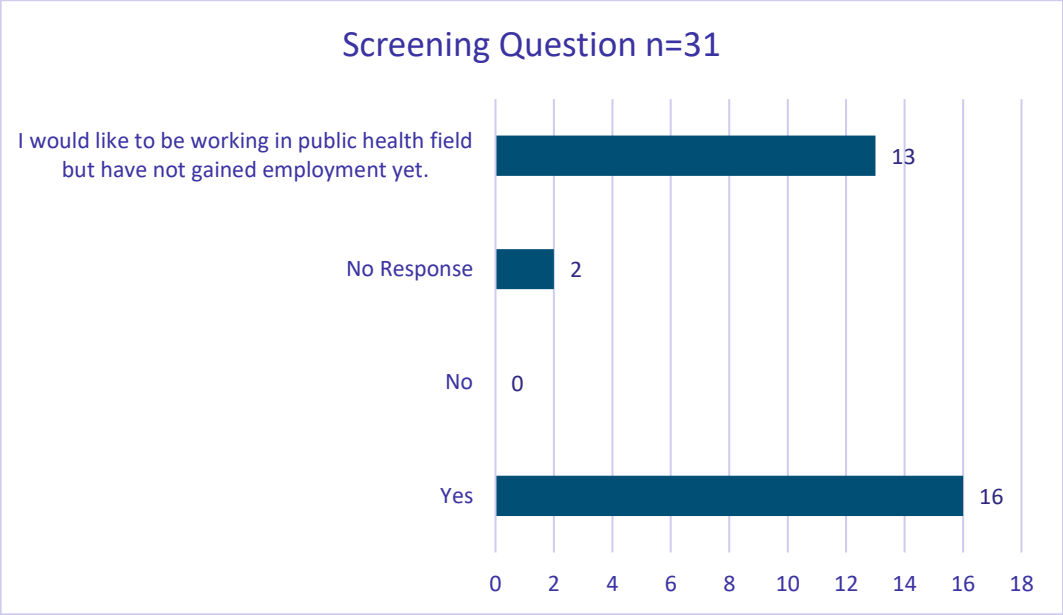


Figure 13: Screening Question by Response

Listening Session Participants Screening Question

LS1

- Yes (3)
- I would like to be working in the public health field but have not gained employment yet. (2)

LS2

- Yes (4)
- I would like to be working in the public health field but have not gained employment yet. (1)
- Unknown (1)

LS3

- Yes (2)

Q7 Degrees

What degrees have you attained? Select the highest degree.

a. Some high school (0)
b. High school degree or equivalent (e.g., GED) (0)
c. High school technical, please specify (Text box) (0)
d. Some college but no degree (0)
e. Associate degree or certificate (1)
f. Bachelor's degree (9)
g. Master's degree (18)
h. Doctoral degree (MD, DO, PhD, DDS, JD, etc.) (1)
i. Other (please specify): __ (0)
j. No Response (2)

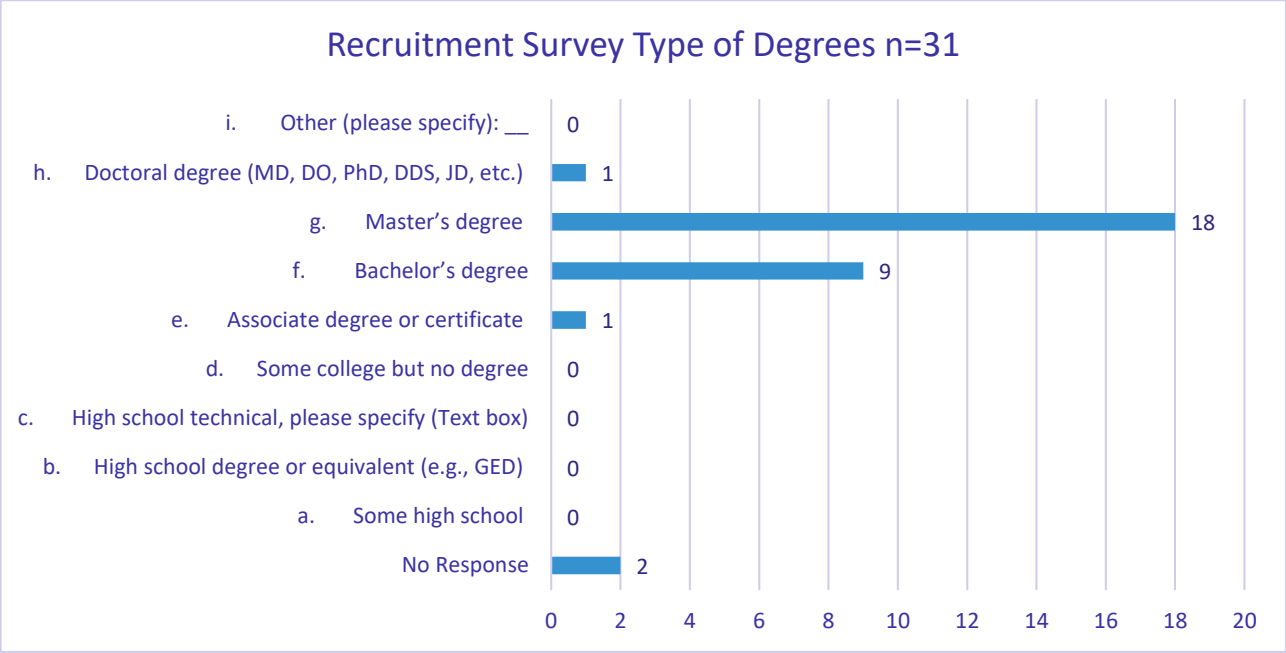


Figure 14: Recruitment Survey Types of Degrees

Listening Session Participants Degrees

LS1

- Bachelor's Degree (1)
- Master's Degree (4)

LS2

- Bachelor's Degree (1)
- Master's Degree (3)
- Doctoral Degree ((1)
- Unknown (1)

LS3

- Master's Degree (2)

Q8 Subjects of Degrees

What subject are your degree(s) in? After your selection please write in the text box the degree that applies to that subject.

Associates degree (1)

- Nursing, Public Health (Interested in Becoming an Infectious Disease Physician)

Doctoral degree (1)

- Public Health

Bachelor's Degree (9)

- Health Services/Administration, Public Health (Currently enrolled, expected to graduate March 2024)
- Public Health (and international studies (BS))
- Public Health, Other (Global Health Studies, Social Policy)
- Public Health (Bachelor of Science)

- Public Health (Bachelor of Science degree in Public Health with a concentration in Behavioral Science and Health Promotion)
- Environmental Health, Health Services/Administration, Nutrition, Public Health
- Public Health (Bachelor of Arts)
- Public Health
- Public Health (Bachelors)

Master's Degree (18)

- Public Health, Science (Epidemiology, Entomology)
- Liberal Arts/Humanities, Public Health (Psychology and Anthropology) (Health Behavior)
- Public Health (Master's (MPH, Concentration in Epidemiology))
- Public Health (MPH)
- Public Health, Science, Other (please specify) (MPH) (Biology (BS)) (Health & Society (BS))
- Public Health (General MPH; Courses: Maternal Child Health, Biostatistics, Epidemiology)
- Public Health (COMMUNITY HEALTH)
- Public Health, Science (Master in Public Health) (Bachelor in Biology)
- Public Health (Health Education & Promotion)
- Public Health (Master of Public Health, Bachelor of Science in Public Health)
- Public Health
- Public Health, Social Work
- Public Health
- Public Health (Epidemiology)
- Public Health (BS in Biobehavioral Health & MPH in Global Health)
- Public Health (Master's in Public Health)
- Mathematics/Economics, Public Health (B.S. Applied Mathematics) (Master, Epidemiology)
- Health Services/Administration, Public Health (Healthcare Management) (Public Health)

Listening Session Participants Degrees Subjects

LS1

- Bachelor's Degree (1)
  - Health Services/Administration, Public Health
- Master's Degree (4)
  - Public Health (Master's MPH, Concentration in Epidemiology)
  - Public Health, Science, Other (MPH, Biology (BS)
  - Public Health
  - Public Health (BS in Behavioral Health & MPH in Global Health)

LS2

- Bachelor's Degree (1)
  - Public Health -Bachelor of Science
- Master's Degree (3)
  - Public Health-Epidemiology, Science-Entomology
  - Public Health-MPH
  - Public Health-General MPH, Courses: Maternal Child Health, Biostatistics, Epidemiology
- Doctoral Degree ((1)
  - Public Health
- Unknown (1)

LS3

- Master's Degree (2)
    - Public Health-Masters in Public Health, Science-Bachelor in Biology
    - Public Health-Epidemiology

Q9 Institution Accreditation

Is the school, college, or university that you attended accredited?
(An accredited school has gone through a rigorous, formal check by an authorizing body in education to make sure the school meets their standards and is qualified to teach students the programs they are offering.)

N=31

a. Yes, it is/was an accredited organization. (29)
b. No, it is/was not accredited. (0)
c. I do not know the accreditation status of the school, college, or university I attended. (0)
d. No response (2)

Listening Session Participants

a. Yes, it is/was an accredited organization. (12)
b. Unknown (1)

Q10 Importance of Accreditation

How important was the accreditation status of the academic institution in your selection process?

a. Extremely Important; the academic institution that I selected must be accredited for me to even consider attending it. (23)
b. Important; the academic institution that I selected should be accredited but I would consider an unaccredited institution. (4)
c. Unimportant; the accreditation status of the academic institution that I attended did not influence my decision to attend there. (1)
d. I am unaware of the accreditation status of the academic institute, and it was not a criterion for me when selecting a school. (0)

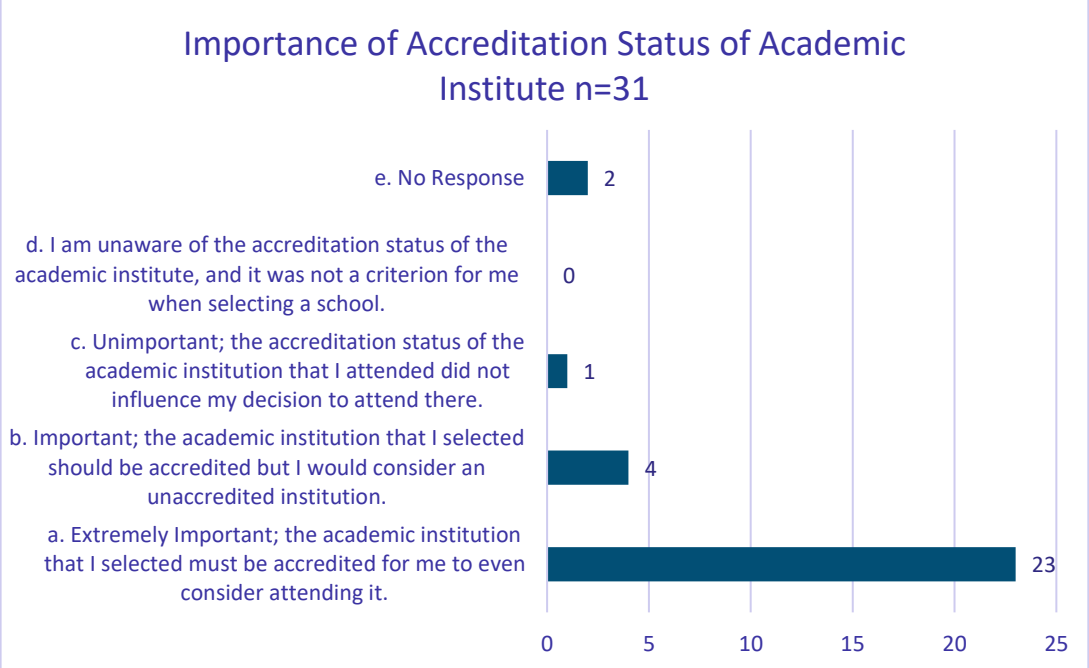


Figure 15: Importance of Accreditation Status of Academic Institute

Listening Session Participants

a. Extremely Important; the academic institution that I selected must be accredited for me to even consider attending it. (12)
b. Unknown (1)

Q11 Motivation for Selecting Institution

Which best describes your motivation for selecting your academic institution? (select all that apply)

N=31

a. Affordability/scholarship offers (19)
b. Reputation of the institution overall (18)
c. Reputation of the department/program of study (8)
d. Friends or family members are enrolled or alumni (2)
e. Accessibility/location/proximity to home (9)
f. Where I applied and was accepted (10)
g. Other (please explain) (Text box) (3)
    a. Online option
    b. An integrated MPH program was offered through my undergraduate institution.
    c. I had no choice-I'm a staff member.
h. No Response (2)

Combinations

- Solo a (3)
- a & b. (4)
- A, b, c, e (1)
- A, b, c, e, f, g (1)
- A, b, c, f (2)
- A, b, e (2)
- A, b, f (1)
- A, c (1)
- A, d, e, f (1)
- A, e (2)
- A, f (1)
- Solo b (2)
- B, c, (1)
- B, c, f (2)
- B, d, e, f (1)
- B, f, (1)
- Solo e (1)
- Solo g (2)

Listening Session Participants

a. Affordability/scholarship offers. (LS1=3, LS2=3, LS3=2) (8)
b. Reputation of the institution overall (LS1=2, LS2=4, LS3=2) (8)
c. Reputation of the department/program of study (LS1=1, LS2=2, LS3=2) (5)
d. Friends or family members are enrolled or alumni (LS1=0, LS2=1, LS3=0) (1)
e. Accessibility/location/proximity to home (LS1=2, LS2=1, LS3=1) (4)
f. Where I applied and was accepted (LS1=1, LS2=2, LS3=1) (4)
g. Other (LS1=1, LS2=0, LS3=0) (1)
    a. An integrated MPH program was offered through my undergraduate institution.
h. No Response (LS2=1)

Q12 Work Setting

Which best describes the work setting in which you currently work?

N=31

a. Local health agency (7)
b. State health agency (1)
c. Territorial health agency (0)
d. Federal health agency (0)
e. Tribal health agency (0)
f. Educational/academic institution (3)
g. Private nonprofit organization (2)
h. Private for-profit foundation (1)
i. Private foundation (0)
j. Personal health service industry (Hospital, Rehabilitation Center, Assisted Living Facility, Dental Facility, Pharmacy, Outpatient facility, Physicians Office) (3)
k. Other (Please specify) (Text Box) (2)
    a. State Government
    b. Large health insurance company providing customer service to those with Medicaid and Medicare
l. I am not currently employed. (10)
m. No Response (2)

Listening Session Participants

LS1

- Local health agency (3)
- Educational/academic institution (1)
- I am not currently employed. (1)

LS2

- Local health agency (2)
- Personal health service industry (Hospital, Rehabilitation Center, Assisted Living Facility, Dental Facility, Pharmacy, Outpatient facility, Physicians Office) (1)
- Other (Please specify)
    - state government
- I am not currently employed. (1)
- Unknown (1)

LS3

- Educational/academic institution (1)
- I am not currently employed. (1)

Q13 Motivation to Work in Public Health

Which best describes your motivation to work in Public Health?

N=31

a. A desire to help people (21)
b. An academic interest in health (6)
c. Pay (0)
d. It seems challenging/fun (1)
e. Other (please explain) (1)
    a. I wanted a career change and I was looking for balance between applying skills that I have already obtained with something I still found personal fulfillment.
f. No Response (2)

Figure 16: Recruitment survey respondents' motivation to work in public health.

Listening Session Participants

LS1

- A desire to help people. (4)
- An academic interest in health (1)

LS2

- A desire to help people. (2)
- An academic interest in health (1)
- It seems challenging/fun. (1)
- Other (1)
- Unknown (1)

LS3

- A desire to help people. (2)

Q14 Drive Time

What is the driving time on average between your current Public Health job and your last academic institution?

N=31

a. Less than 1 hour drive (11)
b. More than 1 hour but less than 5-hour drive (6)
c. Greater than 5-hour drive. (1)
d. I do not know the distance of my current public health job and my last academic institution. (11)
e. No Response (2)

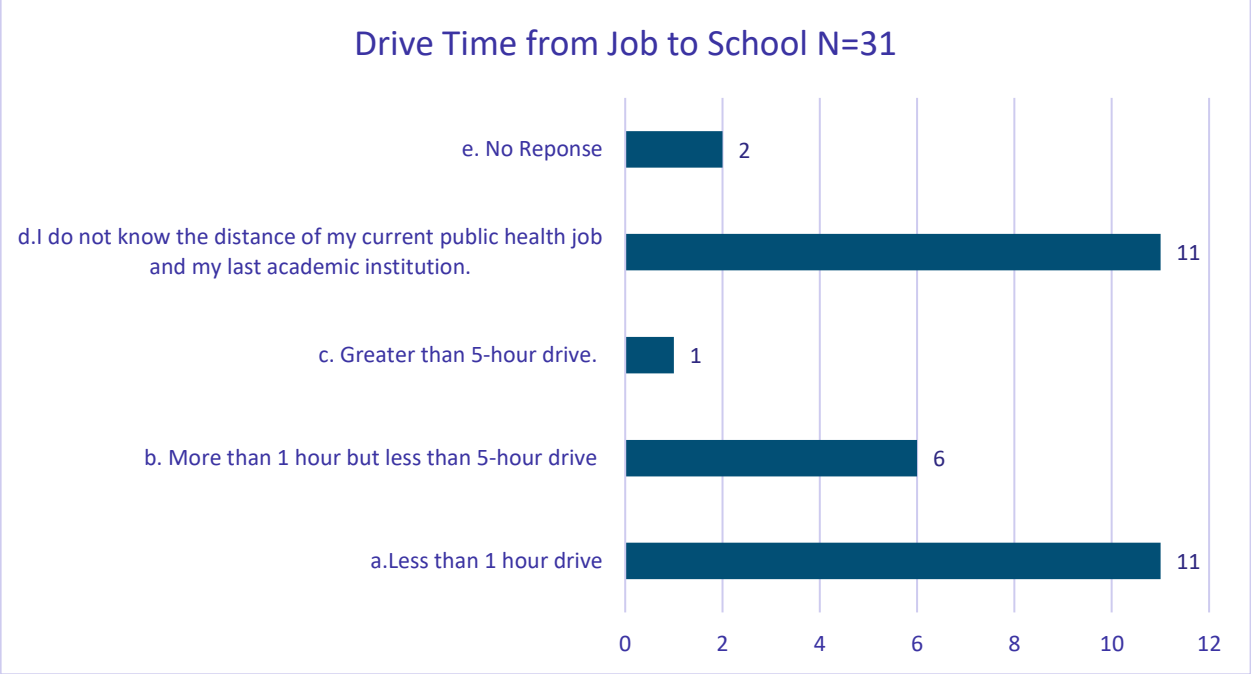


Figure 17: Driving time on average between current PH job and last academic institution

Listening Session Participants

LS1

- Less than 1 hour drive (2)
- Greater than 5-hour drive. (1)
- I do not know the distance of my current public health job and my last academic institution. (2)

LS2

- Less than 1 hour drive (2)
- More than 1 hour but less than 5-hour drive (2)
- I do not know the distance of my current public health job and my last academic institution. (1)
- Unknown (1)

LS3

- Less than 1 hour drive (1)
- I do not know the distance of my current public health job and my last academic institution. (1)

Q15 Alignment of Academic Work with Current Job

What did you learn in your academic program that has proven to be the most helpful to you (useful, most vital) in your current job?

Leadership and Communication

- Advocating for people
- stakeholder involvement
- The information I learned in my health promotion courses has helped me with creating outreach and training materials for my current job.

Data Science

- An understanding of statistics in a professional setting.
- Data analysis skills
- R coding
- software skills
- Use of statistical software, course in infectious disease, public health leadership and management, how to successfully apply for a job

Research Skills

- Attending Concordia University of Nebraska's Public Health Program has prepared me to create, implement, research and assess health strategies to promote public wellness.
- Research skills

Topics Specific

- emergency preparedness
- Foundational Knowledge in Maternal & Child health, Biostatistics, Epidemiology. In psychology, Human Development.

Social Determinants of Health & Health Equity

- My journey towards a career in international public health began as I sought to understand the root causes of these disparities. I engaged in volunteer work with local organizations, participated in community health initiatives, and collaborated with healthcare professionals to provide vital services to underserved populations. These experiences afforded me invaluable insights into the multifaceted challenges faced by communities grappling with health inequalities
- Social Determinants of Health and health equity
- Social determinants of health are a greater predictor of people's health outcomes and can be mediated if specialists implement programs and policies to support marginalized groups.
- The importance of infusing health equity into the planning, implementation, and evaluation of public health programs.

Public Health Impact-Flexibility of Having a Public Health Degree

- That EVERYTHING is public health. I am not currently working in a public health job, but that was the most valuable thing I learned.
- That through public health we can keep communities healthy, protect workers, prevent and address pandemics, pursue social justice, drive public policy, spearhead disaster relief, ensure access to healthcare.
- The key thing I learned in my academic's is how interconnected each sector is to a person's or a communities health
- The varying fields of public health and how they are inter-related

Unemployed

- N/A still applying to positions
- I am not currently employed

- Unemployed

Q16 Course Wish

What academic course or courses do you wish you had taken or been offered that would have helped you in your current job?

Data Science

- Data management, data science, informatics
- More biostatistics course
- More Biostatistics/Epidemiology courses.
- More data courses
- more on biostatistics and coaching - making sure that I am able to understand and know how to deal with emotions
- SAS, STATA,PYTHON BASIC DATA SCIENCE FOR PUBLIC HEALTH
- My MPH concentration was Epidemiology because I enjoyed working with numbers. I wish this concentration emphasized the use of more statistical software programs other than SAS and RStudio. In my experience, we had 1 full semester of learning SAS and 2 full semesters of learning RStudio. I believe it would have been beneficial to at least have 1 semester spent learning either ArcGIS, Stata, SQL integration, etc. I also wish this program gave students more opportunities to gain hands-on experience by collaborating with external stakeholders/agencies. Most of the hands-on experience we were offered were either G.A positions or study-abroad opportunities. Personally, this was hard since we had a small program; G.A positions were filled up immediately and i was already taking summer classes and unable to enroll in any study-aboard courses.

Leadership and Program Management

- Grant writing
- Leadership, Workforce Development, Grants
- Maybe more program management skill courses.
- Public Health Management
- I am not currently employed, but I wish I would have been able to take courses on budgeting and economics in public health

Specific Topics and Application of Skills

- Coursework that relates to infectious diseases, for example microbiology and medical terminology.
- Virology and any course surrounding virus', bacteria and parasitic activity
- Health Physics
- Lifestyle medicine
- Global public health
- A course geared toward exploring the base level of the many facets of public health. I was unaware of this form of public health until I did some research on how to best utilize my degree.
- Although I already have professional case management experience, I think adding a case management course to the public health curriculum would have been valuable, for example in my current position as a Disease Investigation Specialist we conduct interviews and facilitate treatment plans of action for individual patients.
- I wish I took another practicuum course

No Additional Courses

- i think i have the right one

- N/A
- N/A

Q17 Additional Training

What additional training would help you be more effective and/ or confident in your current job? (select all that apply)

a. Budgeting, finance, allocating limited funds (9)
b. Communicating data results to diverse audiences (10)
c. Community engagement and collaboration (8)
d. Fundraising, grant writing, resource development (10)
e. General communication, listening, and interpersonal skills (6)
f. Health equity, social justice in health, health disparities (6)
g. Interdisciplinary, multi-sector, and systems approaches to public health (7)
h. Project/ program leadership (7)
i. Project/ program management (9)
j. Public health advocacy, policy, politics (5)
k. Public health ethics and decision-making (5)
l. Qualitative or quantitative research methods or study design (10)
m. Science or technical writing (5)
n. Using data analysis tools, processes, and results to improve programs (14)
o. Understanding data, data sources, and data analysis results (8)
p. Other (please specify) (Open text) (1)
    - Data Management
q. No Response (6)

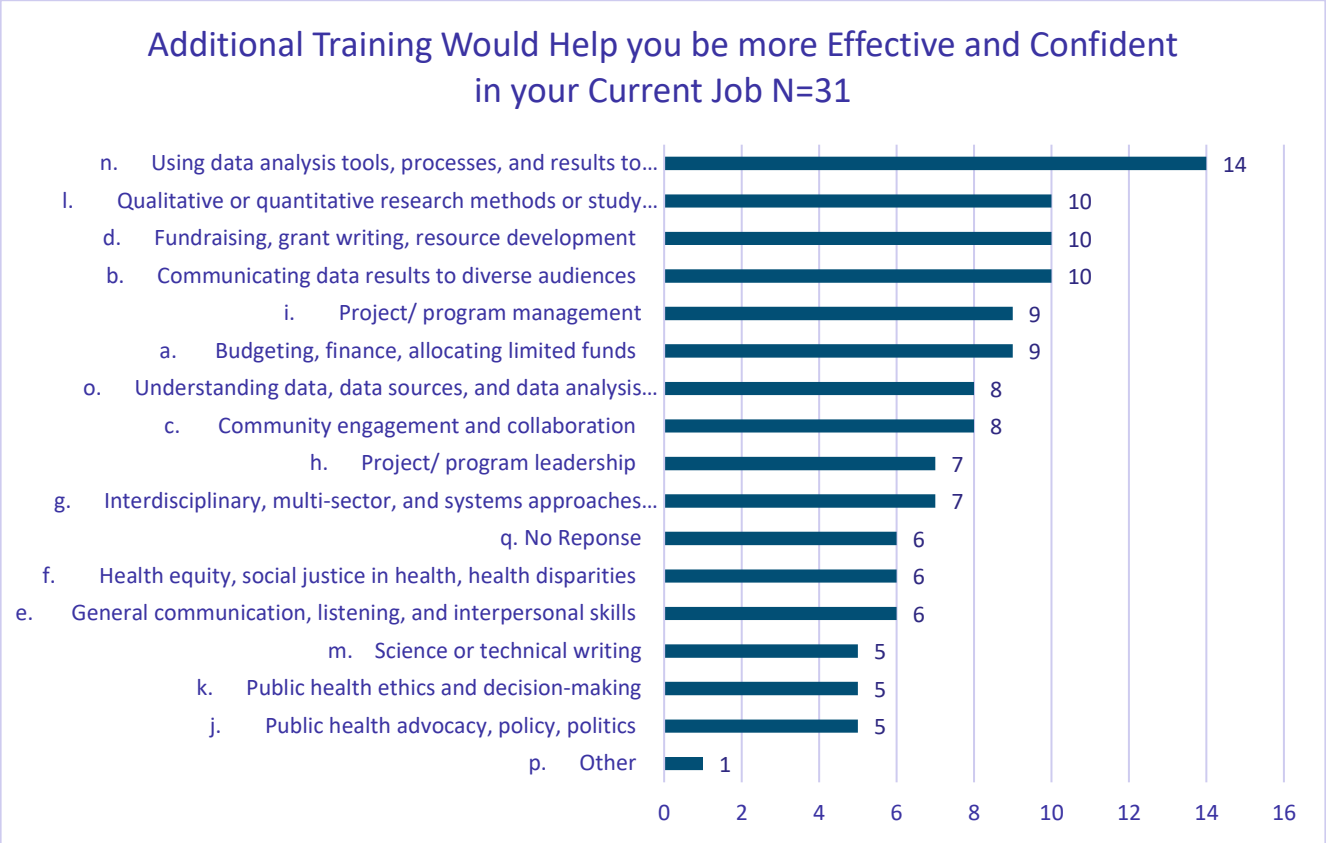


Figure 18: Additional Training for efficiency and confidence on the job

Q18 Barriers in Finding a Job

What were the barriers that you faced when trying to find a job in public health?

Accessibility and Pay

- As an international student there is a lack of access to information to scholarships, fellowships and even jobs.
- Lack of remote options at the state level. I wanted to work for my state department of health but they insist on a commute that would be over two hours every day. In addition, I've applied for 20+ jobs at the CDC and can't seem to get through.
- Having to relocate. Not having experience.
- Limited job opportunities
- Preference to citizens only, No response, No clear reasons of rejections
- I do not have a masters degree in public health, I have no internship experience, I am disabled
- It can be difficult to find a job that is in your interest field but also adequately compensates you for your work.
- Finding a public health role that paid well/livable wage for the location
- I didn't really have a problem but the salaries arent great prior to covid
- While I was able to find the sector of public health I wanted to be a part of, I had a hard time finding where to look for actual positions to apply to. I was unsure of where to find legit job listings.

Alignment of Entry level Positions and Lack of Experience

- Entry Level positions are requiring more experience than I have coming right out of graduate school. Those with more experience are starting in entry level jobs, eliminating people like myself with degrees and internship experience only.
- The biggest barrier is that there was not a lot of true entry level public health positions for someone who only has a bachelor's and not many years of experience. The few that would be found had very low pay compared to retail workers or required way more experience than I had as a recent graduate.
- Job experience, employers overwhelmingly wanted candidates with 5+ years experience for entry to intermediate level positions.
- Other coding languages (other than R) being required. Not many entry level positions at the time I was applying. Not many jobs in One Health field.
- The number 1 barrier I faced was lack of experience. I went straight from undergrad to grad school because I was offered a G.A position that was able to pay for 75% of my tuition. I graduated with my MPH at 24 years old. My only real experience was working for my university and a nursing home. I was knowledgeable in infectious disease, public health theories/foundation, community partnerships, and program evaluation - but it wasnt enough. I was denied from several local/state agencies regardless of my accomplishments (grades, work-ethic, bilingual, first-generations student, reccomendations for teachers, etc.). Although i had an MPH, it wasn't enough to satisfy these jobs with "2" years of experience which left me unmotivated. Another barrier i faced was that i completed my MPH during the middle of the pandemic. Most public health jobs were contract positions that were not flexible with my school hours. I worked at a nursing home 7am-3pm so i could attend school from 4-10pm. When i did find a job in public health, the salary was also not compensative enough. For someone with an MPH, i was continuously being offered less than $50k. It was unfortunate that i had to turn down those positions but i had to remind myself my worth. I also believe another barrier was competing with other grad students for jobs around the D.C Metropolitan area. I was competing not only with other students from George Mason but John Hopkins, UMD, George Washington, VCU, Virginia Tech. With the COVID-19 pandemic, more people were entering the public health workforce, making it difficult to stand out
- The qualifications needed, tough job market.
- Lack of experience
- not enough experience
- Not having enough experience

Other

- Credentials. My background in general Public Health and my focus surrounded Maternal & Child Health. Most MCH programs or organizations were looking for nurses or 10 + experience. Also, the MPH program I attended was online. So, buildings connection and relationships was very crucial and difficult to obtain.
- I am not yet in the field.
- Once I enrolled in an MPH program that really opened up the doors for employment opportunities in addition to my professional experience.

Q19 Willingness to Participate in Listening Session

I am willing to participate in a virtual focus group to provide information about the facilitators, barriers, needs and gaps of newly graduated students in data science and leadership who are within their first 6 months to 2 years of employment:

a. Yes, I am willing to participate in a virtual focus group. (n=22)
b. No, I am not willing to participate in a virtual focus group. (n=2)

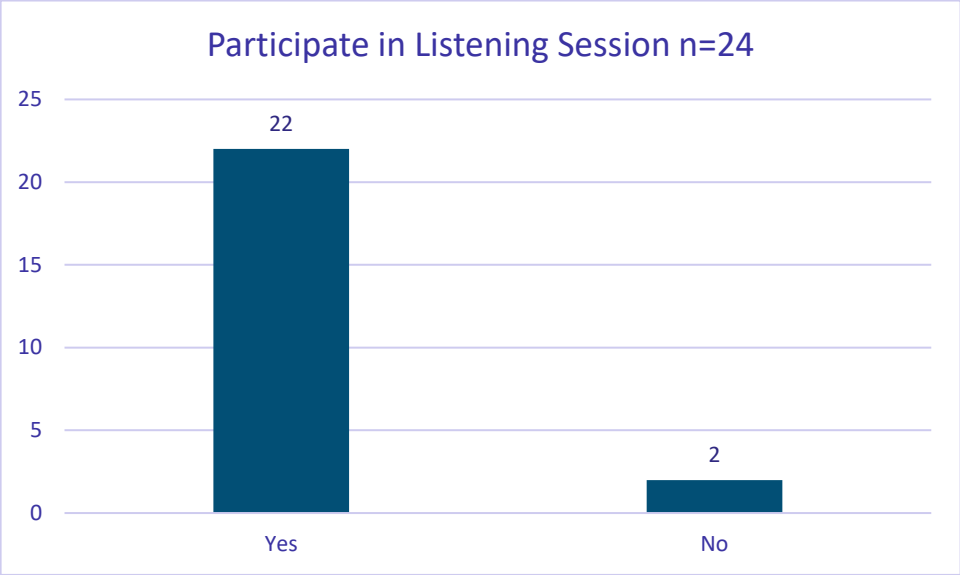


Figure 19: Willingness to Participate in Listening Session

Q20 Dates of Listening Sessions

As we work on the scheduling of the group Listening Sessions (Virtual Focus Groups) which of these Dates and Times would work with your schedule? Please select your top 2 choices.

Q21 Additional Comments

Do you have any additional thoughts or comments to share?

- My career interests are in infection control within a hospital setting, which is fairly niche when thinking about degree programs and job opportunities within a broad field such as public health. So I recognize that my experiences won't necessarily apply to a lot of people.
- Thank you for this opportunity! When i was a student, i use to discuss these barriers as a panelist for GMU students only. I look forward to expanding this conversation with others.
- This seems like a great initiative, thanks for the consideration to participate.
- I am particularly interested in population health and would like to be at the forefront of encouraging people to take control of their health and live healthier and longer lives.
- Are there any annual training opportunities.
- No (4)

Appendix L – Listening Session Data

A sociological thematic exploration was conducted on listening session transcripts resulting in 10 overarching themes. Upon review of the themes and the data from the surveys, two themes were the most frequently experienced: barriers and impediments to employment and alignment and misalignment between academics and practice.

Sociological Thematic Exploration

- **Recruitment/ Retention Barriers and Facilitators**
  - The employer perspective can be informed by these sessions.
- **Barriers/ Impediments to Employment**
  - application process (ATS, Video interviews)
  - lack of experience
  - lack of awareness of how to get a job (networking, LinkedIn, Resume writing)
  - lack of career guidance at university
  - career readiness
  - self and peer reliance in job search process
- **Verbalized frustrations with all aspects of job search**
- **Rejection/ Resilience**
- **Alignment/ misalignment between academics and practice**
  - Essential Skills
  - Gaps in data science curriculum for some
  - Gaps in leadership curriculum for some
  - Gaps in communication curriculum for some
  - Desire for more electives
  - Depends on how schools run their programs
  - Depends how students engage with their programs
- **Guidance/ lack of guidance in curriculum at academic programs**
  - self and peer reliance in academic process
  - Need for academic path
- **Flexibility of having a Public Health degree**
- **Post-academic training**
  - On the job training
  - On the job mentoring (including motivation for mentoring)
  - Lack of access to needed/ wanted training (due to lack of knowledge, availability, finances)
- **Need for Public Health to market the field of public health**
- **Financial accessibility**

High Impact Quotes for Two Themes

Barriers/ Impediments to Employment

There were six themes under the barriers and impediments to employment. They included: lack of experience, lack of guidance, the application process, competition, the role of a network and safety of certain geographical areas.

Lack of Experience as Barrier

S1 1009-24: … I recently graduated with my MPH in May. I'm going through the process of trying to find the first job, getting my foot in the door, struggling a little bit with required experience to get into that first role … Just struggling with barriers to getting into the first role because of experience levels. I think that's the main thing that I'm finding is applying to jobs that are entry level yet still want one to three years of experience, and not getting chosen because I don't have that experience because I'm right out of school.

S1 1008-24: … I'm in my final semester, I'll be graduating this December. I have already started looking for jobs. Maybe I have applied for around 40 jobs so far, but I have heard nothing. I have applied only for entry-level jobs. It's not like I'm applying for senior positions or a position that requires a lot of experience. Even entry-level positions, I don't know why they're not accepting at least for an interview, which is very sad to me. That's my concern.

S1 1004-24: My current role is that I'm a fellow … through CSTE, the Council of State and Territorial Epidemiologists. My experience with getting this position that I currently have is, when I was in my second year of my master's program… these issues that have been presented of looking at entry-level jobs for when I graduate, all these years that they were requiring, I was just like, okay. I had tried applying for some of those positions and it just didn't pan out.

Even as a student applying for internships just to get these experiences, that was such a horrible process. Especially because a lot of them were unpaid and I'm just like, are you serious right now? Anyway, I think for me, when I was introduced to the idea of a fellowship to get specialized experience full-time, the idea of that interests me. I was broadening. I literally was in Google, public health fellowships, master's level fellowships, just seeing what was out there. I did apply to a lot of different ones.

S1 1004-24: I am happy that I went down this [fellowship] route, but I think the only problem now is that it's a temporary position. It's more like a contract, two-year contract. One year down, less than a year to go and I think I'm back. Not that I'm necessarily back to where I'm started, but it's like the same issue of, now I would like a real job with benefits and things like that. It's like, yes I have this experience from the fellowship, but for example, even staying at my agency waiting for something to open up or looking elsewhere. That's been stressful.

S1 1009-24: … I think when you're doing the entry-level positions, probably any position they're asking for direct experience. Can you give me the name of an organization that you worked for? Somebody who you worked under. Very structured. Just what did you do in this role, and then how will it benefit us by hiring you?

I think it's hard sometimes, you can have those more generalized transferable skills, which are really good as well, but having something that you can put like an organization that you're attached to and be like, oh, see, you want me because I was a part of this organization at one point, even if it was as a fellow. The proving that you can work at one place helps you get another role in the future.

S1 1009-24: … More jobs saying, "This is an entry-level position. We want somebody with a master's degree. Maybe not with eight years of experience." What I'm finding is even if I get to an interview, they're like, "Oh, well, we found somebody with more experience than you that's still willing to take $49,000." I'm like, "Okay, great."

Then I'm like, "Where am I supposed to start? This is literally entry-level. You said it doesn't require experience or that my education counts, but you're still taking someone with more experience over me." Maybe recommending to employers that you need different categories. You need the entry-level positions so people can start. If you have too much experience, then maybe you shouldn't be allowed to compete against the people that don't have any because I don't think it's a fair playing field.

I think that carries over into fellowships too. I've had fellowship interviews for CDC fellowships where if you're within five years of graduating from any master's or doctoral program, you qualify, but it doesn't matter if you have 10 years of experience in a master's degree or zero experience in a master's

degree. I've gotten beat out again multiple times because they're like, "Well, we have to pay the same, no matter what. Somebody has 10 years of experience and a master's degree," [chuckles] so I'm like, "Okay, great. Thanks." It's hard to say, but just maybe more specific with how these entry-level jobs are laid out so that the application pools aren't this big.
S2 2009: Yes, of course. The main difficulty with only having a bachelor's in public health was finding a role that didn't require too much experience, just freshly coming out of college, but also one that didn't require a master's, something entry-level that I could start out with, weeding out job postings that I would be qualified for in public health. That was difficult. It took me a while, but finally got in.
S3 3004: It is. It is especially frustrating when you see job descriptions that are like, "Oh, we're looking for someone with five to six years of experience" and you can't find anything that's like, "We only want new grads." It's like, how are you supposed to get that experience? They want it to actually be part of a long-term job, but how do you get a long-term job if you don't even have the experience to begin with? It's extremely frustrating because that's what I'm coming up with over and over again, or they say that they want one to two years on the application, which I have, and then they're like, "Oh, yes, we actually really want like five to six years."
S3 3003: … I was looking up job applications for, I would say, six or seven months really consistently. I was also seeing a lot of very high expectations on job requirements, not just desired qualifications. It would be like requirements like, "I want multiple years."
S3 3003: I know myself and a lot of my friends were having even trouble meeting any of these requirements because they were requiring those one to two years. A lot of times they wouldn't consider your RA-ship or anything like that as one to two years of experience, which I found very difficult. I very much understand what you're going through. The applications being they do have really high requirements that they're expecting. I didn't see many, if any, that weren't requiring those years of experience when I was on my really lengthy search as well.
S1 1003-24 Another thing I would say is volunteer. That's a great way to get yourself into the door as well as really expounding and maximizing your transferable skills and highlighting those things that you might-- Don't apply with the idea like, oh, I don't know this, oh, I'm not able to. Really think about your transferable skills and if they apply to that application. If you feel they do, then say, yes, you're confident in that skill. That would be some of the advice that I would offer.
1009-24: I think I can share a little bit just going off of that point, I am trying to go the fellowship role, because I know that that will give me the experience that I lack and that's one of my barriers. Among myself and my friends that are also going through this process, it's common knowledge of like, oh, well if you do get the fellowship, then it's not guaranteeing you anything after that. It's just like not even that there's a ton of hope that something like a full-time position's going to come out of that. It's like, oh, something you have to accept.
Because it's like, if you don't do that, then you can't keep going further. Essentially, it will help you acquire a role because it will add to your experience and to your transferable skills, but it's not going in that that this isn't probably going to transition to a full-time role. I know that as a person that's currently looking for either entry level or fellowship, I'm applying to both. I am leaning more towards the fellowship, knowing that there may not be anything after it, but that I will have some really solid skills going into the job application process again.
I know from an academic standpoint. My program had a required internship, you had to intern for an entire semester somewhere, and even just acquiring that internship was a lot. Once I did get it, it was great, and it's really helped me again as something on my resume trying to get these entry level jobs or fellowships, but the fellowship was not something that they were going to really offer you anything after you graduate either. It's like you get to the next step, and then you're back the beginning.
S2 2001: … when you're a fresh graduate, you're not always going to get the exact thing that you expected right out of school. Because sometimes the exact thing that you wanted, they want five years

experience. That's not to say that you won't. It's a big world out there, and you can always get lucky, but don't get discouraged if you're not lucky because not everyone's going to be.
S3 3004: … I'm trying to learn how to do this all on my own so I can maybe gain some of that experience, so when I apply for these jobs, I have that experience. The problem is that it's not shown on my resume because I don't have any positions or internships or anything along those lines that can say that, oh, I've actually done blah, blah blah with so and so and things like that.
S3 3004: …Quantitative portions that make it very difficult because I did not really get enough experience with that. I'm trying to learn how to do this all on my own so I can maybe gain some of that experience, so when I apply for these jobs, I have that experience. The problem is that it's not shown on my resume because I don't have any positions or internships or anything along those lines that can say that, oh, I've actually done blah, blah blah with so and so and things like that. [Also in "Alignment between Academics and Practice."]

Barriers to Employment – Lack of Guidance
S1 1004-24: A mini-course, something. Then other things of when it comes to transitioning from a student into the workforce, I feel like other fields, at least I saw in undergrad, the business field or things like that, I would hear some of my peers, they would have career boot camps or these intensive-- I don't know.
It was these intense sessions, whether it was resume building, whether it was networking, it was these structured career institutes or things like that to help them transition from undergrad to a degree, and even at the grad school level. At least, that wasn't a case at my university. I don't think that's the norm either to have these ways to transition students into the workforce. That I would like to see as well.
S3 3004: I guess for me, the thing that I would definitely really like to hear is getting more support from the very beginning. Having each program, no matter what discipline you're in, have a broader approach to it. You're also learning about the other disciplines but you're also learning about how do I do a resume? How do I do some of the basic things that you need to do for job searching?
Then on top of that, also having a career center that will help guide you through those processes. The career center only does so much for someone if-- They can give you the tools but if they don't help you learn how to navigate it. Especially since most people have never had a job outside of like a retail job. You're specifically applying to jobs and not really knowing how to apply to them in the first place. Not to mention LinkedIn is becoming such a big thing now that you need to know how to use LinkedIn. They just assume that you automatically because you're a young person, that you just understand how to do it with the same professional attitude as everyone else. Or they keep on thinking that your resume has to be this one straight line kind of idea when the resumes are constantly changing now in the world.
I really wish we had that personal support whether it be from an advisor who actually cares about you and actually is willing to talk to you and be willing to answer the most silly questions on the face of the earth.
S3 3004: I am jealous that 3003 ended up having even like a one-credit course that went over resumes, it went over CVs, all those things. I wish we had that option, especially in the second year when you're really, really applying. I feel like it's something that should be every single year you should have some class like that and it's optional whether you want to attend or not but I think a lot of people would attend it because they were going to need various different help and we don't get that help.
It's more of us trying to go into the world and trying to figure out how do we do this thing? Here's a YouTube tutorial, watch this YouTube tutorial and hope that maybe it works. How do you connect with people on LinkedIn properly? How do you do all these things? How do you make a proper post that's actually well-written for LinkedIn? Because it's very different than like Facebook and Instagram and all those other things but we never learn any of that. I've been learning all that on my own.

S1 1002-24: … your MPH program should be equivalent to one to two years of experience. I think someone else mentioned when they're applying for entry jobs, they're asking for like two to three, and it's just like, well, everything I did for grad school should count as one to two.

Barriers to Employment – The Application Process

S1 1003-24: One of the things that I was going to add some knowledge to is in the event that certain websites that you're applying to, whether that be government-based websites, do not just attach your items. Do not just attach your resume. Do not just attach your cover letter. You want to actually physically copy and paste those into the slots that are allotted. A lot of times they do not look at that. Do not just attach your cover letter. You want to actually physically copy and paste those into the slots that are allotted. A lot of times they do not look at that.

Do not rely on the attachment section on certain databases, because a lot of times they just get glanced over. They're looking at the application that they provided and the slots that they would require you to fill out. That's one tip. **S1 1003-24:** It was not personable. A lot of the times, you don't have a chance to retake it, or there's also that pressure of how many times you retake it. Then of course, you're interviewing, you don't want to keep redoing it. I know for the one that I did with the State Health Department, I wasn't allowed to do any retakes. I remember dressing up, and it was just a camera and the questions were rolling so fast. I really wanted to be direct and concise and put my best foot forward.

You couldn't ask for any elaboration when you're on the video because there's no one there and then you just send that video out and you hope for the best. A lot of times with government jobs, it does take a long time for them to get back to you. That's also a challenge. You're wondering, did you get it? You send a thank you letter, you get no response. These are the things that do happen.

Barriers to Employment - Competition

S1 1002 24 It's also hard because, in the area where Naima and I are, there are over six public health schools within this one proximity… When I'm applying to jobs, I was also competing against all these other MPH grads from these local universities. If you know the DC area, you know John Hopkins is out there, Georgetown is out there, GW, and then Mason Tech, so it's also a lot of competition.

S1 1009-24: … I don't think I've gotten to mention this, but also just the saturation of the public health workforce, job applications right now, almost every job that I apply to has between 50 and 400 applicants. It's absolutely ridiculous to see on LinkedIn and Indeed that these jobs have 400 applicants. I'm like, "You're going to maybe interview 10. If I didn't get in in the first 100, you're not even going to see my application."

Barriers to Employment – The Role of a Network

S3 3004: Everything I've applied to so far has not really been anything within my connection resources, so I've definitely just been doing it cold call, you can say, rather than, like, my connections that I currently have don't have any availability open, so they know that I'm looking for a job, but they know that they don't have anything right now, so I'm hoping maybe in the future, they might have something available that would be of interest for me. With previous positions, I've definitely just applied to various different internships, and if I was lucky enough, I was chosen. If I was lucky enough, I got an interview, and from that interview, I got chosen.

S1 1003- 24 … I kept in good network with those people and told them my professional desires. I think it's very important to be transparent to everyone and anyone. You go to a party, you tell people, this is my professional skill, these are some of the-- Strike up the conversation, because you never know. Someone actually emailed me like, "Hey, they're hiring for this particular position." I do have a history of HIV and AIDS case management skills previously. I was able to put my best foot forward but had that person not even text me the link, I wouldn't have applied. I do think being transparent with

everyone that you encounter, showcasing yourself, smiling, being that person, being yourself is really very important as well.
1004-24: … right now they don't have anything like that for us who are about to finish up our fellowships or going into our second year. It's just like, hopefully you find something otherwise we did our job, pleased to meet you.
S1 1002-24: In my time as a student for my MPH, it was a hit or miss. I think there's a lot of power in networking and building relationships with not just your professor and your advisors, but also people in the public health field.
S1 1002-24: That helped me, but I'd say it's a mix of having those people be there for you and support you as a student, but then also looking out into it. I would frequently connect with people on LinkedIn and reach out just to at least put my name there. I think the hardest part of graduating with my MPH was understanding that you can reach out so many times, and yes, there's going to be people who will lend a hand to you, and there's some people who will just ghost you.
S1 1003-24: When they were talking about different opportunities through their school. A lot of the stuff, even like the fellowship and stuff like that, I'm very naive to all of those things. I go online, I submit papers. It's like assignments to do a paper. I don't really have engagement with any type of faculty or anything like that.
My master's program is a bit different in that regard, like of conferences and things. The school doesn't even send me emails of different things that I might be able to take advantage of. That has been my experience, but I have connected with some of the fellow classmates offline. We'll speak like, "Hey, how are you going?" We've developed some type of community because you get to see the same faces on-- we use Blackboard, so we see the same people and we've developed a community that way. Even networking for jobs, I've had some of--
When I was looking, some of my fellow classmates, they also reached out to me, like, "Oh, there's a remote position." Even though they might live in Wisconsin, there might be a remote position that they thought I would be able to fill. That's another networking idea, speak to your fellow students or your peers. That's what I was speaking about in regards to my experiences online.

Barriers to Employment – Safety of Certain Geographic Areas
S3 3004: I'm a person of color so there are some areas that are not exactly the safest for someone who's a woman and a person of color. Those areas I wouldn't be applying to but the majority of the fact is I'm applying everywhere. I very rarely ever get interviews so it's just very, very frustrating.
S3 3004: …I'm not the only one. All my friends have done the same thing just because we don't want to be an area where we will actually be attacked or harassed, things like that because our safety outweighs getting a job in some aspects.

Alignment/ misalignment between academics and practice
S1 1003-24: I'm shocked that with all the community engagement that we do that most master's programs don't have a case management course in alignment with it, because to me, if you have to do intake with patients, you have to do certain positions, of course, and they don't touch that at all. Most of it is quality assurance and data.
S1 1009-24: I'm looking at all these jobs and I am now a researcher. I don't know if that's by intention or just happenstance of how I was educated because I went into public health purely from an academic background. I didn't know about public health until I got to university. I did an integrated program right into my master's degree. I've learned about public health as I go. There was no case management classes I could take or anything like that.
Even entry-level positions are program-associated, case management personnel. I don't have any experience to contribute to that because I'm a researcher on paper, because that's really what I was offered from my academic institution, and I know that's not just to my academic institution, even just

hearing from the rest of the people in the group. I definitely think from an academics point, that's something that I would have liked to have the option to pursue because I don't have any experience that's really not research or education based.
S1 1003-24: Right now on the floor that we work on, everybody for the most part connects with patients to some degree. We have the rabies team on our floor, they have to reach out to patients. I really think that having case management implemented in some type of curriculum I think would be helpful. Just because if not, you're just then diving into the community aspect of public health. Public health does deal with communities, so it's just not pushing paperwork, which is great and that is very important, but there also needs to be engagement with the community in order to get that documentation.
S1 1004-24: I think similarly what has been mentioned, I felt like, at least my degree program, it similarly trained me to be a researcher. As others have mentioned, very strong lit review skills and writing papers, and all of this research, research, research. As part of my day-to-day now, if I need to do a lit review, it's just so I understand what's going on with the diseases, but not because I'm actually doing that as part of any of my day-to-day projects or any of my outcomes for these projects.
I think I would've liked to see at least with the degree programs a chance to learn different skills outside of literature review, writing papers, research, whether it is the case management or whether it is-- For example, I do a lot of heavy data analysis as part of my job. Maybe being introduced to softwares that are used in public health, whether that is our GIS, whether that is building dashboards through Power BI, Tableau. I feel like a lot of public health organizations, whether it's government or not, use these softwares. Those haven't really touched--
S2 2010: So far, I took some of the evaluation classes like in my master's, but I didn't have the experience to work in real life. During this project, I have this opportunity to implement or working as a evaluator in a real project, a project by CDC is big thing for me. It is huge grant and huge project.
Patricia: You didn't do GIS or Power BI in your undergrad?
S1 1004-24: No. I learned both of those on the job through my fellowship.
Patricia: Interesting.
S1 1004-24: It would've been nice to be introduced [chuckles] to those things as part of my degree, but I learned those things from--
S2 2004: With my public health degree, it was more so a general form, but the courses that I did take was maternal child health, and health promotion, or a lot of my background was in Epi and biostatistics. Yes, it has laid out for me just because based on the community needs, I'm able to use these systems or use to help-- utilize the epidemiologist with trying to figure out what the needs are within the type of the community that we're supporting, and make sure we are data-based and making sure that we're following the data as far as what needs our needs to be met for our community or our county.
S2 2002: Not at all. [chuckles] I didn't know what I was doing.
S2 2001: … from my perspective, my MPH, there is zero leadership training, and actually, a bit of context, I'm also an epidemiology background. My degree was almost exclusively math-based. It was statistics, and understanding how to do study design, and so on and so forth, so not a lot.
Especially in a two-year program, that can be really-- I'm sure the programs have to pick and choose what needs to be emphasized, but I would say though, having said that, my MPH really trained me for my current position. Knowing those study designs and understanding how to analyze data and how to interpret it, that's essential to what I do in infection control.
S2 2001: My public health trainee had me use SAS a lot, but that's been a challenge because SAS, you need to pay for licensing keys, not every organization wants to do that. Now, I found myself having to learn R. I just started, so it's a little rough. To me, it's like learning a new language…
S2 2002: From what I remember, [communication training] was not part of ours in grad school. I did do some in undergrads because I got a degree in health communication.

S2 2004: Yes. You're pretty much thrown into the wolves with that. [chuckles] Again, when I came in, you had a lot of people that were gone, just left. The retention was pretty bad, so I just fell in and had to ask questions or help. A lot of the people here are fairly new. We're honestly working as we go and just supporting each other and making sure we get this thing right.
S3 3003: Coding is a really big part of what I do and that is always the stress point for students is students aren't taught coding very well. That is the basis of any data analysis or data management. Especially because I'm no longer in the epidemiology department at my university, I'm at the Department of Occupational and Environmental Health Sciences, so those students that I work with are graduate students in that department, and so they receive even less training in data science than I did. I even thought as an epidemiology student, I received too little training in data management. By far that was like the biggest qualm of everyone that I knew in my program, which we were all very data-heavy I guess emphasis. We didn't receive any sort of data management training. We received one class in coding and then it was figure it out for yourself, figure it out during your RAship. Hopefully, you have support for your thesis, if not Google. That was something I really, really wish I would've had.
S3 3003: Yes. In my case, I've never really had someone above me, like a manager or someone on my same level that I can ask data questions to. If I'm like really stuck, I'll text my friends sometimes that are in my program and be like, "What would you guys do?" But for the most part, for me, it's Googling, it's stack overflow. Now ChatGPT is really helpful just for quick little things, but I would say we had like our one course, which was really good on basics and it gave us a really good understanding.
I think it was like a five-week course in R where it was just like three credits or something like that. Then half was in Stata which isn't very helpful for me these days. After that, like bio sets, you'd be given the code and you'd hope you'd understand it for the most part, but it was figure it out. There were no other R coding classes or anything like that, that I could have taken.
S3 3004: For someone in health policy and management, my school didn't really do a lot having to do with statistical analysis, but a lot of jobs that I want to apply for or would be of interest to me require some sort of statistical analysis. We only had one class and it was on SAS and that was for the first semester after that we never touched it ever again. If you wanted to take the second course of that, you had to somehow squeeze that in with 20-something credits, so it wasn't really feasible for most people to do unless you really wanted to struggle the whole entire time which is not realistic.
S3 3004: …Quantitative portions that make it very difficult because I did not really get enough experience with that. I'm trying to learn how to do this all on my own so I can maybe gain some of that experience, so when I apply for these jobs, I have that experience. The problem is that it's not shown on my resume because I don't have any positions or internships or anything along those lines that can say that, oh, I've actually done blah, blah blah with so and so and things like that. [Also in "Barriers to Employment."]
S3 3004: I'm trying to learn how to do it through Google, through Coursera, through random YouTube videos. I don't have access to the programs because their programs cost too much, so I'm trying to do everything on my own, which is very, very tricky. Especially since a lot of these programs, if you want to get a year subscription, they cost $300, which I don't have that money.
After you graduate, you don't have access to some of these programs, and even then within the health management departments, we only had access to SAS, we didn't have access to any of the other ones. I got to use MAXQDA because I was doing a whole entire research project on that, but that still cost us $100 out of pocket for each person that needed it, which is a little bit ridiculous when you're a grad student. They had no discounts or anything.
S3 3003: That's the really big gap that I found. I was really trying to find any sort of coursework even outside the school of public health. There's like one data, I think it was called data management certificate, but my school wasn't even running it. There was really near no support in learning those

skills, which I feel like is, especially in epidemiology, that that's a big part of our job is knowing how to securely and best practices for cleaning data, best practices for storing data, sharing data, everything like that. We received no training in that.
First, the R course that I talked about, half of that course was R. That, they taught us about data cleaning. That was my only formal R training that I would consider applicable to my data management. It's very much just on the job Googling and learning as I go and learning from what's been done before me. If I see data saved in this one way, I make sure that's right and then that's how I'm going to do it from now on.
The person who was in my position before me transitioned to another position that is now merging back into a similar realm as me. Now her and I actually started meeting weekly just to discuss what we're learning by ourselves because she actually received no formal epidemiology training. She's actually a veterinarian by nature, so she didn't do any sort of qualify, nothing. … We figure it out as we go along. We've been meeting and as we learn, we just share with each other the best practices that we've picked up on or talk about any issues that we're facing.
My projects are very international-based for the most part. It's a lot of data security and IRB management with data security. That has been a huge learning curve for me. I filled out an IRB once because it was… an RA-ship that I was doing. I was trying to get a paper through, but that was-- I wouldn't have learned that in my classes as I wouldn't have learned about data security or storage or anything like that in any of my classes. It's very much like as I go, which is scary because that's a really big and important aspect of my current job.
S3 3004: I only learned how to do all this stuff because I had an internship that involved it but other than that, we're never taught anything about it. It's like, we know it exists but there's no training course on how to do it. You basically have to learn how to do it completely on your own which I thought was frustrating considering HPM can go into a lot of research roles as well. You would have all these different forms that you would have to fill out. You would have to know how to use them but we just never were taught how to use them. They just expect you to somehow understand how to use them before you even leave school.
S3 3003: I would say it would be really great to have resources for new professionals in surrounding data management. For me specifically, that would be really exceptional to have a toolbox for standard of practice for-- I know different CDC versus NIH there's different procedures, but even having all those in a digestible manner in one place and just having a go-to for very basic things would be really helpful and compiling resources for-- Especially it sounds for 3004 is learning basics for analytics would be really helpful, I'm sure. Also sounds like maybe a standardization of MP like accredited-- I know accredited MPH program.
S3 3003… It sounds like there needs to be more of a standardized approach for supporting students throughout their time… If you're in a program, you shouldn't be on the verge of failing out because you're not being supportive enough. It sounds like maybe the institutions that are doing better can possibly lend their strategies to institutions where students are struggling a lot more. Maybe advice for institutions that are having a lot more issues with student turnover.

Quotes for other 8 themes

Recruitment/ Retention Barriers and Facilitators –

- Recruitment barriers focused on the employer perspective.

2002: Everyone's going to laugh when I say this, but unless it's a physicist position, I just go off vibes when I'm in interviews if I feel like their personality meshes or will mesh with the rest of the team because I've been told I have a likable personality. I hope that's true, but I use my personality to gauge off for everyone else on our team because they all work really well together. I'd love that to continue.

That's how I go off everything because we can teach you radiation, we can teach you physics. We can't teach personality and work ethic.
2002: You don't have to be necessarily social. We can make you social, it turns out. [laughter] You have to be willing to work on a team. You have to be willing to sometimes sacrifice. It's for the good of the team. You just have to be open really.

- Retention barriers can be both employer and employee –

2004: Yes. You're pretty much thrown into the wolves with that. [chuckles] Again, when I came in, you had a lot of people that were gone, just left. The retention was pretty bad, so I just fell in and had to ask questions or help. A lot of the people here are fairly new. We're honestly working as we go and just supporting each other and making sure we get this thing right.
2002: I want to give them what they need to succeed because I can't be successful without them. I was alone for three months doing this job myself, and I wouldn't have survived if I didn't have my one counterpart at all. Him and I did everything together, and I never would have made it this far. I value them so much, so it's important to me that they feel valued because people say where they feel valued and respected in their jobs. It's not always about the money and I learned that so much, too. They want to be somewhere where they feel supported. It's important to me that they can see that everyone thinks that they are valued.

Rejection/ Resilience
1002-24: I remember when I was applying even outside of my program, it hurts to get rejected and not hear back, but I had this one mentor who was like, "It happens and you do need to accept it because people are busy." Now that I'm working in public health, I'm like, "Yes, it is true. We are busy and it's probably not that person's intention to not reply back to your thank you email or to give you that response."
1002-24 Before if I was ghosted, I would cry. I would not want to watch my show. "I don't want to do anything." You're pounding yourself down. Now I'm a little more mindful, like, "Yes, people are busy and sometimes you have to be okay with not getting the response back, but don't think negatively about it."
1003-24: People have complicated relationships, so we do have to be mindful in our approach with that and facing rejection from that standpoint as well. Tying together what you had mentioned about being rejected from the school, maybe being rejected from application process, and then once you get into the seats of the position, feeling that rejection. Absolutely because we're dealing with people, and people are going to people.
1004-24 Yes, it was incredibly frustrating to not even just get an email saying, we went with somebody else or this position is now filled. Just to simple communication instead of waiting months to be like, did they fill the position? Did they not? Did they make a decision on this fellowship? Did they not? I think that was incredibly frustrating.

Guidance/ lack of guidance in *curriculum* in academic programs

Includes:

- Self and peer reliance in *academic process*
- Need for academic path

1004-24 I think one thing that was mentioned of even reaching out to somebody as a mentor and not getting that kind of support. I had had that sort of experience in grad school, where my mentor, AKA my thesis advisor, she was incredibly hands-off. It was very frustrating because it's like, I need my thesis to graduate. I need your guidance, I need your support. I would always email her. I would always follow up. Week would go by, two weeks, three weeks, and it's nothing. It's like we have deadlines we need to meet. I was like, I am finishing this degree in a timely manner.

It felt like, one, I wasn't being supported, just point blank. Then also having to deal with these external stressors. I couldn't even talk to her about my career or my goals. She didn't have the time, and she didn't make that time for me, even though her role was literally thesis advisor, chair of my committee. It's like that was her designated role.
1009-24 I know one of my professors, she did research that was interesting to me, and so when it came time for me to find somebody for Capstone, I had to have a mentor. I knew my professors that I'd taken a few classes with, and so I had to just reach out to her and be like, "I'm really interested in your research and I'd love to work with you. I know we don't have really any kind of rapport so far, but I'd love to learn more about you and hear more about your research." I'm thankful that she was very receptive to that and was like, "I appreciate you reaching out and taking that initiative. Sure, I'll take you on."
3003: Yes, that was something that was a common theme in my cohort that I was commonly in communication with. There wasn't a lot of support. We did have one class that was like a one-credit seminar with the chair of our department, which I found very helpful. It was just I think master's epidemiology students where we focused on general thesis things.
3003: I also agree with the fact that at least in my experience when I arrived as a Master's student, they gave me an advisor and I reached out to my advisor. He didn't know who I was, didn't know my interests. I don't think I could even get a meeting with him. He was supposed to advise me on my curriculum. Maybe I met with him once, but he's like, "I don't teach any of these classes. I don't really know any of these classes. I really don't work with Master's students." I never reached back out because it wasn't helpful at all.
3004: I was assigned an advisor but she was in charge of like, I don't know, how many students. She had no idea about anything about me even though like they ask your interest forms ahead of time, you give all that information, so what's the point of giving that information if she's not going to even bother to read it? I think I talked to her a grand total of once over two years. I was more likely to talk to my professors than anything else but even then, they had like limited time because there's so many students that needed help, but none of them were really getting the help that they needed and then on top of that, I was doing certificate within the school.
1009-24 I know one of my professors, she did research that was interesting to me, and so when it came time for me to find somebody for Capstone, I had to have a mentor. I knew my professors that I'd taken a few classes with, and so I had to just reach out to her and be like, "I'm really interested in your research and I'd love to work with you. I know we don't have really any kind of rapport so far, but I'd love to learn more about you and hear more about your research." I'm thankful that she was very receptive to that and was like, "I appreciate you reaching out and taking that initiative. Sure, I'll take you on."

Flexibility of having a Public Health degree
2001: That's actually the reason I went into public health was because I liked the idea of how flexible the field can be. If I needed to, for life situations or whatever the case may be, I could always pivot and I would still find something satisfying.

Post-academic training
Includes:
- On the job training
- On the job mentoring (including motivation for mentoring)
- Lack of access to needed/ wanted training (due to lack of knowledge, availability, finances)

1004-24: A mini-course, something. Then other things of when it comes to transitioning from a student into the workforce, I feel like other fields, at least I saw in undergrad, the business field or things like that, I would hear some of my peers, they would have career boot camps or these intensive-- I don't

know. It was these intense sessions, whether it was resume building, whether it was networking, it was these structured career institutes or things like that to help them transition from undergrad to a degree, and even at the grad school level. At least, that wasn't a case at my university. I don't think that's the norm either to have these ways to transition students into the workforce. That I would like to see as well.
1002-24: They definitely do trainings, like we were sent to another city for training, but that's it so far. It was the state health department. [chuckles] That's basically necessary for our job; learning how to work the systems, learning what we should be doing, and basically, that's part of the orientation is that we're mandatory required to have this orientation provided by the state health department.
2002: We try to support career growth. However, sometimes you don't get to do a training you specifically want to do because you need to take a team training because I need the team to be prepared, that's the top line. Your career obviously is-- I want it to be important to me as well. I want to get you to where you want to be, but at the bottom line of the day, our team's got to do what they have to do first. That's the job you were hired for, and then go on to do personal career goals and stuff like that.
2009: They sent us a representative from the GIS system. The representative came, taught us for a whole day, the whole team, seeing how the dashboard works, different features, how to design it from scratch, if you knew nothing, if you knew something, different features, and then we went from there.
3003: I think it was like a five-week course in R where it was just like three credits or something like that. Then half was in Stata which isn't very helpful for me these days. After that, like bio sets, you'd be given the code and you'd hope you'd understand it for the most part, but it was figure it out. There were no other R coding classes or anything like that, that I could have taken.
3003: In my case, I've never really had someone above me, like a manager or someone on my same level that I can ask data questions to. If I'm like really stuck, I'll text my friends sometimes that are in my program and be like, "What would you guys do?" But for the most part, for me, it's Googling, it's stack overflow. Now ChatGPT is really helpful just for quick little things, but I would say we had like our one course, which was really good on basics and it gave us a really good understanding.

Need for Public Health to market the field of public health
1009-24 I didn't know about public health until I got to university. I did an integrated program right into my master's degree. I've learned about public health as I go.
1008-24: We had a huge career fair organized. There were more than 1,000 employers representing that career fair. It's a huge event in my university. Then I went there, but then there were all engineering employers. There were only two or three health-related employers. I went to county. My county table was there as well and then I started to talk to them about public health jobs, but then she was like, "What does public health people do?" They are not aware we public health people even exist. She wasn't aware what kind of work we do. Either we do clinical things. She was asking me more about clinical things, but we don't do any clinical things.
That thing even frustrated me more. I think what we need to do is, we need to-- I don't know, what's the scenario here? If people are not aware about public health or public health employers are very less here, I think somebody should advocate for us. [chuckles] If we have master's degree, we have that knowledge and skill, we can apply in the real setting. If you don't hire us, how do we get that experience? I don't know.

Financial accessibility
1002-24: Another takeback I had is I liked the school because it was proximate to home. I got a graduate assistant job that paid for 75% of my master's, so that was also the biggest key for me is being close to where I live and being a financially good decision.

1003-24: I think it's important that the schools-- again, affordability is very important. For me, that was the reason why I picked the school that I picked was affordability. Also, as a working single mom, I did need that online component. That was very important for me as well. Also, the job that I'm in right now, they do help pay for some of my courses up to a certain amount which has been really a blessing for me financially.
3004: I'm trying to learn how to do it through Google, through Coursera, through random YouTube videos. I don't have access to the programs because their programs cost too much, so I'm trying to do everything on my own, which is very, very tricky. Especially since a lot of these programs, if you want to get a year subscription, they cost $300, which I don’t have that money.
After you graduate, you don't have access to some of these programs, and even then within the health management departments, we only had access to SAS, we didn't have access to any of the other ones. I got to use MAXQDA because I was doing a whole entire research project on that, but that still cost us $100 out of pocket for each person that needed it, which is a little bit ridiculous when you’re a grad student.They had no discounts or anything.

Appendix M – Post Listening Session Survey Data

The post listening session survey was composed of 11 questions: 1 informational, 4 multiple choices, 5 open-ended and 1 demographics question. Qualtrics identified 19 responses within the platform for the post listening session survey from October 24, 2023, through November 7, 2023. Seven (7) responses did not have any contact information or responses and were removed from the analysis. Two responses were provided by duplicated respondents. These duplications were combined. Of the active thirteen listening session participants, ten (n=10) responded to the post listening session survey for a 77% response rate. The average time to complete the survey was 7.9 minutes.

Response rates per listening sessions include 100% for listening session 1 (5/5), 50% LS2 (3/6), 100% LS3 (2/2).

Q3 Session Participation

Table 3: Post Listening Session Survey Respondents by Listening Session

Session Date and Time Listening Session Participants	LS1	LS2	LS3	Total
a. Tuesday, October 24, 2023, from 12:00PM-1:30PM EST (9:00AM-10:30AM PST)	5			5
b. Wednesday, October 25, 2023, from 3:00PM-4:30PM EST (12:00PM-1:30PM PST)		3		3
c. Thursday, October 26, 2023, from 3:00PM-4:30PM EST (12:00PM-1:30PM PST)			2	2
Total	**5**	**3**	**2**	**10**

Q4 Additional Information

Reflecting on your listening session conversation, do you have any additional information or clarifications to share? (n=11)

- It was a great conversation and I am glad I was allowed the opportunity to speak about the saturation of the public health workforce and how entry level positions are challenging to acquire
- We need someone to advocate for entry level public health jobs.
- My listening session was interrupted for about 20 minutes due to a call (sorry!) But overall, i enjoyed the conversation. It hit on some great topics that MPH students face as well as some new advice and takeaways.
- I wish there was more ways to find jobs without having a lot of experience within my field.
- For epidemiology programs that are accredited for MPH it would be great to ensure there is some standard set of data science curriculum or at least ensure there are electives. Data science and epidemiology go so hand in hand and many epidemiology jobs require at least some form of data management afterwards so having no formal instruction in this field has been disappointing.
- None, I thought it was a productive discussion.
- No, it was really good!
- No additional information.
- None at this time
- N/a (2)

Q5 Motivation to Participate

What was your motivation for participating in the listening session? (Select all that apply)

a. Willingness to help; Provide better support in the field and community (Altruistic Motivation). (10)
b. Interesting evaluation; Curiosity (Intellectual Motivation). (7)
c. Incentive offered. (0)
d. Opportunity to learn from others. Individual professional development. (5)
e. The request to participate came from a peer or someone I respect. (2)
f. Camaraderie or to have a shared experience. (4)
g. Other. (please specify) (Text box) (0)

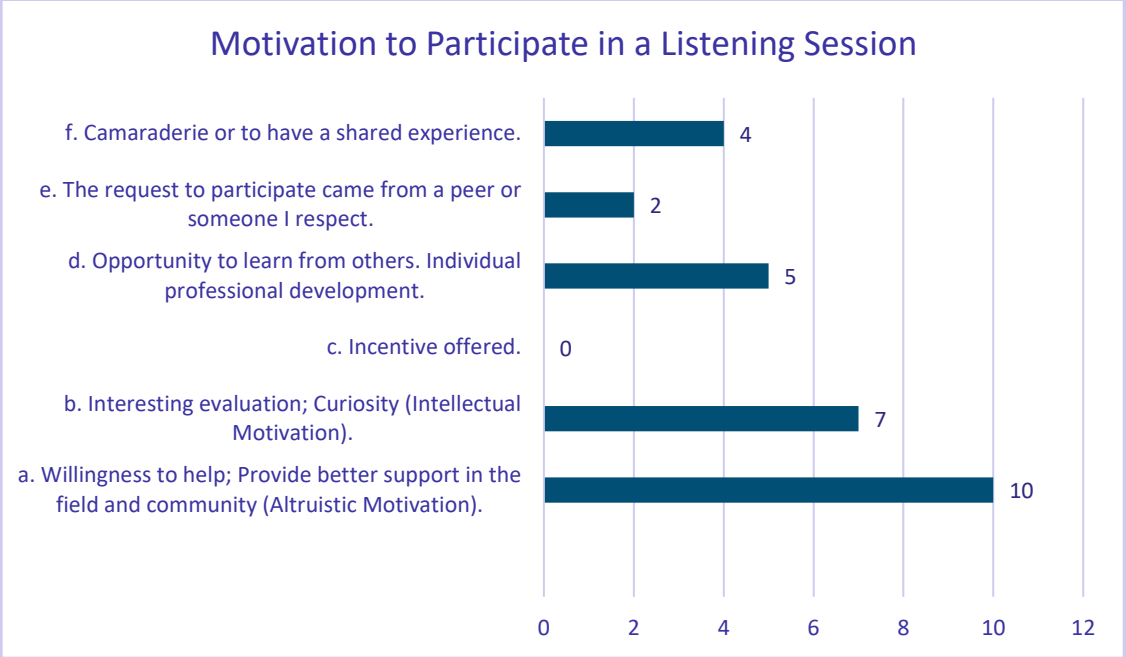


Figure 20: Motivation to Participate in a Listening Session-Post LS Survey

Combinations

- 3 (a & b): a. Willingness to help; Provide better support in the field and community (Altruistic Motivation)., b.Interesting evaluation; Curiosity (Intellectual Motivation).
- 2 (a, b, d, & f): a. Willingness to help; Provide better support in the field and community (Altruistic Motivation)., b. Interesting evaluation; Curiosity (Intellectual Motivation).,d. Opportunity to learn from others; individual professional development., f. Camaraderie or to have a shared experience.
- 1 (a & e): a. Willingness to help; Provide better support in the field and community (Altruistic Motivation)., e.The request to participate came from a peer or someone I respect.
- 1 (a only): a. Willingness to help; Provide better support in the field and community (Altruistic Motivation).
- 1 (a, b, d, e, &f): a. Willingness to help; Provide better support in the field and community (Altruistic Motivation).,b.Interesting evaluation; Curiosity (Intellectual Motivation).,d. Opportunity to learn from others; individual professional development.,e.The request to participate came from a peer or someone I respect.,f. Camaraderie or to have a shared experience.

- 1 (a, b & d): a. Willingness to help; Provide better support in the field and community (Altruistic Motivation)., b. Interesting evaluation; Curiosity (Intellectual Motivation)., d. Opportunity to learn from others; individual professional development.
- 1 (a, d & f): a. Willingness to help; Provide better support in the field and community (Altruistic Motivation)., d. Opportunity to learn from others; individual professional development., f. Camaraderie or to have a shared experience.

Q6 Most Useful Academic Learning

What did you learn in your academic program that has proven to be the most helpful to you (useful, most vital) in your current job?

Data Science

- Data analysis, using a statistical software (SPSS).
- Epidemiological study design and data analysis
- Epidemiology and biostatistics. My basic R coding class was a good foundation but a majority of my R skills came from learning as I went along as a research assistant or in my job or classes.

Research Skills

- Research skills
- How the fundamentals of to review, research, and analyze data
- RStudio, Literature Reviews,

Leadership and Communication

- Leadership in Public Health
- Leadership
- Public health communication, this is very important in being about to get information out to the public that most can understand and can have access to. Learning healthcare systems and how integrated they are in everyday lives helped set me up for my current job

Other

- Honestly not much

Q7 Courses wish had taken

What academic course or courses do you wish you had taken or been offered that would have helped you in your current job?

Data Science

- Courses with use of other softwares like ArcGIS or dashboards.
- More biostatistics courses that teaches SAS software
- Option for more electives or including different skills into one course. I.E i had 2 full semester of learning and utilzing RStudio. I would have liked to use those 2 semesters to also include how to learn SAS, ArcGIS, Microsoft Power BI
- Data management, Data science, Advanced R coding, SQL
- More data analysis courses. More epidemiology courses and more statistic courses to have more experience to present when I was applying for my current role.
- More softwares.
- Community surveillance skills.

Leadership and Communication

- Case working information

- Case management
- How to be a boss lol but idk if that's a class.
- I wish there was a course that involved interdisciplinary research from varying departments. I also wish we had a course that taught the basics of how to do a resume, how to use LinkedIn, etc.

Topic Specific

- Microbiology, pathology

Q8 Barriers faced when trying to find a job

What were the barriers that you faced when trying to find a job in public health?

Accessibility and Pay

- Saturation of the marketplace and asking for more experience than just a degree
- Low pay, not enough for cost-of-living.
- COVID impacted the workforce by having more people learn about Public Health or move into these roles we studied 2 years for.

Alignment of Entry Level Positions and Lack of Experience

- Required many years for an entry-level position
- Job asking a lot of experiences even for entry level jobs, no referrals or connections in the organization
- My MPH not counting as 1-2 years of experience. Competition against other MPH students from about 5 universities within the D.C Metropolitan Area.
- Not having all of the experience needed for the roles i was applying to. Lack of accessibility to a role , as a recent graduate most entry level jobs in public health required more years of experience than possible for a recent graduate
- Lack of work experience
- Experience and meeting all the qualifications like data analysis
- Required experience years, data management requirements made me nervous and hesitant to apply as well.
- Mini mail. i got a lot of experience during covid so it wasn't as hard

Application Process

- It's is very competitive, the application process can be rather challenging and confusing.

Q9 Additional trainings requested

What additional training would help you be more effective and/ or confident in your current job? (Select all that apply)

- Budgeting, finance, allocating limited funds (4)
- Communicating data results to diverse audiences (6)
- Community engagement and collaboration (5)
- Fundraising, grant writing, resource development (2)
- General communication, listening, and interpersonal skills (4)
- Health equity, social justice in health, health disparities (4)
- Interdisciplinary, multi-sector, and systems approaches to public health (2)
- Project/ program leadership (4)
- Project/ program management (5)
- Public health advocacy, policy, politics (2)

- Public health ethics and decision-making (1)
- Qualitative or quantitative research methods or study design (6)
- Science or technical writing (2)
- Using data analysis tools, processes, and results to improve programs (9)
- Understanding data, data sources, and data analysis results (8)
- Other (please specify) (0)

Figure 21: Trainings to Help be More Efficient and Confident in Job

Q10 Participate in Future Work

Would you be willing to participate in similar work in the future with the National Network of Public Health Institutes (NNPHI)?

- Yes (10)
- No (0)
- Maybe (0)

Q11 Additional comments

Do you have any additional thoughts or comments to share?

- This was a great session. I hope we get to see what the final report looks like.
- This session was great. I feel like I am not alone in this process.

- `N/A. This discussion great and the time allotted for many challenging topics to be discussed
- This was such a great opportunity, I really enjoyed the process. Thanks!
- Thank you so much
- Great session!
- NA
- None
- Nope

Appendix N - LinkedIn Poll

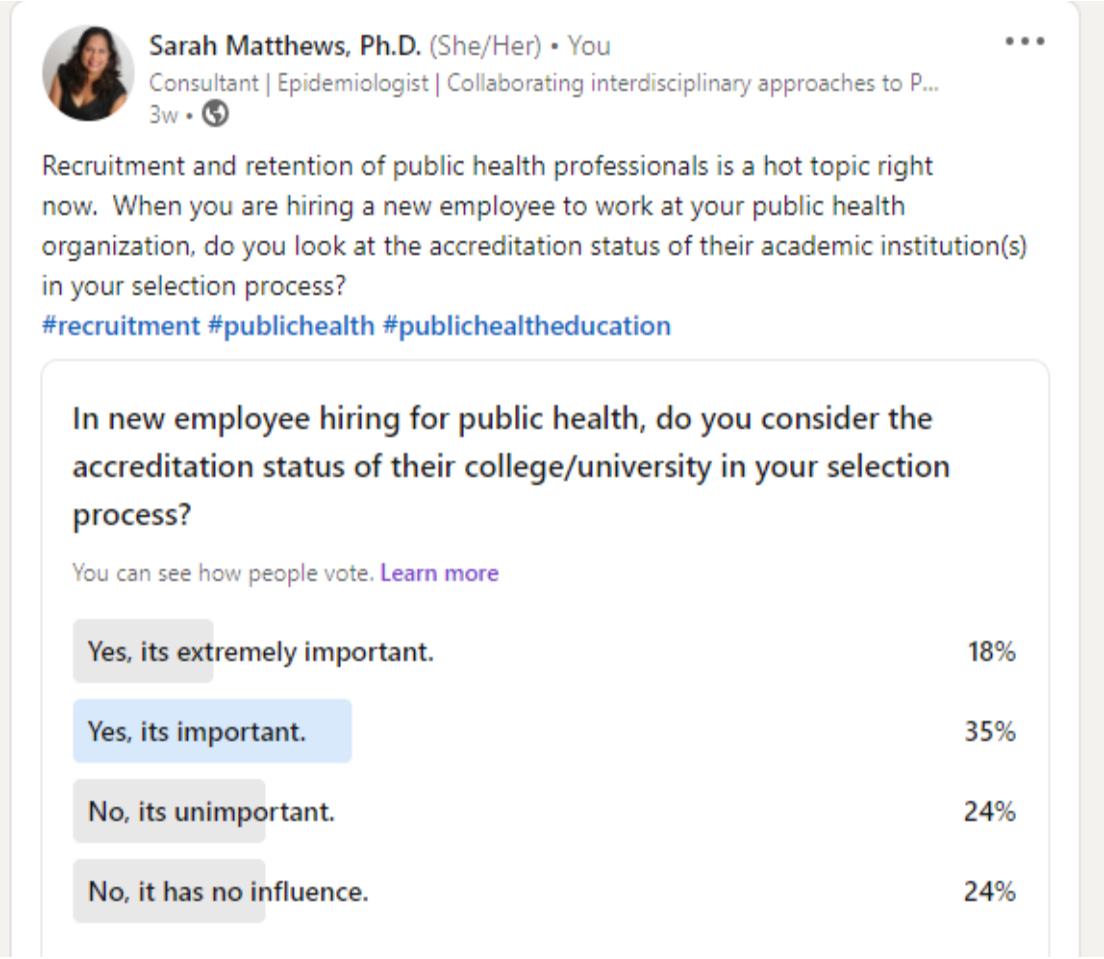


Figure 22: LinkedIn Poll Snippet

A social media poll asked viewers "In new employee hiring for public health, do you consider the accreditation status of their college/university in your selection process?" There were 4 response choices given:

1. Yes, it's extremely important.
2. Yes, its important.
3. No, its unimportant
4. No, it has no influence

The poll ran from 9/29/2023 through 10/13/2023. LinkedIn's post analytics shows that the poll garnered 469 impressions, 5 reposts and 2 comments. There were 18 total respondents, 9 (53%) who responded with a yes

response and 8 (48%) who responded with a no response. The platform provided the respondents' identity with how they voted. The breakdown of votes is provided below.

Yes, its extremely important (3)
- Teacher and Instructional Coach
- Infection Prevention Manager at Advent Health
- Principal at Consulting

Yes, its important (6)
- Harm Reductionist at AIDS United
- Data Advocate
- Regional IT Director for State of Florida DOH
- Epidemiology Manager
- Lead Epidemiologist at North Central Public Health Department

No, its unimportant (4)
- Infection Preventionist at PeaceHealth
- Surveillance Epidemiologist at FDOH
- Consultant, Healthcare Associated Infections
- Public Health and Community Engagement

No, it has no influence (4)
- Assistant Deputy Commissioner with Virginia DOH
- Public Health Student
- Health in All Policies
- Disaster & National Security Consultant

Appendix O – Other Analysis

Comparison of perceived accreditation status and actual accreditation status of the academic institute.

When asked about the accreditation status of their last academic institute, 100% (29/29) respondents stated their academic institute was accredited (Q9 Institution Accreditation). When asked how important accreditation was in their selection process, 93% (27/29) responded with some level of importance (23 extremely important, 4 important. We wanted to understand if the academic institutes mentioned truly were accredited or if it was a perceived accreditation. CEPH accreditation assures quality in public health education and training in public health practice, research and service. Although we use CEPH accreditation as our comparison group, it should be noted that the question that was posed was about accreditation in general and not specifically about CEPH accreditation. Of the 25 academic institutions listed, 21 or 84% were CEPH accredited. Of the non-accredited academic institutes, two were out of the United States (Health Services Academy Islamabad, Lithuanian University of Health Sciences).

Table 4: Academic Institute named by Recruitment Survey Respondents and corresponding CEPH Accreditation Status

Academic Institute	Accreditation (CEPH)
Concordia University Nebraska	Yes
Emory University	Yes
George Mason University	Yes
Hawaii Pacific University	Yes
Health Services Academy Islamabad	No
Indiana University	Yes
Lithuanian University of Health Sciences	No
Massachusetts College of Pharmacy and Health Science	No
North Dakota State University	Yes
Penn State College of Medicine	Yes
Saint Louis University	Yes
Texas A&M University	Yes
The George Washington University	Yes
The University of New Mexico	Yes
University of California, Berkeley	Yes

University of Florida	Yes
University of Indianapolis	Yes
University of Kansas	Yes
University of Nevada, Las Vegas	Yes
University of New England	Yes
University of North Carolina at Chapel Hill	Yes
University of Texas at El Paso	Yes
University of Texas as San Antonio	No
University of Washington	Yes
Utah State University	Yes

Comparison of Recruitment Survey Responses to Post Listening Session Responses.

The phenomenological process invites participants to share stories of their experience rather than respond to a question directly. We made this comparison to understand if there was a change in response to similar questions posed in the recruitment survey which was administered prior to the listening session and the post listening session survey. We compared Q6 with Q15, Q7 with Q16 and Q8 with Q18. There were 10 total responses for each of the sets of questions. In the comparison of Q6 and Q15, of the 10 responses, two showed some deviation from their original responses. In Q7 and Q16, there are 3 deviations and in Q8 and Q18 there are 2 deviations. While the responses were different per participant, they were still aligned with the themes throughout the analysis.

Table 5: Recruitment Survey Responses Compared to Post Listening Session Survey Responses for Q6 & Q15

LS	Q6	Q15
LS	What did you learn in your academic program that has proven to be the most helpful to you (useful, most vital) in your current job?	What did you learn in your academic program that has proven to be the most helpful to you (useful, most vital) in your current job?
LS1	RStudio, Literature Reviews, Leadership in Public Health	Use of statistical software, course in infectious disease, public health leadership and management, how to successfully apply for a job
LS1	How the fundamentals of to review, research, and analyze data	Attending Concordia University of Nebraska's Public Health Program has prepared me to create, implement, research and assess health strategies to promote public wellness.
LS1	Data analysis, using a statistical software (SPSS).	Data analysis skills
LS1	Na	N/A still applying to positions
LS1	Research skills	Research skills
LS2	Leadership	emergency preparedness
LS2	Public health communication, this is very important in being about to get information out to the public that most can understand and can have access to. Learning healthcare systems and how integrated they are in everyday lives helped set me up for my current job	The key thing I learned in my academic's is how interconnected each sector is to a person's or a communities health
LS2	Epidemiological study design and data analysis	An understanding of statistics in a professional setting.
LS3	Honestly not much	The varying fields of public health and how they are inter-related
LS3	Epidemiology and biostatistics. My basic R coding class was a good foundation but a majority of my R skills came from learning as I went along as a research assistant or in my job or classes.	R coding

Table 6: Recruitment Survey Responses Compared to Post Listening Session Survey Responses for Q7 & Q16

LS	Q7	Q16
LS	What academic course or courses do you wish you had taken or been offered that would have helped you in your current job?	What academic course or courses do you wish you had taken or been offered that would have helped you in your current job?
LS1	Option for more electives or including different skills into one course. I.E i had 2 full semester of learning and utilzing RStudio. I would have liked to use those 2 semesters to also include how to learn SAS, ArcGIS, Microsoft Power BI	My MPH concentration was Epidemiology because I enjoyed working with numbers. I wish this concentration emphasized the use of more statistical software programs other than SAS and RStudio. In my experience, we had 1 full semester of learning SAS and 2 full semesters of learning RStudio. I believe it would have been beneficial to at least have 1 semester spent learning either ArcGIS, Stata, SQL integration, etc. I also wish this program gave students more opportunities to gain hands-on experience by collaborating with external stakeholders/agencies. Most of the hands-on experience we were offered were either G.A positions or study-abroad opportunities. Personally, this was hard since we had a small program; G.A positions were filled up immediately and i was already taking summer classes and unable to enroll in any study-aboard courses.
LS1	Case management and community survelinece skills.	Although I already have professional case management experience, I think adding a case management course to the public health curriculum would have been valuable, for example in my current position as a Disease Investigation Specialist we conduct interviews and facilitate treatment plans of action for individual patients.
LS1	Courses with use of other softwares like ArcGIS or dashboards.	More Biostatistics/Epidemiology courses.
LS1	Case working information and more softwares	N/A
LS1	More biostatistics courses that teaches SAS software	More biostatistics course
LS2	How to be a boss lol but idk if that's a class	Health Physics
LS2	More data analysis courses. more epidemiology courses and more statistic courses to have more experience to present when I was applying for my current role	Virology and any course surrounding virus', bacteria and parasitic activity.
LS2	Microbiology, pathology	Coursework that relates to infectious diseases, for example microbiology and medical terminology.
LS3	I wish there was a course that involved interdisciplinary research from varying departments. I also wish we had a course that taught the basics of how to do a resume, how to use LinkedIn, etc	More data courses
LS3	Data management Data science Advanced R coding SQL	Data management, data science, informatics

Table 7: Recruitment Survey Responses Compared to Post Listening Session Survey Responses for Q8 & Q18

LS	Q8	Q18
LS	What were the barriers that you faced when trying to find a job in public health?	What were the barriers that you faced when trying to find a job in public health?
LS3	Experience and meeting all the qualifications like data analysis	Not having enough experience
LS2	Mini mail. i got a lot of experience during covid so it wasnt as hard	I didn't really have a problem but the salaries arent great prior to covid
LS1	My MPH not counting as 1-2 years of experience. Competition against other MPH students from about 5 universities within the D.C Metropolitan Area. COVID impacted the workforce by having more people learn about Public Health or move into these roles we studied 2 years for	The number 1 barrier I faced was lack of experience. I went straight from undergrad to grad school because I was offered a G.A position that was able to pay for 75% of my tuition. I graduated with my MPH at 24 years old. My only real experience was working for my university and a nursing home. I was knowledgeable in infectious disease, public health theories/foundation, community partnerships, and program evaluation - but it wasnt enough. I was denied from several local/state agencies regardless of my accomplishments (grades, work-ethic, bilingual, first-generations student, reccomendations for teachers, etc.). Although i had an MPH, it wasn't enough to satisfy these jobs with "2" years of experience which left me unmotivated. Another barrier i faced was that i completed my MPH during the middle of the pandemic. Most public health jobs were contract positions that were not flexible with my school hours. I worked at a nursing home 7am-3pm so i could attend school from 4-10pm. When i did find a job in public health, the salary was also not compensative enough. For someone with an MPH, i was continuously being offered less than $50k. It was unfortunate that i had to turn down those positions but i had to remind myself my worth. I also believe another barrier was competing with other grad students for jobs around the D.C Metropolitan area. I was competing not only with other students from George Mason but John Hopkins, UMD, George Washington, VCU, Virginia Tech. With the COVID-19 pandemic, more people were entering the public health workforce, making it difficult to stand out
LS3	Required experience years, data management requirements made me nervous and hesitant to apply as well.	Other coding languages (other than R) being required. Not many entry level positions at the time I was applying. Not many jobs in One Health field.
LS1	It's is very competitive, the application process can be rather challenging and confusing.	Once I enrolled in an MPH program that really opened up the doors for employment opportunities in addition to my professional experience.
LS1	Required many years for an entry-level position. Low pay, not enough for cost-of-living.	The qualifications needed, tough job market.

LS2	Not having all of the experience needed for the roles i was applying to. Lack of accessibility to a role , as a recent graduate most entry level jobs in public health required more years of experience than possible for a recent graduate	The biggest barrier is that there was not a lot of true entry level public health positions for someone who only has a bachelor's and not many years of experience. The few that would be found had very low pay compared to retail workers or required way more experience than I had as a recent graduate.
LS1	Saturation of the marketplace and asking for more experience than just a degree	Entry Level positions are requiring more experience than I have coming right out of graduate school. Those with more experience are starting in entry level jobs, eliminating people like myself with degrees and internship experience only.
LS1	Job asking a lot of experiences even for entry level jobs, no referrals or connections in the organization	Preference to citizens only, No response, No clear reasons of rejections
LS2	Lack of work experience	Job experience, employers overwhelmingly wanted candidates with 5+ years experience for entry to intermediate level positions.

Comparison of Race/Ethnicity, Age and Gender to Employment Status

Table 8: Race, Ethnicity, Age, Gender and Employment Status of Recruitment Survey Respondents

Comparison of Race/Ethnicity, Age and Gender to Employment Status			
Q3 How would you best describe your Race/Ethnicity (select all that apply)	Q4 What is your age?	Q5 How do you best identify in terms of gender?	Q12 Which best describes the work setting in which you currently work?
Black/African American	26	Female	
White	28	Female	
Hispanic, Latino or Spanish origin of any race,White	25	Female	a. Local health agency
Black/African American,Non-Hispanic	40	Female	a. Local health agency
Hispanic, Latino or Spanish origin of any race	22	Female	a. Local health agency
Black/African American	24	Female	a. Local health agency
Asian, Non-Hispanic	25	Female	a. Local health agency
Black/African American	31	Female	a. Local health agency
Asian	28	Male	a. Local health agency
Asian, Native Hawaiian or other Pacific Islander	27	Male	b. State health agency
Asian	30	Female	f. Educational/academic institution
White	25	Female	f. Educational/academic institution
Hispanic, Latino or Spanish origin of any race	40	Female	f. Educational/academic institution
White	25	Female	g. Private nonprofit organization
Hispanic, Latino or Spanish origin of any race	22	Female	g. Private nonprofit organization
Black/African American	23	Female	h. Private for-profit organization
White	30	Male	j. Personal health service industry (Hospital, Rehabilitation Center, Assisted Living Facility, Dental Facility, Pharmacy, Outpatient facility, Physician's Office)
Black/African American	30	Female	j. Personal health service industry (Hospital, Rehabilitation Center, Assisted Living Facility, Dental Facility, Pharmacy, Outpatient facility, Physician's Office)
Some other race (please specify)	23	Female	j. Personal health service industry (Hospital, Rehabilitation Center, Assisted Living Facility, Dental Facility, Pharmacy, Outpatient facility, Physician's Office)
Decline to state	27	Female	k. Other (Please specify)
Black/African American	24	Female	k. Other (Please specify)
Black/African American	31	Female	l. I am not currently employed.

Asian, Hispanic, Latino or Spanish origin of any race	28	Female	l. I am not currently employed.
Asian	22	Female	l. I am not currently employed.
American Indian or Alaskan Native	30	Female	l. I am not currently employed.
Asian	22	Female	l. I am not currently employed.
White	24	Non-binary	l. I am not currently employed.
Asian	26	Female	l. I am not currently employed.
Asian	27	Male	l. I am not currently employed.
Hispanic, Latino or Spanish origin of any race,White	23	Female	l. I am not currently employed.
Black/African American	37	Female	l. I am not currently employed.

*Filled Cell=Not in United States

In the recruitment survey respondents 32% (10/31) responded that they were not currently employed. Two respondents did not provide employment status.

To understand the relationship of age to employment status, comparing a quantitative variable with a categorical variable, we employed a two-way table and looked at marginal and conditional distributions.

Table 9: Marginal Distribution of AGE and EMPLOYMENT STATUS

Marginal Distribution of AGE and EMPLOYMENT STATUS			
	Employment Status		
Age	Employed	Unemployed	Total
22	2	2	4
23	2	1	3
24	2	1	3
25	4	0	4
26	0	1	1
27	2	1	3
28	1	1	2
30	3	0	3
31	1	1	2
37	0	1	1
40	2	0	2
Total	19	9	28

We visualized the marginal distribution in a stacked bar chart. While there are some difference across the varying ages we do not see any distinct patterns in employment status as it relates to age.

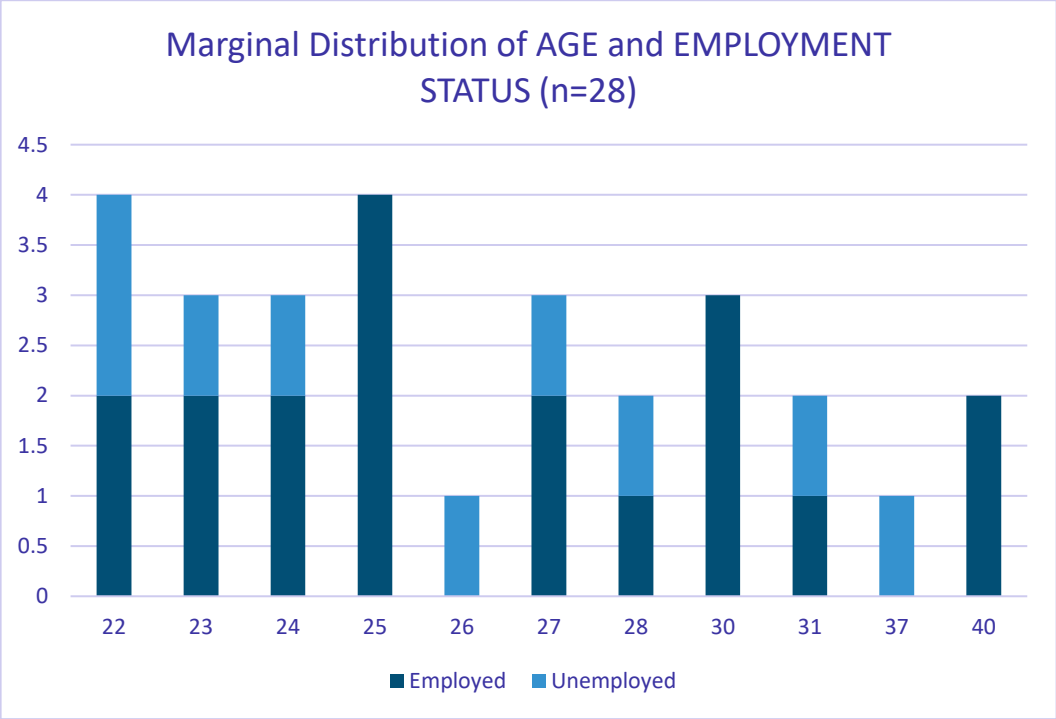


Figure 23: Marginal Distribution of AGE and EMPLOYMENT STATUS

Table 10: Conditional Distribution of AGE given EMPLOYMENT STATUS and Conditional Distribution of EMPLOYMENT STATUS given AGE

Conditional Distribution of AGE given EMPLOYMENT STATUS		
	Employment Status	
Age	Employed (n) %	Unemployed (n) %
22	(2) 10.5%	(2) 22.2%
23	(2) 10.5%	(1) 11.1%
24	(2) 10.5%	(1) 11.1%
25	(4) 21.1%	(0) 0.0%
26	(0) 0.0%	(1) 11.1%
27	(2) 10.5%	(1) 11.1%
28	(1) 5.3%	(1) 11.1%
30	(3) 15.8%	(0) 0.0%
31	(1) 5.3%	(1) 11.1%
37	(0) 0.0%	(1) 11.1%
40	(2) 10.5%	(0) 0.0%
Total	(19) 100%	(9) 100%

Conditional Distribution of EMPLOYMENT STATUS given AGE			
	Employment Status		
Age	Employed (n) %	Unemployed (n) %	Total
22	(2) 50.0%	(2) 50.0%	(4) 100%
23	(2) 66.7%	(1) 33.3%	(3) 100%
24	(2) 66.7%	(1) 33.3%	(3) 100%
25	(4) 100.0%	(0) 0.0%	(4) 100%
26	(0) 0.0%	(1) 100.0%	(1) 100%
27	(2) 66.7%	(1) 33.3%	(3) 100%
28	(1) 50.0%	(1) 50.0%	(2) 100%
30	(3) 100.0%	(0) 0.0%	(3) 100%
31	(1) 50.0%	(1) 50.0%	(2) 100%
37	(0) 0.0%	(1) 100.0%	(1) 100%
40	(2) 100.0%	(0) 0.0%	(2) 100%

The conditional distribution of age given employment status shows that there is double the percent (22%) unemployed persons at age 22 versus other ages in our dataset with ages 25 (21%) and 30 (16%) have the highest percentage in employed status.

Table 11: Recruitment Survey Respondents' Race and Employment Status

Race	Respondents (31)	Employed (19)	Unemployed (10)
White	6	4 (21%)	1 (10%)
Black	9	6 (32%)	2 (20%)
Asian	9	4 (21%)	5 (50%)
Hispanic	4	3 (16%)	1 (10%)
Other	3	2 (10%)	1 (10%)

To understand the relationship between race and employment status we correlated the data in a correlation matrix and then ran a multiple regression model on the data. However, before we could do this, dummy coding was performed on categorical variables.

Table 12: Dummy Coding for Race, Gender and Employment Status of Recruitment Survey Respondents

Person	White	Black	Hispanic	Asian	Other	Female	Male	Nonbinary	Employed	Unemployed
1	1	0	0	0	0	1	0	0	1	0
2	0	1	0	0	0	1	0	0	1	0
3	0	0	1	0	0	1	0	0	1	0
4	0	1	0	0	0	1	0	0	1	0
5	0	0	0	1	0	1	0	0	1	0
6	0	1	0	0	0	1	0	0	1	0
7	0	0	0	1	0	0	1	0	1	0
8	0	0	0	1	0	0	1	0	1	0
9	0	0	0	1	0	1	0	0	1	0
10	1	0	0	0	0	1	0	0	1	0
11	0	0	1	0	0	1	0	0	1	0
12	1	0	0	0	0	1	0	0	1	0
13	0	0	1	0	0	1	0	0	1	0
14	0	1	0	0	0	1	0	0	1	0
15	1	0	0	0	0	0	1	0	1	0
16	0	1	0	0	0	1	0	0	1	0
17	0	0	0	0	1	1	0	0	1	0
18	0	0	0	0	1	1	0	0	1	0
19	0	1	0	0	0	1	0	0	1	0
20	0	1	0	0	0	1	0	0	0	1
21	0	0	0	1	0	1	0	0	0	1
22	0	0	0	1	0	1	0	0	0	1
23	0	0	0	0	1	1	0	0	0	1
24	0	0	0	1	0	1	0	0	0	1
25	1	0	0	0	0	0	0	1	0	1
26	0	0	0	1	0	1	0	0	0	1

27	0	0	0	1	0	0	1	0	0	1
28	0	0	1	0	0	1	0	0	0	1
29	0	1	0	0	0	1	0	0	0	1

Correlation Matrix

Table 13: Correlation Matrix of Categorial Variables of Race, Gender and Employment Status

	White	*Black*	*Hispanic*	*Asian*	*Other*	*Female*	*Male*	*Nonbinary*	*employed*	*Unemployed*
White	1									
Black	-0.2817181	1								
Hispanic	-0.1825742	-0.2468854	1							
Asian	-0.3061862	-0.4140393	-0.26833	1						
Other	-0.1550434	-0.209657	-0.13587	-0.22787	1					
Female	-0.275	0.28171808	0.182574	-0.28577	0.155043	1				
Male	0.08215838	-0.2468854	-0.16	0.380132	-0.13587	-0.87636	1			
Nonbinary	0.41403934	-0.1166424	-0.07559	-0.12677	-0.06419	-0.41404	-0.07559	1		
employed	0.1390759	0.12313776	0.079802	-0.29741	0.008214	0.052981	0.079802	-0.260494036	1	
Unemployed	-0.1390759	-0.1231378	-0.0798	0.297406	-0.00821	-0.05298	-0.0798	0.260494036	-1	1

Correlation analysis is used to show the strength of a linear relationship between variables. In our dataset the correlation matrix shows a positive correlation with being white, black, Hispanic and other with employment, while being Asian has a negative correlation for employment.

Multiple Regression

Table 14: Multiple Regression Results for Categorical Variables of Race, Gender and Employment Status

Regression Statistics	
Multiple R	0.305839846
R Square	0.093538012
Adjusted R Square	-0.099205653
Standard Error	0.497447187
Observations	29

Regression allows us to see a relationship in the form of an equation (e.g., linear equation). Goodness of fit measures in the regression statistics show that the data does not fit the linear regression equation well. Since we have multiple x variables, it is appropriate to use the Adjusted R Square which demonstrates the linear relationship between race and employment are not very strong with our dataset.

Table 15: ANOVA Results

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	5	0.612835249	0.12256705	0.619141318	0.686533419
Residual	24	5.938888889	0.2474537		
Total	29	6.551724138			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.666666667	0.287201267	2.32125252	0.02908679	0.073912384	1.259420949	0.073912384	1.259420949
White	0.133333333	0.363284061	0.36702225	0.716818753	-0.616448117	0.883114783	-0.616448117	0.883114783
Black	0.083333333	0.336773338	0.24744635	0.80666745	-0.611732674	0.77839934	-0.611732674	0.77839934
Hispanic	0.083333333	0.379931565	0.21933775	0.828241689	-0.700806876	0.867473543	-0.700806876	0.867473543
Asian	-0.222222222	0.331631458	-0.67008788	0.509198519	-0.906675911	0.462231467	-0.906675911	0.462231467
Other	0	0	65535	#NUM!	0	0	0	0

Table 16: Residual Output

RESIDUAL OUTPUT

Observation	*Predicted employed*	*Residuals*
1	0.8	0.2
2	0.75	0.25
3	0.75	0.25
4	0.75	0.25
5	0.444444444	0.555555556
6	0.75	0.25
7	0.444444444	0.555555556

8	0.444444444	0.555555556
9	0.444444444	0.555555556
10	0.8	0.2
11	0.75	0.25
12	0.8	0.2
13	0.75	0.25
14	0.75	0.25
15	0.8	0.2
16	0.75	0.25
17	0.666666667	0.333333333
18	0.666666667	0.333333333
19	0.75	0.25
20	0.75	-0.75
21	0.444444444	-0.444444444
22	0.444444444	-0.444444444
23	0.666666667	-0.666666667
24	0.444444444	-0.444444444
25	0.8	-0.8
26	0.444444444	-0.444444444
27	0.444444444	-0.444444444
28	0.75	-0.75
29	0.75	-0.75

The residuals show how far away the actual data points are from the predicted data points in the linear equation. We can see that many of the residuals values are high which equates to the model not being able to explain the observation. Further calculations that race does not have a linear relationship with employment in our dataset.

Appendix P – Incentives Email

Subject: Incentives for Participating in the CDC, NNPHI, HCC, Inc. Listening Session

Hello Public Health Professionals:

Thank you again for contributing to our CDC PH LEADS, NNPHI, HCC, Inc. Public Health Data Science and Leadership Listening Sessions last week.

As a demonstration of our appreciation for the value of your time, energy and contributions and our gratitude to you for sharing those with us, we would like to provide you with several incentives.

- The first is a certificate of contribution in your name
- The second is a letter to the recipient of your choice confirming your participation in the sessions, and describing the benefits received from your contributions
- The third is a 3-month gift subscription to the HeadSpace mindfulness and relaxation app.

To facilitate your receipt of these, please let us know by responding to this email by **November 10, 2023** the following:

1. The full name you wish to appear on your certificate.
2. The name and address of the person to who you would like us to address the letter, as well as the form of your name you would like to appear on the letter
3. The email to which you want us to send the HeadSpace subscription.

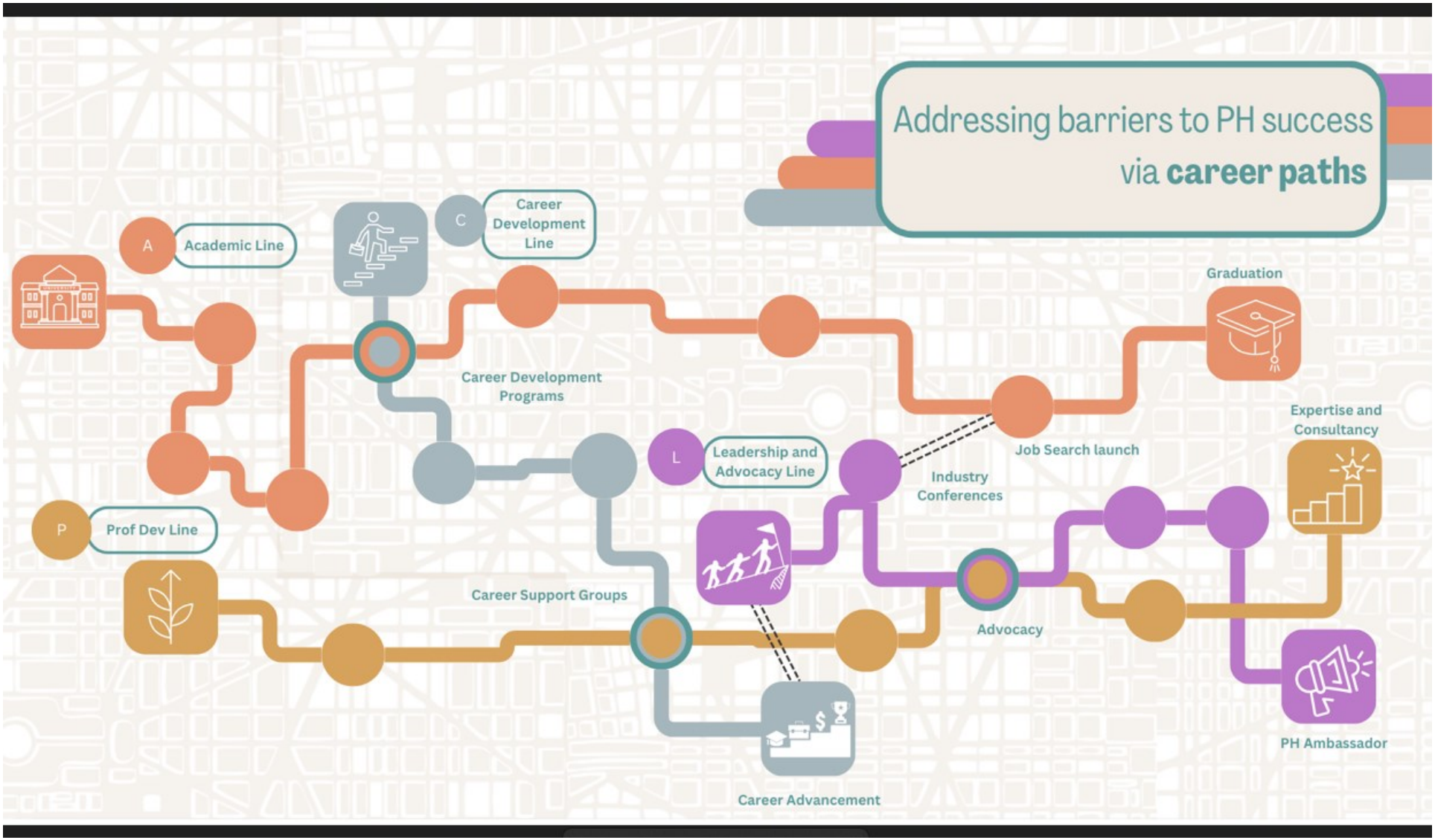
If you are not interested in receiving one or all of the incentives, that is ok too! Just let us know which you are interested in and provide the information needed for that one.

If you have any questions or concerns please let me know. Thank you again for assisting us in this important project!

With gratitude,
Sarah

--
Sarah D. Matthews, Ph.D. (she/her/hers)

Appendix Q - Visualization of Model Career Paths



Academic Line

Start: University Entrance
Station 1: Introductory Courses - Basic public health concepts.
Station 2: Technical Skills Workshops - Introduce GIS, statistical software, data visualization tools.
Station 3: Advanced Courses - In-depth public health studies with a focus on practical applications.
Station 4: **Career Development Programs** - Career boot camps, resume workshops, mock interviews.
Station 5: Practicums/Internships - Hands-on experience in real-world settings.
Station 6: Capstone Projects - Collaborative projects with industry partners. (**Connection to Industry Conferences**)
Station 7: **Job Search Launch**
End: Graduation

Career Entry Line

Start: **Career Development** in Academic institution
Job Search Launch
Station 1: Tailored Job Listings - Entry-level positions with clear experience requirements.
Station 2: Fair Hiring Processes - Blind recruitment, appropriate screening for entry-level.
Station 3: First Job Placement - Securing an initial position in public health.
Station 4: **Career Support Groups - Peer networking, mentorship connections**.
End: Career Advancement

Professional Development Line

Start: Continuing development (cross over to Career Development Station)
Station 1: On-the-Job Training - Learning new skills relevant to *current and emergent* public health issues and techniques.
Station 2: **Career Support Groups - Peer networking, mentorship connection**s
Station 3: Certifications and Specializations - Gaining additional qualifications.
Station 4: **Leadership Development** - Training for advocacy, management and supervisory roles.
Station 5: Cross-Sector Collaboration - Involvement in interdisciplinary projects.
End: Expertise and Consultancy

Leadership and Advocacy Line

Start: Professional Identity Formation
Station 1: Public Health Campaigns - Participating in or leading advocacy initiatives bridging PH organizations and communities.
Station 2: **Industry Conferences** - Presenting work, networking with a broader community.
Station 3: Policy Development - Contributing to public health policy discussions.
Station 4: **Leadership Development** - Advocacy; Becoming a voice for the profession in various forums, connection with **Career Support Groups/mentorship**
End: Public Health Ambassador

References

1. CDC. *Public Health Leadership and Education, Advancing Health Equity and Data Science* 2023 [cited 2023; Available from: https://www.cdc.gov/phleads/index.html.
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